Financial sector and household balance sheet dynamics:

Rethinking the determinants of income and wealth inequality in the USA since the 1980s

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The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

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Abstract

The aim of this thesis is to examine the link between financial sector transformation and rising inequality in the USA since the 1980s. The research hypothesis states that differences in household balance sheet structures across the distribution influenced inequality by generating disparities in rates of return and leverage among households. Balance sheet heterogeneity has been shaped by the changing nature of financial sector operations, deregulation, securitisation, and by privatisation and labour market liberalisation. The contribution of this thesis is to develop a theoretical and empirical account of financial sector transformation, wealth distribution, and interactions between income and wealth as the key determinants of inequality in the 21st century. We explicitly explore the intersectional dimension of this relationship with gender, racial, and intergenerational inequality. We develop a three-class stock-flow consistent model of inequality determination calibrated to the US economy to account for the growing wealth heterogeneity among households in the Post-Keynesian macro-models. We observe that differences in wealth composition in the household sector result in higher levels and more adequate patterns of income and wealth inequality than in scenarios without the proposed features. This finding is empirically supported by parametric and non-parametric approaches using data from the U.S. Survey of Consumer Finances between 1989 and 2013. Linear regression analysis finds that dependence on non-financial assets and unsecured debt is associated with lower household income relative to the median, while greater relative holdings of business equity, high-yielding financial assets, and secured debt are related to higher increases in the median income ratio, although these effects are not shared equally across gender, race, and generations. Moreover, inequality decomposition analysis reveals that assets, particularly business equity, high-yielding financial assets, and housing, contribute more to inequality than liabilities. The thesis concludes by analysing policy responses to alleviate inequality in light of the research findings.

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Abbreviations

ABS	Asset-backed securities
BEA	U.S. Bureau of Economic Analysis
CFPB	Consumer Financial Protection Bureau
CBO	Congressional Budget Office
CDAs	Child Development Accounts
CDO	Collateralised Debt Obligations
CDS	Credit Default Swaps
DSY	Debt-service-to-income ratio
FIRE	Finance, insurance, and real estate sector
FRB	Federal Reserve Bank
G20	Group of Twenty
GDP	Gross Domestic Product
IDAs	Individual Development Accounts
IMF	International Monetary Fund
ITEP	Institute on Taxation and Economic Policy
JCHS	Joint Center for Housing Studies
IRA	Individual Retirement Account
IRS	Internal Revenue Service
LAD	Least Absolute Deviation
LCT	Life-cycle theory of consumption
MBS	Mortgage-backed securities
OB	Oaxaca-Blinder decomposition
OECD	Organisation for Economic Co-operation and Development
OLG	Overlapping generations model
OLS	Ordinary Least Squares
PEU	Primary economic unit
PIH	Permanent income hypothesis
POLS	Pooled Ordinary Least Squares
PSID	Panel Study of Income Dynamics
QE	Quantitative easing
QR	Quantile regression
RBD	Regression-based decomposition
RIH	Relative income hypothesis
RMSE	Root Mean Squared Error
SCF	U.S. Survey of Consumer Finances
SFCM	Stock-flow consistent modelling
SIFMA	Securities Industry and Financial Markets Association
SPVs	Special Purpose Vehicles
USA	United States of America
USAs	Universal Savings Accounts
WLS	Weighted Least Squares

Note

Due to the extensive amount of data presented in certain parts of this thesis, longer tables were moved to appendices for clarity and ease of reading, and a separate list of contents is provided.

Introduction

i. Motivation and aims of research

This thesis examines the determinants of wealth and income inequality in the USA since the 1980s. Its main purpose is to analyse how inequality has been influenced by changes in the operations of financial sector observed in the USA since that period. It argues that financial sector transformation, defined as the development of financial deregulation, structured finance, transformation of the role and nature of financial intermediaries, and increasing financial commitments of households since the 1980s, has shaped inequality by generating disparate wealth accumulation possibilities across the population, which has been aided by broader liberalisation measures in the US economy since the 1980s.

The principal motivation to explore the relationship between finance and inequality in the US context arises because the USA has been characterised by some of the highest levels of income and wealth inequality among the advanced economies, and its financial sector is one of largest in the world, being at the forefront of financial deregulation and innovation since the 1980s. Moreover, it has one of the best available data on wealth at the household level, spanning several decades. Importantly, study of the USA enables exploration of the intersection of wealth inequality with the racial, gender, and intergenerational disparities, which have not been extensively integrated into the studies of inequality in Europe and have not been resolved in the US-centred debates. For these reasons, the USA yields itself as an informative case study of the link between financial commitments of households and inequality.

The key research hypothesis of this study is that differences in household balance sheet composition associated with financial sector transformation have contributed to increasing income and wealth inequality by influencing disparities in leverage levels and returns to wealth depending on the absolute size of wealth holdings. This is because the accumulation of high-yielding financial assets and business equity have required large initial downpayments, which could only be afforded by households with sizeable stock of wealth. Simultaneously, low- and middle-income households have increasingly relied on homeownership to make up for sluggishly growing earnings and deepening employment insecurity, often becoming dependent on debt to finance expenditure. This reliance on highly leveraged homeownership has not been accidental, as mortgage lending constituted the basis of high-yielding securitised instruments, which have been accumulated by households at the top of the distribution. A vicious cycle has emerged, where both the demand and the supply of credit have reinforced each other, pushing many households into unsustainable indebtedness, which benefited the wealthy financial investors. Increasing leverage

levels among households towards the middle and the bottom of the distribution led to broader macroeconomic instability, which culminated in the Great Recession. However, while the 2007 financial crisis brought a check on the mortgage securitisation trade, the ability of the financial sector to generate high returns for the narrow group of beneficiaries has not been reigned in. Similar securitisation mechanisms are now being reproduced in other parts of the credit market, this time for unsecured debt. Consequently, wealth ownership and leverage continue to define the prosperity and financial stability of households across the distribution. In this context, the thesis aims to analyse the precise mechanisms through which differences in asset and debt ownership across households have shaped inequality. To achieve this purpose, we intend to answer the following research questions:

(1) How has financial sector transformation influenced income and wealth distribution in the USA since the 1980s?

(2) How do differences in ownership of wealth shape inequality?

(3) Which types of assets and liabilities are held by the US households at different points of the income distribution and how has this balance sheet composition changed over time, particularly in light of the 2007 financial crisis?

In addition to these research questions, we aim to evaluate the policy implications of our findings. Specifically, we analyse how economic policy can effectively alleviate wealth and income inequality in the USA in the context of the increasing heterogeneity of household wealth composition resulting from financial sector transformation.

ii. Inequality as the defining challenge of our time

There are strong economic arguments in favour of a more equal distribution of income and wealth. The relationship between equality and economic growth has long been debated in the economic literature. For classical economists, the aggregate amount of wealth (in terms of inheritance) is positively related to the equality of wealth distribution (Smith [1776] 1994; Sismondi [1824] 1957; Mill [1848] 1965). Furthermore, inequality has been argued to impede growth and contribute to macroeconomic instability, as evidenced by the 2007 financial crisis. From the Kaleckian aggregate demand perspective, redistribution of income and wealth towards poorer households would contribute to higher economic growth as they consume a larger part of their income and wealth than the rich (Kalecki 1954; Onaran/Galanis 2014). However, with the rise of the neoliberal economic paradigm in the 1980s, inequality came to be seen as a necessary evil, reflecting differences in the marginal contribution to productivity among economic agents (Okun 1975; Bénabou 1996; Barro 2000). In this view, inequality is positively related to economic growth as

higher savings of the rich translate into investment. Consequently, this paradigm argues that redistributive policies aiming at reducing inequality would distort economic incentives for the accumulation of savings and thus impede growth.

Empirical evidence tends to contradict the neoliberal case and support the presence of a negative relationship between inequality and economic growth (Alesina/Rodrick 1994; Persson/Tabellini 1994; Li *et al*. 1998; Ostry *et al*. 2014). Inequality has been shown to induce economic volatility as income concentration at the top has contributed to unsustainable household debt accumulation and increased the propensity to speculate, which has magnified the devastating impact of the Great Recession across the economy (Kumhof/Ranciere 2010; Mian/Sufi 2010, 2013; Rajan 2010; Gurrieri/Lorenzoni 2011; Kim 2013; Mian *et al.* 2013; Stockhammer 2015; Goda *et al*. 2016; see Van Treeck/Sturn 2012 for a review).

Moreover, research has shown that policies aiming to reduce inequality by limiting high incomes would not lower economic growth. This is because additional money does not provide incentives to work at such high level of pay, which challenges the neoliberal argument (Piketty 2014:512). Rather, the incremental income and wealth at the top of the distribution constitute rents earned from high economic power of the rich rather than a fair reward for their contribution to the production process (Stiglitz 2012). Recent research by IMF (2017) finds that introduction of progressive income and transfer taxes would not slow down growth.

Consequently, the concentration of power related to the rising inequality creates significant political costs as it is fundamentally undemocratic. This is because the doctrine of "one man, one vote" becomes replaced by the principle of "one dollar, one vote", as the rich are increasingly able to influence the political process through campaign donations and lobbying. Empirical evidence has found that higher inequality reduces voter turnout and discourages political participation, which further undermines the democratic process (Boix 2003; Blais 2006; Solt 2008).

In addition to these economic and political concerns, a large body of empirical evidence reveals considerable social costs of inequality. Unequal distribution of income and wealth is related to poorer public health, contributing to lower life expectancy, higher infant mortality rates, and greater incidence of obesity in the society (Wilkinson 1996; Marmot 2010; Offer *et al*. 2012). Furthermore, income and wealth inequality threaten social cohesion by reducing social trust and exacerbating discrimination and crime (Rothstein/Uslaner 2005; Pressman 2016:50-51). Moreover, inequality may discourage family formation, as low incomes are associated with falling birth rates and increased likelihood of divorce (Livingston 2011; Pressman 2016:51). Importantly, research shows that unequal societies suffer from low social mobility, which suggests that the costs of inequality are passed on to the future generations (Wilkinson/Pickett 2010).

Given these economic, political, and social concerns, inequality alleviation would bring real improvement not only to the living conditions and economic prospects of those at the bottom of the distribution, but also to the wellbeing of the society as a whole. Consequently, combating inequality should be at the top of the US policy agenda. Nevertheless, despite the former US president Barack Obama calling inequality "the defining challenge of our time"[1], not enough has been done to boost incomes and wealth of the low- and middle-income households, reduce their dependence on debt, and curb the ability of the financial sector to generate high returns to wealth for households at the top of the distribution. The prospects for reducing inequality are further impeded by the subsequent administration's commitment to cutting corporate and personal taxation[2], reducing the public financing of healthcare[3], and rolling back financial regulation implemented by the Dodd-Frank Act after the 2007 crisis[4]. In this context, research on the determinants of inequality as undertaken in this thesis is timely. It is only through understanding what drives inequality that adequate policy responses can be formulated to combat social injustice and foster economic fairness for the society today and in the future.

iii. Contribution to the literature

The main contribution of this thesis is to rethink the determinants of inequality in the context of the increasing power of the financial sector, taking the USA as the case study. Firstly, it is one of the few studies highlighting the need to look beyond the distribution of income towards wealth in order to understand rising inequality in modern times. The distinction between income and wealth has not been sufficiently explored in the existing literature on inequality and the two terms are often conflated. This study argues that there are fundamental differences between the economic concepts of income and wealth. It emphasises that in the context of rising financial commitments of households observed in the USA since the 1980s the interaction between wealth and income has been the key driver of economic inequality. This is because differences in wealth composition generated disparate leverage levels and capital income flows as returns to wealth became dependent on its absolute size.

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[1] Speech to the Center for American Progress, 4th Dec 2013. Transcript available at: https://obamawhitehouse.archives.gov/the-press-office/2013/12/04/remarks-president-economic-mobility

[2] https://www.whitehouse.gov/bringing-back-jobs-and-growth

[3] https://www.whitehouse.gov/repeal-and-replace-obamacare

[4] The Financial CHOICE Act of 2017 (https://www.congress.gov/bill/115th-congress/house-bill/10). See also: https://www.whitehouse.gov/the-press-office/2017/02/03/presidential-executive-order-core-principles-regulating-united-states, https://www.whitehouse.gov/the-press-office/2017/02/03/presidential-memorandum-fiduciary-duty-rule, https://www.whitehouse.gov/the-press-office/2017/04/21/presidential-memorandum-secretary-treasury-0

Secondly, at the theoretical level, this study builds on the Post-Keynesian macro-modelling literature to develop a new theory of inequality determination within the stock-flow consistent modelling framework, accounting for the heterogeneity of household wealth composition and the complexity of financial sector operations. It proposes a new conceptualisation of the household sector based on the balance sheet composition rather than income sources, introducing a third class of leveraged homeowners into the dominant two-class taxonomy of the Post-Keynesian macro-models. It also incorporates the Post-Keynesian assumption of the social dependence of consumption, distinguishing between different motives for debt accumulation across households. The proposed stock-flow consistent model is calibrated to the US data, and is able to reproduce the patterns of income and wealth inequality observed in the real life. The model generates inequality endogenously through introducing disparities in wealth ownership across households, which generate differences in capital income receipts depending on the size of wealth holdings. It shows that analysis which does not account for household wealth heterogeneity cannot fully explain the high levels of income and wealth inequality observed in the USA.

Thirdly, the thesis contributes to the literature by testing the implication of the stock-flow consistent model through an innovative applied analysis of inequality using household level data from the U.S. Survey of Consumer Finances between 1989 and 2013. It develops stylised facts of the differences in household wealth composition observed in the USA since the 1980s. Moreover, the empirical contribution is to apply the existing methods of linear regression analysis and non-parametric estimation to a new research problem, evaluating the relationship between income polarisation and wealth composition. Moreover, we extend the inequality decomposition analysis, which is traditionally focused on income, to examine the determinants of wealth inequality. We explicitly focus on the intersectional dimension of wealth heterogeneity, analysing the role of balance sheet composition in driving wealth and income inequality across class, gender, race, and generations.

Finally, the thesis links its theoretical and empirical findings with the current policy debate in the literature. In addition to providing a detailed overview of the existing policy proposals to reduce wealth inequality, the contribution of the thesis is to evaluate the policy implications in light of its research findings regarding the distributional role of household wealth heterogeneity, considering the impact of the proposed policies on wealth disparities across class, gender, race, and generations.

iv. Structure of the thesis and summary of findings

The thesis is structured as follows. Chapter 1 documents the increase in wealth and income inequality in the USA since the 1980s and provides a detailed account of changes in the financial

sector operations in this period. Based on this narrative, we develop the research hypothesis regarding the nexus between finance and inequality, specifying that financial sector transformation has contributed to rising inequality through shaping differences in household wealth accumulation possibilities across the distribution. The chapter illustrates this hypothesis by developing stylised facts of the evolution of household balance sheet composition in the USA since the 1980s across class, gender, race, and generations. Given the evident polarisation of income and wealth at the top decile of the income distribution, and among households headed by men, Whites, and those aged 35 and above, we show that differences in balance sheet composition have generated disparities in income and wealth through unequal leverage levels and capital gains flows.

Chapter 2 examines how the existing economic theory explains inequality and to what extent it incorporates finance and household wealth heterogeneity in analysing the determinants of income and wealth distribution. We distinguish between two main strands of the relevant literature. Firstly, we review the macroeconomic approaches to distribution, which highlight the role of markets (Galbraith 2012), government policy (Stiglitz 2012), relative returns to income and wealth (Piketty 2014), and relationship to the production process (the Post-Keynesian literature) in generating inequality. We argue that while these approaches appreciate the role of finance and socio-institutional structures in influencing income inequality, the impact of household wealth heterogeneity on the distribution of income and wealth is not sufficiently explored. Secondly, to gauge the determinants of wealth distribution we analyse the microeconomic theories of consumption and household portfolio decisions. We argue that while the mainstream life-cycle theory and the permanent income hypothesis shed light on the determinants of household wealth accumulation, they do not consider the socio-institutional context influencing household portfolio choices. Based on this literature review, we argue that the Post-Keynesian macroeconomic approach combined with the Post-Keynesian insights into the social dependency of household consumption behaviour provides the most appropriate foundation for the extension of the economic theory of inequality to account for the role of household wealth heterogeneity and financial sector transformation.

Chapter 3 develops a stock-flow consistent model of inequality determination incorporating differences in household balance sheet composition and financial sector complexity. We adopt the stock-flow consistent modelling methodology because it incorporates both the real and the financial side of the economy and its integrated balance sheet analysis yields itself to the examination of the impact of household wealth heterogeneity on distribution. Based on the stylised facts developed in the balance sheet analysis in Chapter 1, we propose a new conceptualisation of households in the Post-Keynesian macro-models based on the balance sheet composition rather than income sources. The heterogeneity of wealth structures is incorporated by introducing a third

class of households, identified with the new middle class of leveraged homeowners emergent in the subprime lending boom. We assume that mortgages given to the middle class are the basis of the securitisation processes in the model, and are socially determined by relative consumption concerns. The model is solved through simulations, and is calibrated to the US data to reflect the conditions in the US economy. The model shows that greater household wealth heterogeneity owing to the financial sector complexity generates higher levels of inequality and macroeconomic fragility than scenarios without these features. We show that this occurs because of the emergent disparities in the flows of income across the household groups associated with the size of wealth holdings. We note that the caveat of our model is its high level of aggregation, which limits the ability to account for the social dimension of wealth distribution in determining inequality.

Chapter 4 undertakes the empirical test of the model implications from the previous chapter using household data from the nine waves of the U.S. Survey of Consumer Finances between 1989-2013. The empirical analysis of the research hypothesis is conducted in two stages in order to provide a comprehensive examination of the role of wealth composition in determining wealth and income inequality. To address the limitation of the stock-flow consistent model, we explicitly analyse the social dimension of class, gender, race, and generations associated with the distributional impact of wealth heterogeneity.

Firstly, we apply linear regression analysis using the pooled ordinary least squares estimation to examine the statistical significance of the relationship between household wealth composition and relative inequality, measuring the position of households in the distribution of income relative to the median. We find that greater relative holdings of high-yielding financial assets, business equity, and secured debt are associated with higher relative inequality, while reliance on housing and unsecured debt pushes household income towards the bottom of the distribution. These effects are estimated to have been generated in the subprime lending boom between 2001-2007, and are found to be stronger for males, Whites, and households aged 35 and over. As endogeneity issues and sensitivity to extreme values pose problems to the regression analysis, we test the robustness of these findings using the quantile regression and the non-parametric Theil-Sen median slope estimation. We find that the majority of our results are robust in their sign and significance, although the magnitude of the estimates tends to be lower in the median quantile regression compared to the pooled OLS and the non-parametric estimation.

Secondly, we use inequality decomposition analysis to assess the contribution of different assets and debt to the overall measures of income and wealth inequality between 1989-2013. We apply the non-parametric Shorrocks decomposition and the regression-based Fields decomposition to provide a robust analysis of the influence of different balance sheet items and their associated

income flows to inequality. Moreover, we apply the Oaxaca-Blinder decomposition to analyse which types of wealth determine inequality across class, gender, race, and generations. We thus explore the social dimension of the distributional consequences of wealth heterogeneity, which was not considered in the stock-flow consistent model in Chapter 3. Moreover, by decomposing the gap in income and wealth between the top 10% and the bottom 90%, and between the bottom 20% and the top 80% of the income distribution, we test the validity of the new conceptualisation of households based on their wealth composition proposed in the stock-flow consistent model.

Overall, we find that differences in capital income ownership, particularly business equity and capital gains, explained the largest portion of income inequality between 1989-2013, although the contribution of wage inequality has been increasing over time and was particularly important in the regression-based decompositions. Moreover, we establish that disparities in asset ownership, particularly business equity and primary residence, contribute more to wealth inequality than disparities in debt, although the latter explained a sizeable part of wealth inequality across gender. We also find that the contribution of financial assets, especially pension wealth, has increased over time. Furthermore, the analysis supports the distinction of the third class of leveraged homeowners from the working class, and the introduction of the rentier wage in the stock-flow consistent model.

Chapter 5 discusses the policy implications of our research findings and evaluates the existing policy measures to reduce inequality. We review current proposals of income and wealth taxation, and asset-based welfare policies found in Piketty (2014), Atkinson (2015), Galbraith (2012, 2016), and Stiglitz (2012, 2014). Given our finding that rising heterogeneity of household wealth composition contributed to inequality, we support policies which explicitly target wealth inequality alongside income because measures that do not address the size of wealth holdings cannot reduce high returns earned by households at the top of the distribution. We discuss the social implications of the reviewed policies across gender, race, and generations, as well as potential obstacles to implementation. In light of our findings, we argue that effective reduction in wealth and income inequality can be achieved through a mix of progressive taxation of wealth holdings and transfers, complemented by higher marginal rates of personal and corporate income taxes, and policies explicitly addressing the distribution of market wealth through affordable asset accumulation, personal debt relief, and coordinated fiscal-monetary policy. We note that promoting sustainable asset ownership, extending wage income tax credits, and developing more inclusive social security, subsidised savings, and debt relief programs are particularly important for tackling wealth inequality across gender, race, and generations. The chapter concludes with an appeal for a proactive government policy to foster shared values of social justice in the society to achieve a sustainable reduction in wealth and income inequality in the USA and at the global level.

Chapter 1

The finance-inequality nexus

In this chapter, we document the rise of income and wealth inequality in the USA, using the U.S. Survey of Consumer Finances between 1989-2013. We link the observed patterns of inequality with the account of changes in the nature of financial sector operations occurring in the USA since the 1980s. We develop the original theoretical framework of the thesis, which argues that financial sector transformation has influenced inequality in the USA by shaping differences in wealth accumulation possibilities and balance sheet fragility across households. This research hypothesis is illustrated by examining changes in the ownership and value of various components of income, assets, and debt. We show that wealth and income inequality across households was associated with differences in wealth composition, which generated unequal income flows depending on the absolute size of wealth holdings. This is because asset portfolios of households in the top of the income distribution consisted primarily of high-yielding assets and secured debt, while households towards the middle and the bottom of the distribution became reliant on leveraged homeownership, low-yielding assets, and unsecured debt. Consequently, they enjoyed lower increases in capital income and suffered from greater relative indebtedness driven by unsustainable accumulation of housing before the Great Recession compared to the rich. We observe that this had a clear social dimension, as wealth disparities deepened across gender, race, and generations. We conclude that wealth heterogeneity is an important determinant of inequality in times of financial sector transformation, arguing that analyses which do not explicitly consider wealth distribution cannot fully explain the rise in income and wealth inequality in the USA since the 1980s.

1.1. Trends in inequality in the USA since the 1980

Measurement of inequality is a complex task and can be considered along a variety of dimensions, e.g. economic (measured in monetary terms) vs. social (e.g. access to healthcare), personal (among individuals/households) vs. functional (between factors of production, i.e. labour and capital). Inequality can be broadly understood as a deviation from some definition of equality, such as the difference between several quantitative magnitudes (cf. Cowell 2009). However, the ideas of the precise nature of (in)equality depend on the ideological and the social context of investigation. In this thesis we focus on the monetary aspect of inequality, measured in terms of the differences in income and wealth across households. We appreciate that monetary inequality carries a range of social implications. For this reason, we examine disparities in income and wealth across the dimensions of class, gender, race, and generations. In doing so, we aim to observe if the analysed

differences are larger in some of these dimensions than in others, and whether there are any common trends in inequality across these dimensions. We distinguish between income and wealth in order to precisely analyse what factors are responsible for the observed differences in monetary inequality in each of these dimensions.

Analysis of the data from the U.S. Survey of Consumer Finances reveals that income and wealth inequality in the USA increased between 1989 and 2013. The survey is conducted at the household level every three years and its methodological features are explained in more detailed at the beginning of Chapter 4. Income is reported before transfers and taxes, measured for the calendar year prior to the survey wave, while wealth is measured at the time of the interview as the difference between assets and liabilities (net worth). In the discussion below we use multiple inequality indicators in order to provide the most comprehensive picture of the trends in inequality over time. Firstly, we report changes in the distribution of income and wealth, analysing overall inequality indices[5], distributional rankings using the generalised Lorenz curve[6], and shares of income, assets, and debt held by various households[7]. Explicit attention is paid to measurement differences between income and wealth, as many of the conventional indicators of income inequality cannot encompass the negative and zero values often encountered in the measurement of net worth. Secondly, we present the corresponding changes in inequality of the various types of income sources, assets, and debt, in order to understand the distribution of the individual components of income and wealth over time.

1.1.1. Measures of inequality

Overall inequality indices are commonly used in the literature to summarise the distribution of income or wealth in a single easily comparable indicator. Below, we report the Gini coefficient, the Atkinson index, and half of the squared coefficient of variation. The advantage of using several indicators is that each of the overall inequality indices gives a distinct insight into changes at different points of the distribution[8].

The Gini index is the most sensitive to transfers between households in the middle of the distribution. It is based on the Lorenz curve, which represents the proportion of the variable in question (e.g. income) held by a cumulative share of the population ranked from the poorest to the

[5] The analysis was conducted using STATA module *ineqdeco* for income and *ineqdec0* for net wealth developed by Jenkins (1999).
[6] The analysis was conducted using STATA module *svylorenz* developed by Jenkins (2005) for income and manually by calculating mean of net worth across deciles for wealth.
[7] The analysis was performed using STATA module *pshare* developed by Jann (2016).
[8] Detailed equations for calculating each of these measures are included in Chapter 3, subsection 3.3.6.

richest (also called the Pen's Parade; cf. Cowell 2009:25-26). The Gini coefficient measures the distance between the Lorenz curve and the 45-degree line of perfect equality, where each population share is assumed to receive a symmetrical proportion of the overall income or wealth. The Gini index can be thus understood as the average difference between all possible pairs of income or wealth in the population expressed as a share of the total (*ibid*.). It ranges from 0 (perfect equality) to 1 (perfect inequality). The Gini index satisfies a range of desirable properties such as mean independence (inequality measured by the index would not change if all incomes were multiplied by the same constant), independence from the population size, symmetry (swapping incomes among population members would not change inequality), and the Pigou-Dalton transfer rule (transfer of income from the rich to the poor reduces inequality). Importantly, the Gini coefficient is well-defined when negative values are present, as in the distribution of wealth. Nevertheless, in the presence of negative observations the index may take unusually large values or even exceed 1 (Jenkins/Jäntii 2005:16). A further drawback of the Gini index is that it is not easily decomposable (the total population Gini is not equal to the Gini coefficients of population subgroups) and its sensitivity to transfers in the middle of the distribution may not provide an accurate picture of inequality if the latter is driven by changes at either the top or the bottom of the distribution.

An alternative overall inequality indicator is provided by Atkinson (1970). The Atkinson index constitutes a welfare-based measure of inequality, which is associated with the sensitivity parameter ε, typically taking values $\varepsilon \in [0.5, 1, 2, 2.5]$. The index ranges from 0 (equal distribution) to 1, and represents the proportion of total income which the society would have to forgo to achieve a more equal distribution. The higher the value of ε, the greater the sensitivity of the index to transfers at the bottom of the distribution and the greater the aversion to inequality in the society (Afonso *et al*. 2015). Consequently, in the analysis below we report the Atkinson index with $\varepsilon=2$. The index satisfies the principles of mean and population independence, symmetry, and the Pigou-Dalton transfers, and is also decomposable. However, its analytical usefulness is limited to income, as the index cannot account for zero or negative values, which are often associated with wealth (Wittenberg/Leibbrandt 2017).

Finally, the overall inequality measure capturing the importance of transfers at the top of the distribution can be identified with the half of the coefficient of variation squared. This measure is derived from the coefficient of variation, which represents the standardised variance of the variable in question and is calculated by dividing the standard deviation of the variable by its

mean, thus satisfying the mean independence criterion[9] (Brewer/Wren-Lewis 2016:293). Hence, half of the coefficient of variation squared represents the dispersion of a variable around its mean[10], scaled by two for the convenience of presentation. The coefficient ranges from 0 to ∞, with higher values corresponding to higher inequality (World Bank 2005:99). The indicator comes from a family of the generalised entropy measures of inequality, which, similarly to the Atkinson index, are characterised by the sensitivity parameter α, typically taking values $\alpha \in [-1, 0, 1, 2]$. The higher the value of α, the greater the sensitivity of the measure to changes at the top of the distribution. Half of the coefficient of variation squared corresponds to the generalised entropy indicator with α=2. The measure satisfies the above desirable properties of inequality measurement, and in addition it is fully decomposable and can handle negative values of wealth. However, its disadvantage is that it can be sensitive to very high values of the variable in question (Jenkins/Jäntti 2005:16). This, coupled with the lack of the upper bound of the measure, may render comparisons using half of the coefficient of variation squared more difficult.

1.1.2. Changes in income and wealth inequality in the USA since the 1980s

Figure 1.1 presents the evolution of the Gini coefficients for income and wealth between 1989 and 2013. The data show that not only has wealth inequality been persistently higher than income inequality but it has also increased more rapidly over time, particularly after the Great Recession.

The Gini index for income increased from 0.54 to 0.574 over the whole period, rising by 6.3% between 1989 and 2007. The Gini index for wealth rose from 0.79 in 1989 to 0.85 in 2013. The trends in income and wealth inequality were dramatically different during the Great Recession. While the Gini index for income fell from 0.574 to 0.549 between 2007 and 2010, the Gini coefficient for wealth continued to rise, increasing from 0.816 in 2007 to 0.846 in 2010.

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[9] This standardisation is necessary as variance itself does not satisfy the mean independence criterion – doubling all incomes would in fact quadruple the variance, which follows from the formula: $\sigma^2 = \frac{1}{n}\sum_{i=1}^{n}(y_i - \bar{y})^2$.

[10] This comes from the statistical properties of the standard deviation and variance. The coefficient of variation CV is equal to: $CV = \frac{\sigma(x)}{\bar{x}}$, where $\sigma(x)$ is the standard deviation of variable x and $\bar{x}$ is its mean. Thus, the squared coefficient of variation can be expressed as: $CV^2 = \frac{\sigma^2(x)}{\bar{x}^2}$, which corresponds to the variance of variable x to its mean squared. Half of the squared coefficient of variation I_2 is then: $I_2 = \frac{\sigma^2(x)}{2\bar{x}^2}$.

Figure 1.1 Change in the Gini index of before-tax income and net worth, USA 1989-2013 (source: U.S. Survey of Consumer Finances)

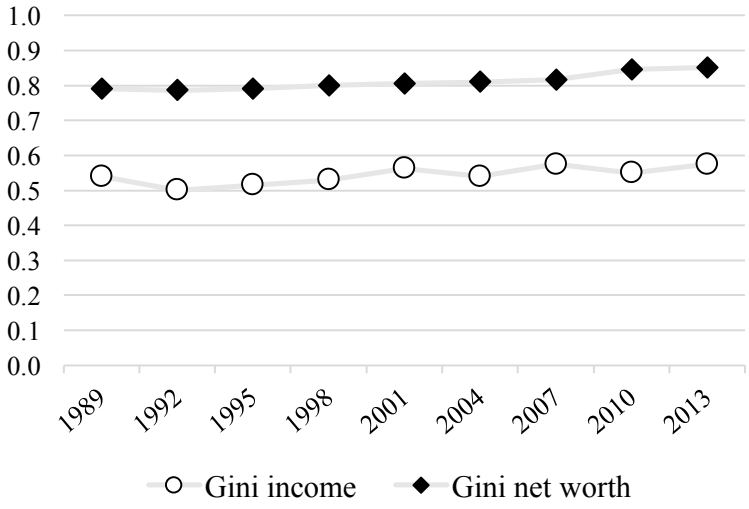
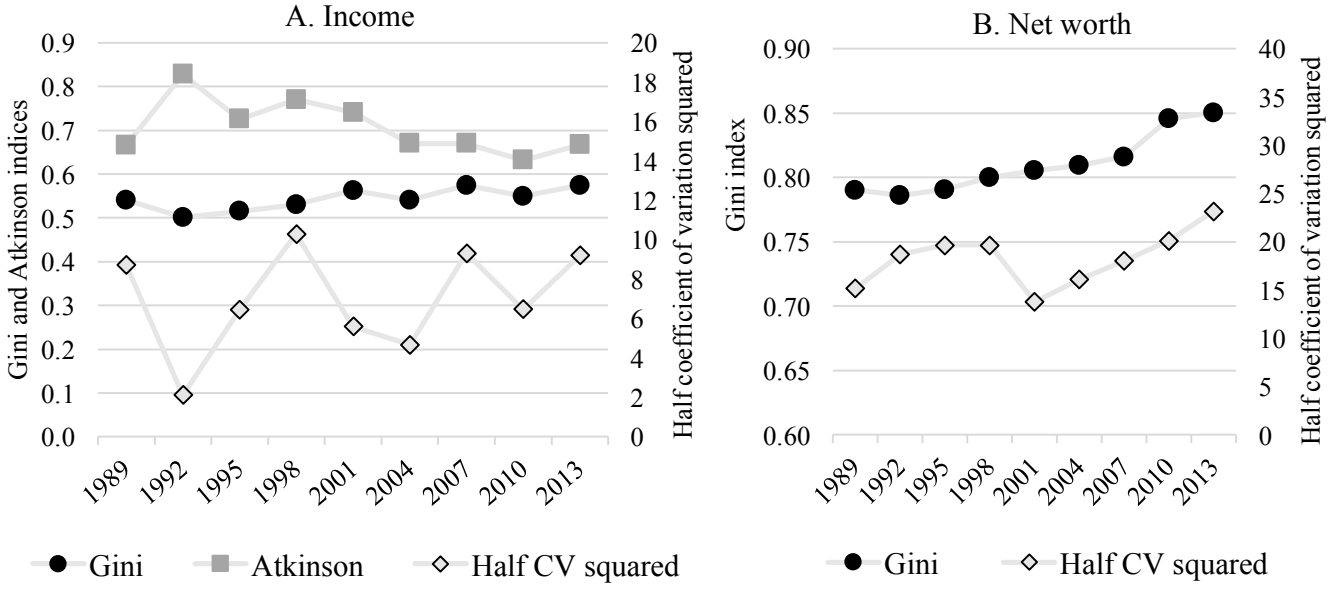


Figure 1.2 compares the evolution of the Gini coefficient, the Atkinson index, and half of the coefficient of variation squared for income and wealth. In terms of income, trends among these indicators were the most disparate between 1989 and 2001. In this period, the Atkinson index experienced the highest rise from 0.666 in 1989 to 0.741 in 2001, mirrored by a less substantial increase in the Gini coefficient from 0.54 to 0.56. In contrast, half of the coefficient of variation squared fell over this period, from 8.7 in 1989 to 5.6 in 2001. This suggests that from the late 1980s to the early 2000s, inequality at the bottom of the distribution widened, while inequality at the top declined. This picture changed in the run up to the Great Recession. As the Atkinson index fell to 0.67 in 2007, both the Gini index and half of the coefficient of variation squared increased to 0.574 and 9.31 respectively, indicating the growing importance of income disparities at the top for the overall changes in inequality. After the 2007 crisis, all measures experienced a similar trajectory, decreasing in 2010 and rising in 2013.

In terms of wealth, we only compare changes in the Gini index and half of the coefficient of variation squared due to the aforementioned problems with accounting for zero and negative values associated with the Atkinson index. As in the case of income, the trends for wealth were the most disparate between 1989 and 2001. In this period, half of the coefficient of variation squared experienced an overall decline from 15.2 to 13.8 as the Gini index increased from 0.79 to 0.805. This indicates that in the 1990s wealth inequality at the top of the distribution decreased. However, both indicators increased between 2001 and 2013, although the Gini coefficient experienced the fastest increase after the crisis, between 2007 and 2010, compared to a more steady increase in half of the coefficient of variation squared in the whole period.

Figure 1.2 Comparison of inequality indices for income and net worth, USA 1989-2013 (source: U.S. Survey of Consumer Finances)



Overall, this analysis reveals that changes in income and wealth inequality were not uniform across the distribution between 1989 and 2013. Consequently, it is necessary to undertake a more detailed examination of income and wealth ownership across households in our sample in order to understand how inequality has changed in the period. For this reason, we examine the distributional rankings for income and wealth using the generalised Lorenz curve analysis[11]. The generalised Lorenz curve performs a similar task to the ordinary Lorenz curve described above, i.e. it ranks population from the poorest to the richest and assigns income or wealth to each cumulative population share. However, in the case of the generalised Lorenz curve, the mean income or wealth rather than its share is displayed on the vertical axis. Consequently, it allows for a direct comparison of the Lorenz curves with different means of incomes or wealth (Shorrocks 1983; Thistle 1989). We are thus able to rank the distributions over time, evaluating whether they became unambiguously more or less equal. This is the case only when the generalised Lorenz curves do not intersect. If one curve lies below the other at all cumulative population shares, that

[11] Lorenz dominance is part of the broader literature on social welfare evaluations, which aims to compare distributions of uncertain prospects based on the social welfare functions (Yitzhaki 1982). The literature was initiated by Atkinson's (1970) theorem of Lorenz dominance, which states that out of two distributions with equal means, one distribution is preferred to another by all additive and concave social welfare functions if its Lorenz curve lies entirely above the Lorenz curve of the second distribution (Thistle 1989:1). This theorem was extended to distributions with different means using the generalised Lorenz curves by Shorrocks (1982) and Kakwani (1984), and to S-concave social welfare functions by Dasgupta *et al*. (1973) and Rothschild/Stiglitz (1973). The stochastic dominance approach extended this discussion to social welfare functions with unknown shapes (Yitzhaki 1982).

distribution exhibits Lorenz dominance and is unambiguously more unequal (Shorrocks 1983:6). The height of the curve represents the level of mean income or wealth, while its convexity indicates the degree of inequality (Thistle 1989:1)[12]. Figure 1.3 presents the generalised Lorenz curve for income, and is accompanied by Table 1.1 to precisely rank the distribution of income over time. Figure 1.4 and Table 1.2 present the corresponding data for net wealth. Tables A1.1 and A1.2 in Appendix I presents decile boundaries for the distributions of income and net worth in the period studied.

Comparison of the generalised Lorenz curves for income across the years confirms that income distribution in 2013 was unambiguously more unequal than in 1989. There was an initial decline in income inequality in the period – the distribution of income in 1992 was unambiguously more equal than in 1989. Since 1992, income inequality was increasing, and the distribution in 2001 was unambiguously more unequal than in 1992 and 1995. Between 2001 and 2007, the individual curves intersect at various points of the distribution and it is thus not possible to unambiguously rank the distribution of income in the run up to the crisis. However, the distribution of income in 2010 was unambiguously less unequal than in 2007, indicating the fall in income inequality immediately after the Great Recession. It is not possible to establish unambiguous dominance of the 2013 income distribution due to intersecting curves.

In terms of wealth, the ranking of its distribution over time is made more difficult by the presence of negative values. Specifically, it is estimated that households in the bottom 10% of wealth distribution have held negative wealth in the period. For these negative observations, we compare their absolute values, so that a higher absolute value indicates increasing inequality. We find that net wealth distribution in 2007 was unambiguously more unequal than in 1989. Moreover, the distribution of net wealth in 1995 was unambiguously more unequal than in 1992, and this is the case for the wealth distributions between 2001 and 1998. However, the ranking is ambiguous since 2001. This is primarily because of the increasingly negative net worth of the bottom 10% of wealth distribution and the rising wealth of the top decile.

Furthermore, the generalised Lorenz curve analysis reveals that there is a clear polarisation of income and wealth between the top 10% and the bottom 90% of the distribution. This suggests that inequality has been driven by the concentration of resources at the top decile, as the rich have been pulling away further from the rest. In addition, in the case of wealth, the bottom part of the distribution has fared worse over time, accumulating increasingly negative wealth. In fact, the

[12] This is because convexity of the generalised Lorenz curve indicates its distance from the 45-degree line of perfect equality.

bottom 30% of the wealth distribution experienced a consistent decline in their mean net wealth in every wave since 2001. This shows the disparity of changes in net wealth across the distribution, and motivates our further exploration of the trends in wealth composition later in this chapter.

Given the disparity of trends of income and wealth across the distribution revealed by the generalised Lorenz curve analysis, we take a more detailed look at the relative holdings of income and wealth across households. Figure 1.5 presents the shares of income, net worth, assets, and debt held by percentiles of the respective distributions, corresponding to households in the bottom 60%, 60^{th}-80^{th} percentile, 80^{th}-90^{th} percentile, 90^{th}-99^{th} percentile, and the top 1%[13].

[13] For the ease of discussion, we round the upper percentile boundaries. To be precise, the analysed income groups are households in the 0^{th}-19.99^{th}, 20^{th}-39.99^{th}, 40^{th}-59.99^{th}, 60^{th}-79.99^{th}, 80^{th}-89.99^{th}, and 90^{th}-100^{th} percentile. The top decile is broken into households in the 90^{th}-98.99^{th} percentile and the top 1%.

Figure 1.3 Generalised Lorenz curve for income, USA 1989-2013 (source: U.S. Survey of Consumer Finances)

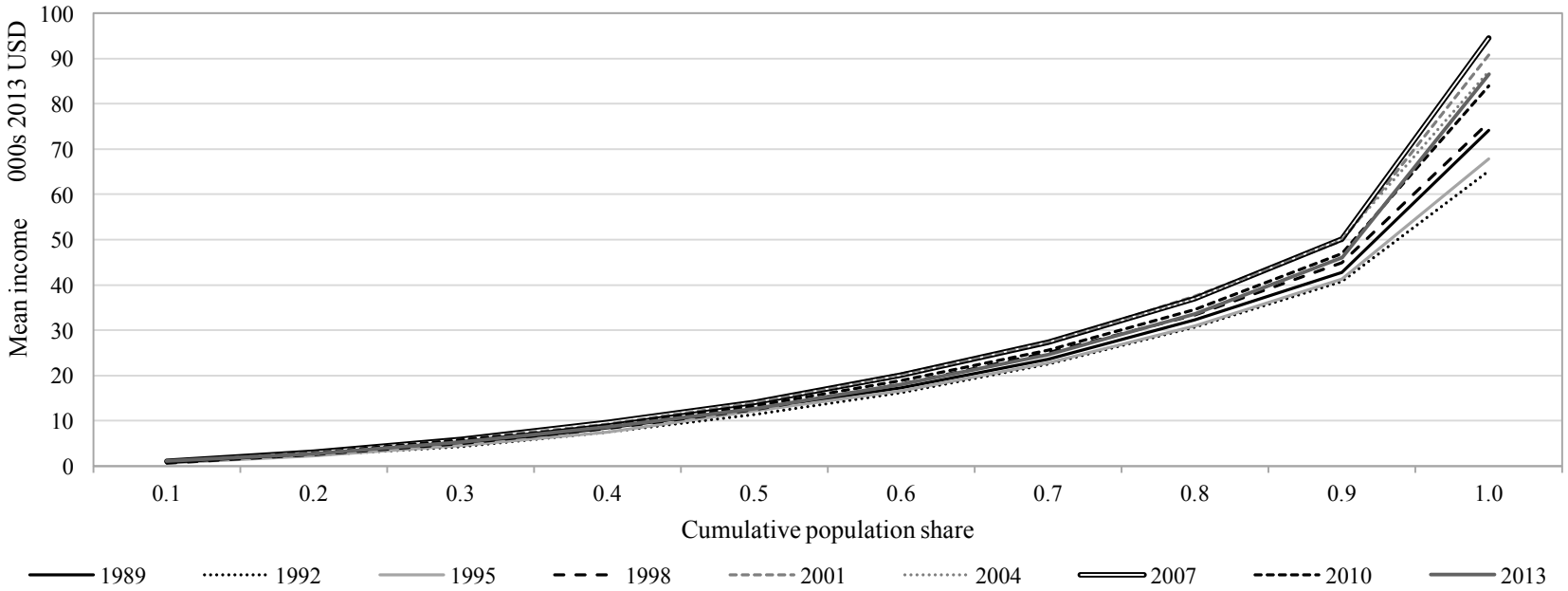


Table 1.1 Coordinates of the generalised Lorenz curve for income, USA 1989-2013 (source: U.S. Survey of Consumer Finances)

Cumulative income share	1989	1992	1995	1998	2001	2004	2007	2010	2013
0.01	943.5	710.9	600.2	675.0	1,020.6	1,017.2	1,081.1	1,016.8	1,104.1
0.02	2,454.7	2,403.0	2,189.5	2,508.8	2,666.9	2,712.9	2,989.9	2,883.3	2,754.8
0.03	4,722.8	4,329.3	4,472.1	4,940.4	5,840.0	5,572.7	5,825.0	5,747.9	5,213.3
0.04	8,488.5	7,531.9	7,431.1	8,260.6	9,161.2	9,222.6	9,579.1	8,854.6	8,640.5
0.05	12,528.4	11,351.8	12,142.6	12,445.0	13,923.6	13,953.9	14,086.9	13,263.4	12,660.4
0.06	17,263.4	16,142.6	16,642.5	18,098.3	20,326.4	19,883.1	20,102.4	18,947.9	17,950.8
0.07	23,584.4	22,444.7	22,742.9	25,104.1	27,205.5	27,292.5	27,363.7	25,615.8	24,594.4
0.08	32,341.5	30,625.8	30,964.1	33,334.2	37,546.9	37,023.9	36,965.6	34,566.3	33,617.0
0.09	42,762.8	40,720.8	41,253.8	44,907.1	49,776.6	50,092.2	50,113.0	46,898.6	45,982.6
0.1	74,141.0	65,088.6	67,799.4	75,858.8	90,786.0	87,142.7	94,483.2	83,948.5	86,596.1

Figure 1.4 Generalised Lorenz curve for net worth, USA 1989-2013 (source: U.S. Survey of Consumer Finances)

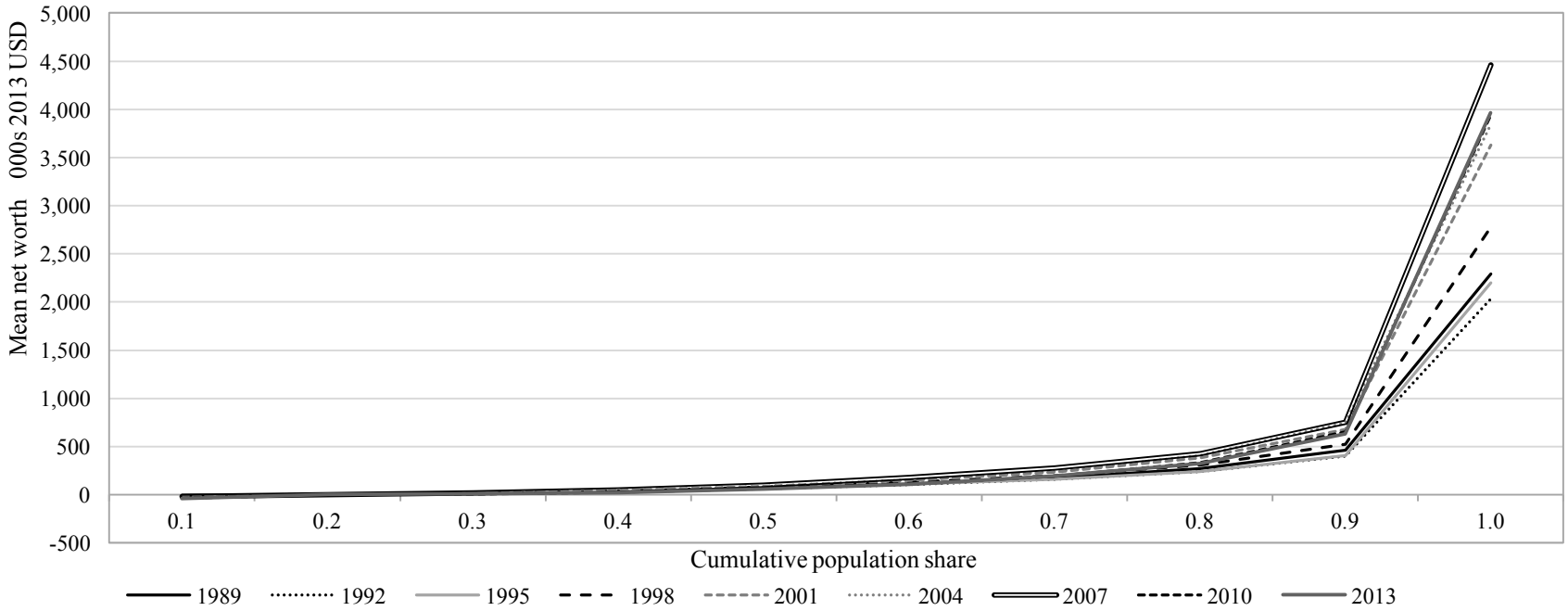


Table 1.2 Coordinates of the generalised Lorenz curve for net worth, USA 1989-2013 (source: U.S. Survey of Consumer Finances)

Cumulative income share	1989	1992	1995	1998	2001	2004	2007	2010	2013
0.01	-7,146.4	-8,818.5	-9,737.2	-14,338.7	-9,936.0	-13,783.7	-15,389.4	-37,148.1	-36,736.2
0.02	1,420.0	2,201.2	3,580.9	2,672.9	3,797.3	3,703.4	3,588.6	1,307.5	1,086.4
0.03	10,461.0	12,412.3	15,391.2	14,722.7	18,054.0	16,859.7	17,003.9	9,355.1	8,952.8
0.04	31,744.2	32,614.5	36,991.5	40,077.6	46,026.0	45,881.8	49,906.2	27,975.1	25,204.7
0.05	65,644.0	62,775.3	69,426.4	78,825.3	88,294.9	88,592.1	102,148.1	61,437.3	58,724.8
0.06	111,551.3	102,660.2	108,432.4	129,292.3	145,948.9	152,723.9	176,216.5	112,946.6	111,438.5
0.07	174,998.1	158,721.1	160,653.3	195,698.3	235,870.8	243,140.8	275,722.5	194,621.6	193,469.3
0.08	270,821.1	242,122.0	243,602.3	305,695.5	382,750.8	409,362.4	427,295.2	332,667.2	323,904.0
0.09	465,412.9	398,930.2	409,003.5	521,160.2	676,239.8	745,980.3	750,211.1	654,141.5	634,822.3
0.1	2,294,404.0	2,035,372.0	2,196,968.0	2,779,654.0	3,631,645.0	3,845,826.0	4,462,992.0	3,945,856.0	3,962,434.0

Panel A of Figure 1.5 shows the proportion of income held by each of the above distributional percentiles. In the whole period, the share of income held by households in the bottom 60% of the income distribution fell from 22.8% in 1989 to 20.6% in 2013[14]. Similarly, the share of income held by households between the 60th and 80th percentile declined from nearly 20% in 1989 to 18.1% 2013, while the income share of households in the 80th-90th percentile remained approximately constant, decreasing from 14.9% in 1989 to 14.4% in 2013. In contrast, the income share of households in the top decile of the income distribution increased in the period. Households between the 90th and 99th percentile held 25.4% of income in 1989, which rose to 27.2% in 2013, while the income share of households in the top 1% increased from 17% to 19.7% in the period. 1992 marks the year when the income share of the top 1% was the lowest at 11.7% and the remaining household groups took a higher share of income than in 1989. Moreover, the top 1% income share declined between 2007 and 2010, as the share of each income group in the bottom 99% increased. Nevertheless, this was reversed by 2013 as the top 1% share of income increased, which corresponds to changes in the Gini coefficient for income after the Great Recession.

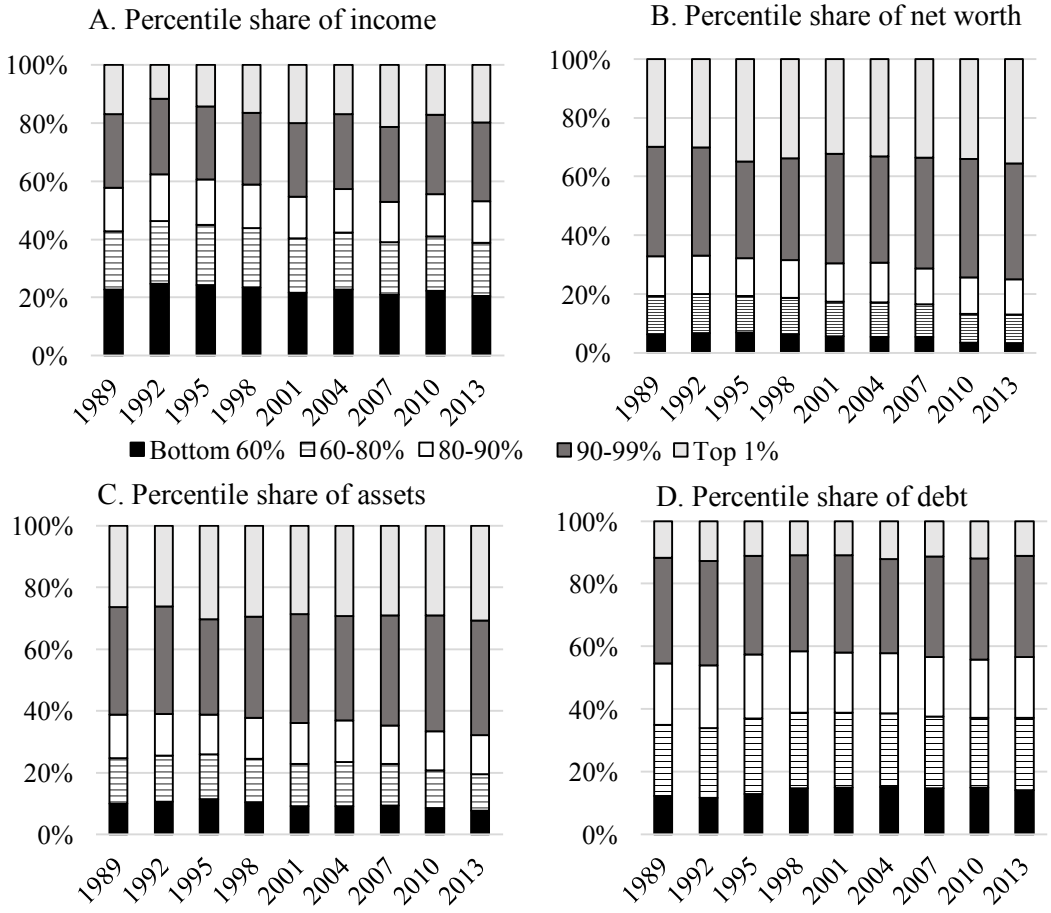
Panel B of Figure 1.5 presents the share of net wealth held by the households at different points of the wealth distribution. As indicated by the above analysis of the overall inequality indices and the generalised Lorenz curves, wealth is more concentrated at the top of the distribution than income. Bottom 60% held only 10% of net wealth in 1989, which declined to just 7.6% in 2013. Similarly, the share of net wealth accruing to households in the 60th-80th and the 80th-90th percentile fell from 14.7% and 14.1% to 11.9% and 12.7% respectively. In contrast, the share of net wealth held by households in the top decile increased in the period. Households in the 90th-99th percentile owned 34.8% of total net wealth in 1989, rising to 36.9% in 2013, while the wealth share of households in the top 1% increased from 26.4% to 30.9% between 1989 and 2013. Notably, these trends have been consistent throughout the period, and, unlike in the case of income, continued after the Great Recession. This was driven by the increasing share of net wealth held by the top decile with a simultaneous decline in the net wealth share of the bottom 60%.

Breaking down the relative share of net wealth held by each percentile group by its components, we observe that the declining share of the bottom 90% of the wealth distribution has been associated with growing indebtedness. The shares of total assets and debt holdings depicted in panels C and D of Figure 1.5 respectively show that while the bottom 90% collectively held

[14] Note that the decline concerns relative holdings of income by this group and not the absolute size, as both the mean and the median income have increased over time across the distribution, albeit to a varying extent (see the beginning of section 1.3).

only ca. 40% of all assets in 1989, they owned nearly 55% of all debt that year. The share of total debt held by the bottom 90% peaked at an average of 58% in 1998-2004 before the Great Recession, declining slightly to 57% in 2013, while their share of assets continued to fall throughout the years despite a slight increase between 1992-1995, declining to 32% in 2013. In contrast, households in the top decile took an increasing share of assets over time, rising from 34.8% to 36.9% for households in the 90th-99th percentile and from 26.4% to 30.9% for the top 1%. Simultaneously, the share of total debt held by households in the 90th-99th percentile declined in the period from 33.7% to 30.1% in 2004 before the Great Recession, rising to 32.3% in 2013. The share of total debt owned by households in the top 1% fell between 1989 and 2001 from 11.6% to 10.9%, but it increased to around 12% in 2004 and 2010 respectively. In 2013, the top 1% share of total debt declined back to 11.2%, resulting in an overall decrease between 1989-2013.

Figure 1.5 Percentile shares of income, net worth, assets, and debt, USA 1989-2013 (source: U.S. Survey of Consumer Finances)



The analysis of the percentile shares of income, net worth, and wealth components reveals large asymmetries across the distribution, with resources concentrating over time among households in the top decile, particularly the top 1%. The exploration of changes in the relative holdings of assets and debt across the distribution indicates that the composition of wealth has

important consequences for the overall observed trends in inequality. Consequently, in order to understand the impact of wealth composition and its associated income flows on inequality, in the following section we analyse the distribution of the various components of income and wealth available in the U.S. Survey of Consumer Finances between 1989-2013.

Before proceeding to the analysis of inequality in the components of income and wealth, we report findings regarding changes in the relative wealth holdings across the distribution which are established by earlier studies using data from sources other than household surveys. This is because household survey data tends to exclude the richest individuals, who may be more reluctant to provide sensitive information on their finances[15]. Exclusion of these individuals may lead to underestimation of the true degree of wealth inequality in society. Hence, by reporting the existing findings of the trends in wealth distribution which account for the richest individuals, we are able to provide a more robust insight into changes in wealth inequality since the 1980s. An alternative source to collecting wealth data directly through surveys is inference of wealth from tax returns through the so-called income capitalisation method (Kennickell 2001; Kopczuk/Saez 2004). The main disadvantage of this approach is that tax returns data are not readily available, require approval of the relevant government institutions, and often exclude other information on household characteristics for confidentiality reasons. Saez/Zucman (2016) combine information from the National Accounts Flow of Funds and the income tax returns data in the USA to estimate the dynamics of wealth distribution since 1913 accounting for underreporting among the richest. They report disparate wealth dynamics for the bottom and the top percentiles. The former experienced an inverted-U-shaped evolution of their wealth share, with a peak in the mid-1980s due to gains from pension and housing wealth, and a substantial decrease since due to indebtedness. In contrast, the total wealth share of the top percentiles followed a U-shaped pattern and rose particularly high since the 1980s owing to the dynamic growth of the top incomes and rising saving rates (Saez/Zucman 2016:36-37). The increase in the wealth share of the top 10% and the top 1% was driven primarily by the rise in wealth owned by the top 0.1%, from 7% in the late 1970s to 22% in 2012 (*ibid.*:1). Moreover, the top 0.1% accounted for the largest part of wealth accumulation with average real growth rate of wealth in 1986-2012 of 5% compared to 2% for all households. These results are consistent with our analysis of wealth, although they provide a longer timeframe and a more accurate insight into the wealth of the richest.

[15] This is explained in more detail in section 4.1. of Chapter 4, with application to the U.S. Survey of Consumer Finances.

1.1.3. Changes in the inequality of income and wealth components

In this subsection, we undertake a detailed analysis of changes in inequality of the various components of income and wealth in order to understand their role in shaping the overall trends in inequality observed between 1989 and 2013. In the dataset, income is composed of wages (i.e. income from employment), capital income (i.e. self-employment, business, and farm ownership income; taxable and non-taxable interest and dividend payments; social security income and withdrawals from retirement accounts excluding defined benefit plans; and realised capital gains or losses[16]), as well as income flowing from transfers and other sources (such as unemployment benefits, food stamps, child support, alimony payments, and other miscellaneous sources).

In terms of wealth, we distinguish between non-financial and financial assets. Non-financial assets consist of housing (the market value of primary residence as well as other residential and non-residential real estate), net equity in privately held business, as well as vehicles, consumer durables, and other non-financial assets. Financial assets include transaction accounts, which are also called liquid assets (i.e. call, checking, and saving accounts; money market deposit accounts; and money market mutual funds), high-yielding financial investment assets (i.e. certificates of deposits; savings bonds; bonds; stocks; other managed assets; pooled investment funds, i.e. non-money market mutual funds; and other), as well as the value of retirement accounts (such as the Individual Retirement Accounts, Keogh accounts, 401(k), and other) and the cash value of life insurance plans. Liabilities consist of the amount outstanding on mortgages and home equity lines of credit secured by primary residence and other property, as well as unsecured debt, such as instalment loans (including vehicle, student, and consumer loans), credit card balances, other unsecured lines of credit, as well as other miscellaneous forms of debt (e.g. debt to family members, borrowing against insurance policies or pension accounts, margin debt, etc.).

Table 1.3 shows changes in the Gini coefficients[17] for the various sources of income over time. Out of the aforementioned types of income, social security and retirement income and wages

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[16] Note that the dataset does not distinguish between the different types of capital gains income dependent on the changes in the specific asset values.

[17] For the purpose of clarity, in the following analysis we report only the Gini coefficients. However, trends in the Atkinson index and half of the coefficient of variation squared for these variables are consistent with the Gini coefficient, with the exception of half of the coefficient of variation squared for business income (which declined over the period in contrast to the rising Gini index), vehicles and other non-financial assets and debt (in both instances half of the coefficient of variation squared increased, compared to the fall in the Gini index). The additional reason for not reporting these indicators is their sensitivity to extreme values, which are particularly likely in the presence of negative and zero observations encountered in measurement of the different types of capital income, assets, and debt in the data (see subsection 1.1.1. above).

are the least unequally distributed, while the distribution of business income, interest and dividend payments, and capital gains is the most unequal. Like total income, the Gini coefficient for all of these sources increased over time. The Gini coefficient for social security and retirement income rose from 0.427 to 0.468 between 1989 and 2013, declining in the Great Recession. Similarly, the Gini index for wages increased from 0.461 in 1989 to 0.52 in 2013. However, unlike income, wage inequality continued to increase after the Great Recession, rising from 0.504 to 0.521 between 2007 and 2010. The Gini index for business income rose from 0.768 in 1989 to 0.796 in 2013, with a decline in the run up to and immediately after the Great Recession. Moreover, inequality of the interest and dividend income rose over time from 0.835 in 1989 to 0.893 in 2013, continuing to increase after the 2007 crisis. The Gini index for capital gains has been the highest at 0.864 in 1989, increasing to 0.9 in 2013, with a decline between 2007 and 2010. Lastly, the Gini coefficient for transfer income has been higher than for income as a whole, although in contrast to other sources it declined over time from 0.696 in 1989 to 0.567 in 2010, rising to 0.656 in 2013.

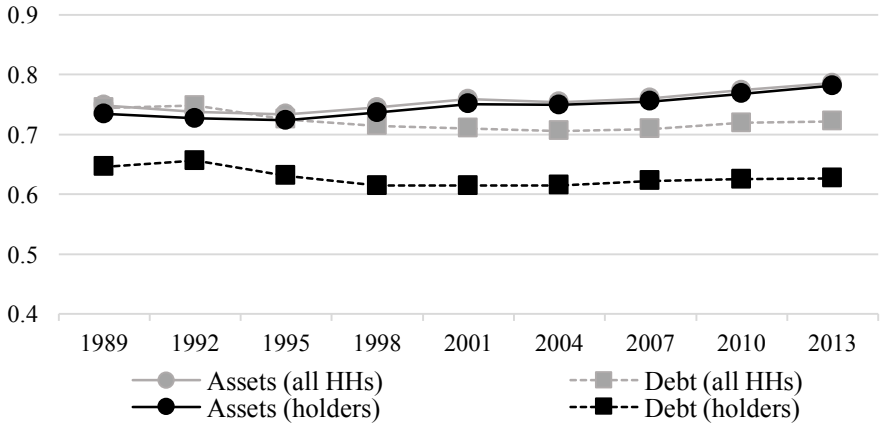
Figure 1.6 shows changes in the Gini coefficients for assets and debt, estimated for all households in the sample as well as for asset and debt holders only. The reason for reporting both magnitudes is that not as many households in the sample own debt as assets[18]. Consequently, the large number of zero observations may inflate the Gini index for debt. Indeed, in Figure 1.6 the Gini coefficient for debt for holders is lower than that indicator for all households, although the trends of both measures are consistent over time. Since the Gini index of assets for holders among all households are similar in magnitude and converge over time, we describe trends in the Gini coefficient for asset and debt holders only.

Table 1.3 Gini indices by the type of income, USA 1989-2013 (source: U.S. Survey of Consumer Finances)

Gini index	Wages	Business and farm income	Interest and dividend income	Capital gains	Social security and retirement income	Transfer and other income
1989	0.461	0.768	0.835	0.864	0.427	0.696
1992	0.459	0.795	0.827	0.820	0.422	0.860
1995	0.464	0.807	0.880	0.825	0.444	0.625
1998	0.456	0.795	0.846	0.847	0.422	0.651
2001	0.496	0.777	0.837	0.905	0.420	0.645
2004	0.488	0.770	0.866	0.877	0.460	0.569
2007	0.504	0.766	0.874	0.888	0.451	0.582
2010	0.521	0.760	0.877	0.877	0.431	0.567
2013	0.520	0.796	0.893	0.900	0.468	0.656

[18] Detailed information on participation rates for assets, debt, and their components is provided below in the description of household balance sheet evolution in section 1.3. of this chapter.

Figure 1.6 Gini indices for asset and debt holdings, USA 1989-2013 (source: U.S. Survey of Consumer Finances)



Analysis of the Gini coefficients suggests that assets are more unequally distributed than debt. This suggest that households at the top of the distribution own relatively more assets than they owe in debt and thus suffer from smaller leverage problems than households towards the bottom of the distribution. Moreover, the Gini indices of both variables exhibit disparate trends over time. The Gini coefficient for assets increased from 0.734 in 1989 to 0.781 in 2013, after an initial decline to 0.724 in 1995. In contrast, the Gini index for debt fell from 0.646 to 0.627 in the same period, with the lowest value of 0.615 in 1998 and 2001, and an increase since 2004. Overall, the fall in the Gini coefficient for debt over time is worrying as it indicates that households at the bottom of the distribution accumulated debt levels which were increasingly similar to those among households at the top of the distribution.

In order to understand which types of assets and debt may be driving these trends in the overall inequality of asset and debt holdings over time, Table 1.4 presents changes in the Gini coefficients for the various types of assets and liabilities between 1989 and 2013. Among assets, the distribution of vehicles, consumer durables, and other non-financial assets, as well as primary residence was the least unequal in this period, while business equity, other real estate, and financial investment assets were the most unequally distributed. Inequality of the majority of assets increased in the period studied, apart from vehicles, other real estate, and retirement and insurance assets, and all these trends continued throughout the Great Recession. The Gini coefficient for primary residence increased from 0.65 in 1989 to 0.668 in 2013, with an initial decline to 0.613 in 1995. The Gini index for vehicles, durables, and other non-financial assets decreased from 0.642 to 0.603 in the same period. Similarly, the Gini coefficient for other real estate fell from 0.976 in 1989 to 0.953 in 2013. In contrast, inequality in business equity holdings increased slightly in the period from 0.975 in 1989 to 0.985 in 2013. Similarly, the Gini index of financial investment assets rose from 0.92 to 0.958 between 1989 and 2013, which constitutes the fastest increase among the various types of assets in this period. Moreover, the Gini coefficient for

transaction accounts rose from 0.847 in 1989 to 0.872 in 2010, falling to 0.867 in 2013. Lastly, the Gini index for retirement and insurance assets declined from 0.861 in 1989 to 0.859 in 2013, with the lowest value of 0.836 in 2001.

Among liabilities, debt secured by primary residence, instalment debt, and credit card balances were the least unequally distributed between 1989-2013, while the Gini coefficients of debt secured by other real estate, other unsecured lines of credit, and other debt were the highest. The latter does not necessarily signify high inequality of these holdings *per se*, but rather reflects large number of zero observations associated with the fact that few households hold these types of debt[19]. This assertion is further supported by the fact that these Gini coefficients exhibit little, almost near-zero change over time. The Gini coefficient for debt secured by other real estate rose from 0.967 in 1989 to 0.97 in 2013, with a peak of 0.98 in 2004. The Gini index for other unsecured lines of credit remained approximately constant at 0.997 in the period, while the index for other debt declined from 0.982 in 1989 to 0.98 in 2013. In contrast, the Gini coefficient for credit card debt increased from 0.79 in 1989 to 0.827 in 2010 and 2013. Similarly, the Gini index for instalment debt rose from 0.712 to 0.752 between 1989 and 2010, declining to 0.734 in 2013. The largest change over time occurred for the Gini index of mortgages secured by main residence, declining from 0.732 to 0.657 between 1989 and 2004 before the crisis, and increasing to 0.689 in 2013. This suggests that households towards the bottom of the distribution held an increasingly greater share of this type of mortgages over time.

Table 1.4 Gini indices by the type of asset and debt, USA 1989-2013 (source: U.S. Survey of Consumer Finances)

	Assets						
Wave	Primary residence	Other real estate	Vehicles and other non-financial	Business equity	Transaction accounts	Financial investment assets	Retirement and insurance assets
1989	0.650	0.976	0.642	0.975	0.847	0.920	0.861
1992	0.635	0.953	0.609	0.976	0.834	0.921	0.855
1995	0.613	0.951	0.609	0.984	0.856	0.934	0.846
1998	0.617	0.947	0.614	0.983	0.824	0.927	0.838
2001	0.633	0.956	0.593	0.979	0.824	0.930	0.836
2004	0.641	0.954	0.622	0.982	0.849	0.936	0.847
2007	0.642	0.949	0.605	0.983	0.841	0.943	0.842
2010	0.650	0.951	0.600	0.982	0.872	0.951	0.857
2013	0.668	0.953	0.603	0.985	0.867	0.958	0.859

[19] See the methodological explanation of the Gini coefficient in presence of zero or negative values in subsection 1.1.1. above.

(Table 1.4 continued)

	Debt					
Wave	Secured by primary residence	Secured by other property	Instalment debt	Credit card balances	Other lines of credit	Other debt
1989	0.732	0.967	0.712	0.790	0.995	0.982
1992	0.723	0.971	0.733	0.777	0.994	0.975
1995	0.703	0.976	0.724	0.755	0.994	0.982
1998	0.677	0.971	0.748	0.790	0.992	0.983
2001	0.681	0.975	0.728	0.789	0.996	0.984
2004	0.657	0.980	0.734	0.782	0.997	0.980
2007	0.667	0.969	0.734	0.799	0.996	0.978
2010	0.672	0.970	0.752	0.827	0.996	0.979
2013	0.689	0.970	0.734	0.827	0.995	0.980

Furthermore, in order to understand how these different types of income and wealth are concentrated across the distribution, Table 1.5 reports shares of the above income sources and assets held by households in the top 10%. The top decile is broken down into the 90^{th}-99^{th} percentile and the top 1%. Among income sources, the top 10% has held the highest share of business income, capital gains, interest and dividend payments, and transfer income, while their share of wages and social security income has been relatively the lowest. However, the wage share of the top decile increased between 1989 and 2013, as did the share of capital gains and interest and dividend payments. In contrast, the top 10% share of transfer income, business income, and social security and retirement income declined in this period.

The top 10% share of wages increased from 39.9% in 1989 to 46.3% in 2013. Importantly, this increase was driven by the top 1%, whose share of employment income rose from 10.8% to 15.2% in this period. During the 2007 crisis the wage share received by the top 10% of households declined slightly, but this seems to have been redistributed within the top parts of the population. This is suggested by the observed increase in the wage share of households in the 90^{th}-99^{th} percentile from 28.6% to 30.8% between 2007 and 2010, as the top 1% share of wages fell from 15.9% to 15.7%.

In terms of capital income, the top 10% share of interest and dividend income increased from 88.7% to 99.1% between 1989 and 2013, and the trend continued throughout the Great Recession. As in the case of wages, this was driven by an increase in the share of the top 1% from 45.5% to 67.9%, while the share of the 90^{th}-99^{th} percentile declined from 43.2% to 31.1%. Similar trends can be observed for capital gains income. Due to the presence of negative values across the distribution, the share of capital gains earned by the top 10% exceeded 100%, increasing from 103.7% to 105.9% between 1989 and 2013. However, this was concentrated among households in the top 1% whose share rose from 86% to 96.3%, while the share of the 90^{th}-99^{th} percentile fell from 17.7% to 9.6%. Similarly, the share of business income held by the top 1% increased from

62.5% to 64.7% while the share of percentile 90th-99th declined from 41.9% to 34.9%, leading to an overall decrease in the top 10% share of business income from 104.4% in 1989 to 99.6% in 2013. Moreover, while the share of retirement and social security income of the top decile declined in the period from 63.4% to 60.6%, the top 1% increased their share from 15.1% to 15.6%, while the portion accruing to households in the 90th-99th percentile fell from 48.2% to 45%. An opposite trend was experienced by the top decile share of transfer and other income, which declined from 88.9% in 1989 to 81.7% in 2013. However, this was distributed within the top decile as the decrease in the share of transfer income held by the top 1% from 49% to 40.8% was accompanied by a rise in the share of the 90th-99th percentile from 39.9% in 1989 to 54.5% in 2007, reaching 40.9% in 2013.

In terms of asset ownership, the top decile has held the highest share of business equity, financial investment assets, and other real estate, followed by transaction accounts and retirement accounts, with relatively lower shares of primary residence, and vehicles and other non-financial assets. The top 10% share of financial investment assets experienced the fastest increase between 1989 and 2013, rising from 87.1% to 95.6%. This was driven by gains of the top 1% whose share increased from 45.6% to 58% in the period, compared to the decline of the relative holdings of households in the 90th-99th percentile from 42.2% to 37.6%. A comparable increase was observed for the top 10% share of primary residence holdings, which rose from 44% in 1989 to 47.9% in 2013. Once again, the top 1% experienced the fastest increase in its share from 10.8% to 14.1%, compared to a modest rise in the share of households in the 90th-99th percentile from 33.1% to 33.8% (which was preceded by a decline to approximately 31.8% before the 2007 crisis). A smaller increase from 76.5% to 78.9% was observed for the top 10% share of transaction accounts, although this was led by an increase in the top 1% share from 39.9% to 43.8% between 1989-2013, as the portion of holdings accruing to households in the 90th-99th percentile declined by 10.6%. Similarly, while the top decile's share of business equity remained approximately constant at 99.9% over the period, the relative holdings of the top 1% rose from 64.1% to 76.7%, while the 90th-99th share declined from 35.8% to 23.3%.

In contrast, while the overall top 10% share of other property increased from 94.8% to 96.4% between 1989 and 2013, the top 1% reduced their share from 51% in 1989 to 48.8% in 2013, as households in the 90th-99th percentile claimed an increasing portion of holdings rising from 43.8% to 47.7%. Similarly, in the case of retirement and insurance assets the share of households in the 90th-99th percentile expanded from 45.8% to 46.6%, while the top 1% share declined from 30% to 28.2%, resulting in an overall decrease of the top decile share from 75.9% to 74.8%. Finally, the only asset whose relative holdings saw a uniform decline among the top decile was vehicles and other non-financial assets, falling from 50% in 1989 to 46.3% in 2013.

1.1.4. Summary

Overall, the analysis of the overall inequality measures and the top shares of income, wealth, and their components reveals that capital income and assets are more unequally distributed than wages and debt. However, examining changes in these indicators over time we observe that wage inequality increased between 1989 and 2013. Moreover, the ownership of assets tended to concentrate at the very top of the distribution among the top 1%. Lower and decreasing inequality of debt, particularly mortgages secured by main residence, is especially troubling given the increase in asset inequality over time, revealing leverage problems for households towards the bottom of the distribution. In the section below, we argue that these trends in wage, asset, and debt inequality (driven by mortgages) have not been accidental, but constituted a direct outcome of changes in the socio-institutional structure of the financial sector since the 1980s.

Table 1.5 Percentage of income sources and assets held by the top decile, USA 1989-2013 (source: U.S. Survey of Consumer Finances)

Income sources										
Percentile	**1989**	**1992**	**1995**	**1998**	**2001**	**2004**	**2007**	**2010**	**2013**	*Percentage change 1989-2013*
Wages										
90-99	29.17	29.22	28.44	27.74	27.28	28.32	28.56	30.77	31.06	*12.54*
99-100	10.80	10.67	12.06	11.35	15.48	13.71	15.91	15.69	15.22	*40.95*
Sum	*39.96*	*39.89*	*40.50*	*39.10*	*42.76*	*42.02*	*44.47*	*46.46*	*46.27*	*15.79*
Business income										
90-99	41.91	40.54	35.49	36.46	37.78	39.98	40.73	42.65	34.93	*-36.24*
99-100	62.52	62.02	66.74	64.54	64.08	61.53	58.52	57.89	64.65	*3.40*
Sum	*104.44*	*102.56*	*102.23*	*101.01*	*101.86*	*101.51*	*99.25*	*100.54*	*99.58*	*-4.65*
Interest and dividend income										
90-99	43.20	44.32	30.47	40.96	40.84	36.18	35.47	34.11	31.12	*-78.78*
99-100	45.45	44.16	63.62	52.26	52.21	60.13	60.84	64.11	67.94	*49.47*
Sum	*88.65*	*88.47*	*94.09*	*93.22*	*93.05*	*96.31*	*96.30*	*98.22*	*99.05*	*11.73*
Capital gains										
90-99	17.74	22.85	19.81	23.68	15.05	14.68	14.77	14.52	9.57	*-133.68*
99-100	85.98	92.65	85.29	77.67	90.02	100.11	89.01	156.95	96.29	*11.99*
Sum	*103.72*	*115.50*	*105.10*	*101.35*	*105.08*	*114.80*	*103.79*	*171.47*	*105.86*	*2.06*
Social security and retirement income										
90-99	48.23	48.45	50.00	50.69	48.19	48.15	47.02	47.08	44.96	*-14.35*
99-100	15.12	14.90	14.73	14.35	14.66	15.81	16.31	13.81	15.61	*3.26*
Sum	*63.35*	*63.35*	*64.73*	*65.04*	*62.85*	*63.97*	*63.33*	*60.89*	*60.57*	*-4.39*
Transfer and other income										
90-99	39.86	18.18	53.05	48.18	50.68	54.35	54.50	48.16	40.94	*6.70*
99-100	49.01	78.09	35.44	45.35	43.44	33.65	31.22	28.06	40.78	*-16.79*
Sum	*88.88*	*96.27*	*88.49*	*93.53*	*94.11*	*88.00*	*85.72*	*76.22*	*81.72*	*-8.05*

Assets										
Percentile	**1989**	**1992**	**1995**	**1998**	**2001**	**2004**	**2007**	**2010**	**2013**	*Percentage change 1989-2013*
Primary residence										
90-99	33.13	31.25	29.48	30.50	31.79	31.81	31.65	33.26	33.77	*2.70*
99-100	10.84	11.26	10.19	11.08	12.50	13.30	13.40	12.96	14.10	*30.06*
Sum	*43.98*	*42.51*	*39.67*	*41.59*	*44.28*	*45.11*	*45.04*	*46.22*	*47.87*	*8.87*
Other real estate										
90-99	43.83	40.61	47.37	45.14	44.08	44.94	49.65	47.45	47.69	*12.64*
99-100	50.96	53.66	47.46	48.71	52.51	51.23	45.37	47.91	48.75	*-4.34*
Sum	*94.79*	*94.27*	*94.83*	*93.85*	*96.59*	*96.17*	*95.01*	*95.35*	*96.44*	*1.74*
Business equity										
90-99	35.82	32.14	21.75	24.51	28.56	24.29	23.92	26.05	23.32	*-98.08*
99-100	64.05	67.54	78.18	75.40	71.23	75.62	75.98	73.86	76.68	*19.71*
Sum	*99.87*	*99.68*	*99.93*	*99.91*	*99.79*	*99.91*	*99.90*	*99.91*	*99.99*	*0.13*
Vehicles and other non-financial assets										
90-99	27.44	27.90	25.19	27.67	25.78	26.93	26.24	27.07	25.89	*-9.93*
99-100	22.67	18.34	20.74	18.59	19.34	20.77	19.99	18.52	20.44	*-9.84*
Sum	*50.11*	*46.24*	*45.93*	*46.26*	*45.12*	*47.70*	*46.22*	*45.59*	*46.33*	*-7.55*
Transaction accounts										
90-99	36.59	40.46	32.71	37.86	36.49	36.83	38.48	38.07	35.19	*-10.55*
99-100	39.88	33.70	44.88	35.18	39.45	39.28	37.08	42.59	43.75	*9.69*
Sum	*76.47*	*74.16*	*77.58*	*73.04*	*75.94*	*76.11*	*75.56*	*80.66*	*78.94*	*3.23*
Financial investment assets										
90-99	42.20	41.00	36.32	36.19	37.98	36.56	36.89	38.18	37.61	*-32.41*
99-100	45.61	46.55	53.72	51.94	51.26	53.78	55.09	55.73	58.01	*27.21*
Sum	*87.81*	*87.56*	*90.04*	*88.13*	*89.24*	*90.34*	*91.99*	*93.91*	*95.62*	*8.90*
Retirement and insurance assets										
90-99	45.76	46.63	45.34	43.59	46.06	48.27	45.77	49.23	46.61	*4.63*
99-100	30.10	27.67	27.80	27.67	25.29	25.03	26.19	25.91	28.17	*-6.42*
Sum	*75.86*	*74.30*	*73.13*	*71.26*	*71.34*	*73.31*	*71.96*	*75.14*	*74.78*	*-1.42*

1.2. Financial sector transformation

In the previous section we showed that income and wealth inequality increased since the 1980s, which was driven mainly by the concentration of resources, particularly capital income and assets, at the top of the distribution. The increasing wage and asset inequality coupled with the fall in debt inequality driven by mortgages suggested a build-up of financial fragility among households towards the bottom of the distribution. In this thesis we argue that these changes were explicitly determined by the transformation in the nature of financial sector operations in the USA since the 1980s.

The role of changes in the operations of the US financial sector in shaping household wealth accumulation and stability has been discussed in the recent literature inspired by the 2007 crisis. The transformation of financial intermediation (i.e. channelling of funds between lenders and borrowers by bank and non-bank intermediaries in a financial system), often described by the umbrella term "financialisation", is an extremely complex process occurring at a variety of dimensions. Although the most pronounced in the USA, financial sector transformation has also taken place in various aspects and at different points since the 1980s in Europe (cf. Passarella Veronese 2013).

Financialisation finds its roots in the persistently high inflation and high interest rates in the late 1960s, which induced many non-financial companies to turn to financial markets in addition to banks to fund investment (Krippner 2005)[20]. This realigned firms' objectives away from long-term investment towards short-term profitability, making them more involved in financial activities (such as issuing shares), which raised the importance of financial over real profits (Fig.1.7) (Palley 2007:18). These changes in corporate behaviour contributed to the growing share of the financial, insurance and real estate sector (FIRE) in the economy at the expense of manufacturing (Fig.1.8).

[20] In this thesis, we focus exclusively on changes in financial sector operations (primarily the development of structured finance and subprime lending) and their impact on the economy occurring since the 20th century. However, the processes of financialisation related to the development of credit, money, financial instruments, and interest rates have been argued to take place for as many as 5,000 years (cf. Graeber 2011; Sawyer 2013). Consequently, *financialisation* is not limited to any particular time or place, can take a variety of forms, and at times may also go in reverse (cf. Sawyer 2017). For this reason, the preferred term used in this thesis is *financial sector transformation*, which refers to the processes of financial liberalisation and deepening in the USA since the second half of the 20th century. Financial deepening refers to increasing provision of financial services, diversity of financial instruments, and a greater number of financial institutions (cf. Shaw 1973).

Figure 1.7 Sectoral shares of domestic corporate profits, USA 1980-2016 (source: National Income and Product Accounts)

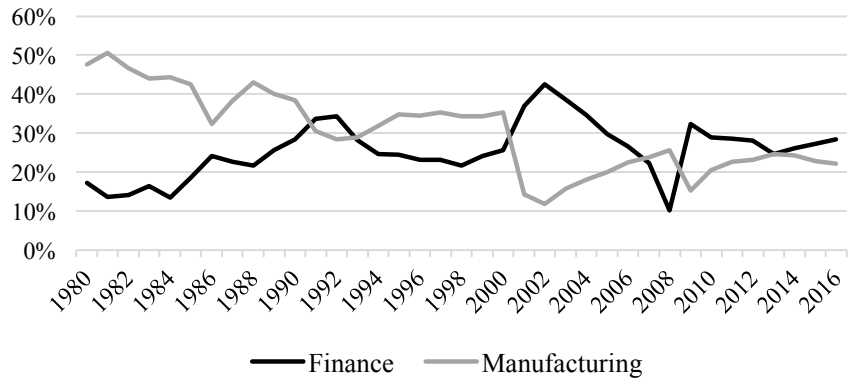
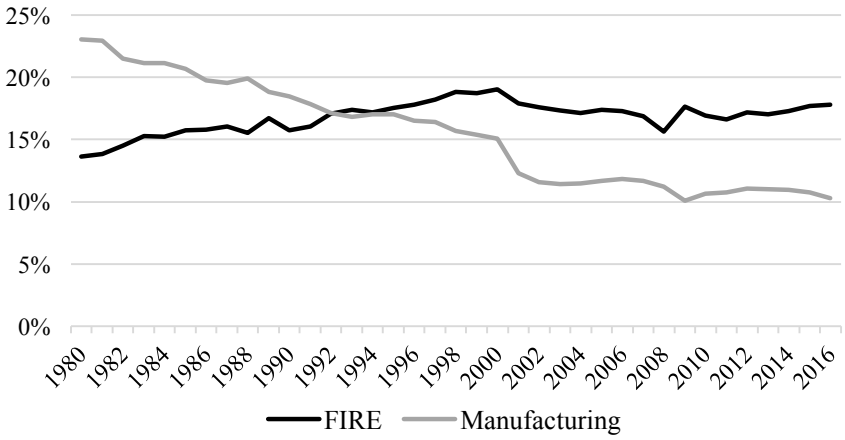


Figure 1.8 Sectoral shares of national income, USA 1980-2016 (source: National Income and Product Accounts)



The processes of financial sector transformation gained steam in the 1980s under policies promoting market liberalisation and retrenchment of the state from public service provision (Sawyer 2013:13). Firstly, labour market liberalisation and the associated rolling back of the minimum wage, unemployment protection, and union-oriented policies resulted in a sluggish wage income growth lagging behind productivity increases (Fig.1.9). Simultaneously, provision of pensions, housing, and public goods such as education and healthcare was increasingly delegated from the state to the private sector. With stagnant wages and diminishing state provision, households found themselves in need of additional financing of their living standards through borrowing. Consequently, the proportion of credit given to households relative to GDP increased dramatically, surpassing the relative size of credit to corporations in the early 1990s (Fig.1.10).

Figure 1.9 Quarterly growth of productivity and employee compensation and labour share in the non-farm business sector, USA 1980-2012 (source: Bureau of Labor Statistics)

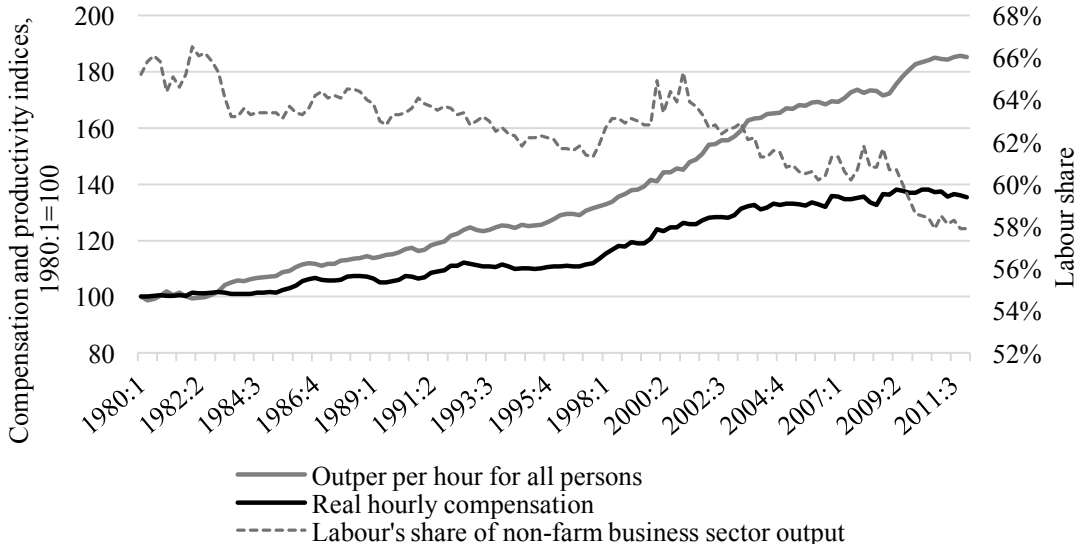
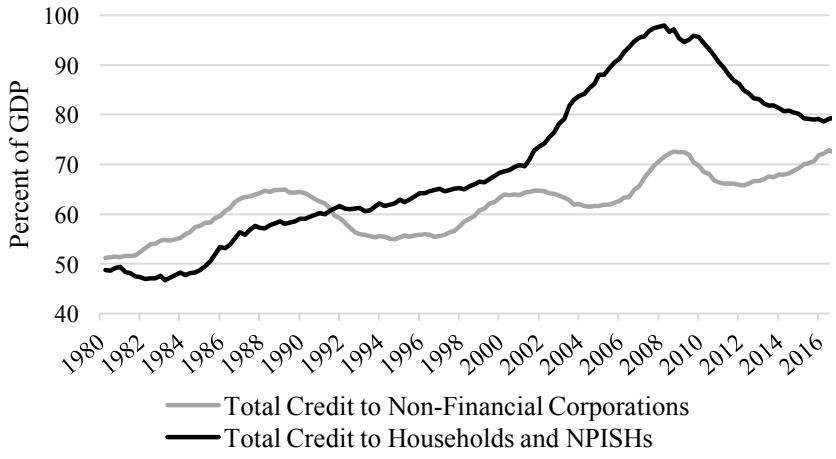


Figure 1.10 Total credit to non-financial corporations and households and non-profit institutions serving households (NPISHs) as a percentage of GDP, USA 1980-2016 (source: Federal Reserve Economic Data, St. Louis Fed)



The rising credit demand was paralleled by the massive proliferation of financial instruments and the development of structured finance. The aforementioned turn of non-financial companies towards financial markets resulting from high borrowing costs in the 1960s and the 1970s led financial intermediaries to seek additional sources of revenue in the household sector and through innovation of new financial products (Dymski 2009:157). An increasing volume of financial obligations — primarily mortgages and consumer debt— was transformed into securities in a process of securitisation, forming collateralised debt obligations (CDOs). These were issued by the Special Purpose Vehicles (SPVs), which pooled financial instruments of varying risk and return characteristics purchased at high fees from the loan originators (Pollin/Heintz 2013:113).

Based on this risk profile, CDOs were divided into tranches, which were classified into different degrees of seniority in terms of the payment of interest to their owner and the degree of losses incurred. The highest payment priority was assigned to senior tranches, which were rated between AAA and A by the credit rating agencies, followed by the mezzanine and junior tranches (rated between BBB and B), and equity tranches, which were of the highest risk. The lower the tranche, the higher was the amount that needed to be covered by its owner in case of any asset losses (Marcantoni 2014:7).

Paralleling the development of the CDOs, the establishment of credit default swaps (CDS) and derivatives on existing products allowed investors to bet against the default of any financial instrument, leading to the transformation of the traditional lending relations based on intermediation towards an "originate and redistribute" model, where default risk became "originated" by creditors and then spread across the financial system through securitisation. The actors of this new lending model were not only registered banks, transformed into highly consolidated "megabanks" as a result of an intense merger activity, but also non-bank intermediaries, which played a role similar to that of formal banks but were outside the central bank's jurisdiction in obtaining liquidity (Pollin/Heintz 2013:115; cf. Pozsar *et al*. 2010; Gorton/Metrick 2013)[21,22]. This whole process was validated by increasing financial deregulation measures such as the Gramm-Leach-Bliley Act in 1999 in the USA, which allowed commercial banks to engage in financial investment activities.

The combination of the demand factors (stagnant earnings, privatisation of public services) and the supply factors (securitisation, deregulation) led the US households to become more involved in the financial market. On the supply side, financial intermediaries were eager to include more households in their services partly to compensate for the diminishing deposits from non-financial firms (banks) and partly to generate more underlying assets for CDOs to keep pace with

[21] From the perspective of the endogenous money theory discussed in Chapter 2, unlike commercial banks, non-bank intermediaries, also called shadow banks, do not create money. This is because their liabilities cannot be used to pay for goods or services (Michell 2016). While commercial banks are involved in 'initial finance' by creating new purchasing power through lending, shadow banks can be classified as a part of the circuit of 'final finance', circulating money created by the commercial banks (Fontana/Sawyer 2016, 2017). Instead, liabilities of shadow banks are near-monies, serving as liquid short-term stores of wealth rather than the universal means of payment (*ibid*.; cf. Michell 2016; Gabor/Vestergaard 2017).

[22] The precise definition of shadow banks has been debated based on the types of their institutions (cf. Pozsar *et al*. 2010) or their activities (cf. Lysandrou/Nesvetailova 2015). The Financial Stability Board (2017) compiles a "narrow" definition of shadow banking including both dimensions, specifying their five economic functions. These include management of volatile collective investment schemes (EF1), lending and intermediation of short-term funds (EF2 and EF3), facilitating credit creation (EF4), and credit intermediation based on securitisation (EF5).

the rapidly growing demand for securitised instruments among financial investors (bank and non-bank intermediaries) (cf. Goda/Lysandrou 2013). In the process, many non-bank intermediaries took advantage of lax financial regulation and engaged in predatory lending practices by offering "subprime" mortgages at extremely harsh conditions (high interest rates and penalties) to social groups previously excluded from access to credit, such as the young, women, and racial minorities (cf. Dymski *et al*. 2013). Those subprime mortgages formed a lion share of the securitised instruments such as the asset-backed securities (ABS) and mortgage-backed securities (MBS) demanded by financial investors (Fig.1.11). In result, growth in homeownership rates among households at the bottom of the distribution spiked between 1989 and 2004, and fell sharply in the aftermath of the Great Recession, which reflected the price bubble in the US housing market between the late 1990s and mid-2006 (Fig.1.12). Securitisation and tranching of subprime loans and other instruments into CDOs created an unequal hierarchy of monetary claims, giving priority to the interests of the senior (and wealthy) financial investors and diminishing the possibilities of debt renegotiation and forgiveness in case of financial distress for the low-income borrowers (cf. Mian/Sufi 2013).

Figure 1.11 Securitised loans issuance, by type of securitised asset, USA 1985-2016 (source: SIFMA)

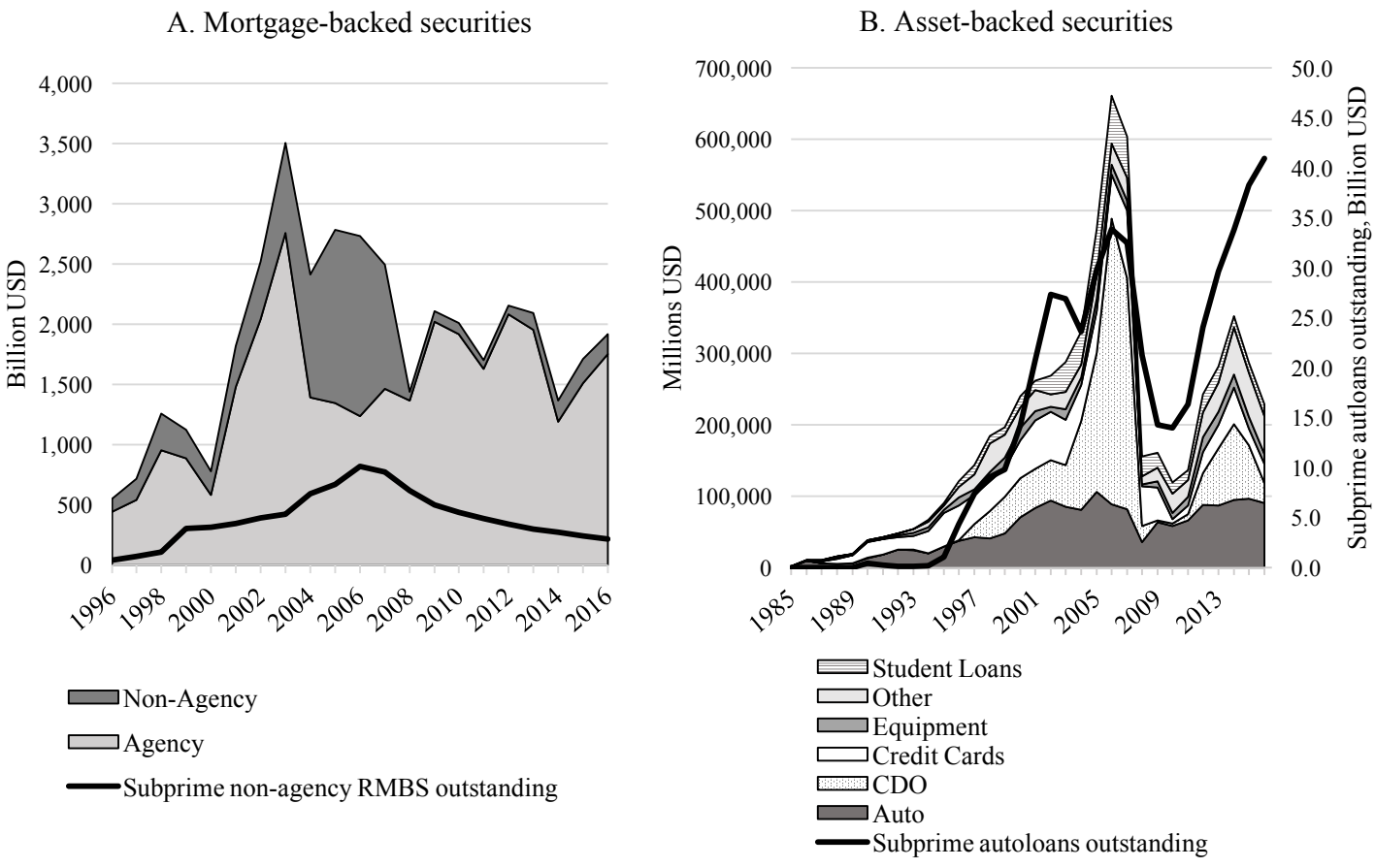
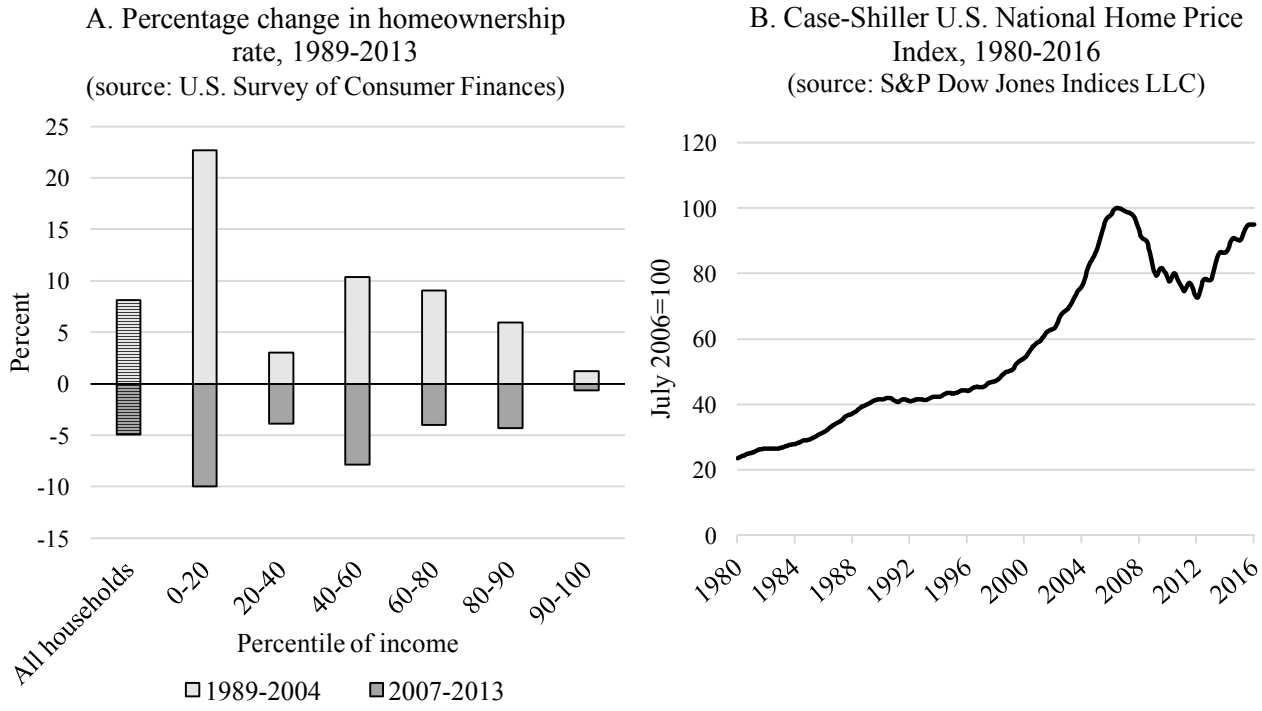


Figure 1.12 Expansion of homeownership in the USA, 1980-2016



This unequal hierarchy of financial interests led to a build-up of leverage in the household sector, which increased the financial sector's fragility and induced macroeconomic instability, culminating in the Great Recession. In the wake of the 2007 crisis, unsustainable leverage levels of the subprime homeowners resulted in a wave of foreclosures, evictions, and bankruptcies for the low-income borrowers (cf. Newman/Schafran 2013; Dufour/Orhangazi 2016). Given the gender, racial, and generational profiling of the subprime borrowers, the burden of the crisis was spread unequally between different race, gender, and age groups (cf. Young 2010). This uneven impact continued to affect minorities after the Great Recession. In 2012, the foreclosure rate in communities with majority non-White households was 17 foreclosed houses per 1000 properties, with an average of $2,200 wealth losses per household (Henry *et al*. 2013). In contrast, in majority White communities 10 per 1000 houses were foreclosed, with an average wealth loss of $1,300 per household (*ibid*.).

Despite the visible intersectional dimension of increasing inequality, the debate over the extent to which racial/ethnic discrimination and segregation is responsible for wealth and income disparities is unresolved. The main point of contention is the equality of access to assets, particularly housing and non-exploitative housing finance. There is substantial textual and empirical evidence that discriminatory processes are at work (Darity Jr. *et al*. 2006; Chiteji/Hamilton 2006), but critics point out that other factors, namely banks' sensitivity to greater

risks or government policy imperatives (Calomiris/Haber 2014) might explain these apparent disparities. As Dymski (2006) argues, this explanatory difference depends on the importance of missing variable bias, which cannot be dismissed, and is unresolvable.

Moreover, the impact of gender disparities on income inequality has been studied extensively, focusing on labour markets, earnings, and family structure (cf. Albelda/Tilly 1999) and their macroeconomic implications. Nevertheless, the issues of gender have been largely absent from the Post-Keynesian approach to macroeconomics and income distribution (Jenninngs 1994; Danby 2004; Todorova 2009; Austen/Jefferson 2010; Fukuda-Parr *et al*. 2013; Spotton Visano 2016). Moreover, the discussion of the role of gender in wealth inequality has been less developed (cf. Pahl 2001; Sierminska *et al*. 2010), primarily due to limited individual-level data on wealth across gender. Consequently, in this thesis we contribute to the discussion of the disparities in wealth across gender of households, acknowledging that this does not shed light on the intra-household distribution of wealth.

The debate of intergenerational inequality in economics has been focused on the transfer of income and wealth through inheritance and asset ownership (Tomes 1981; Piketty 2000; Bowles/Gintis 2002), while economic sociology has analysed intergenerational mobility across social classes (Becker/Tomes 1979; Atkinson *et al.* 1983; Erikson/Goldthorpe 2002). In these approaches, intergenerational inequality is argued to be one of the key determinants of rising income and wealth inequality in advanced capitalist economies. Economic geography has contested this view of intergenerational inequality, emphasising the structural role of economic inequality, which is instead manifested and reproduced through the emergence of intergenerational disparities in income and wealth (Christophers 2017).

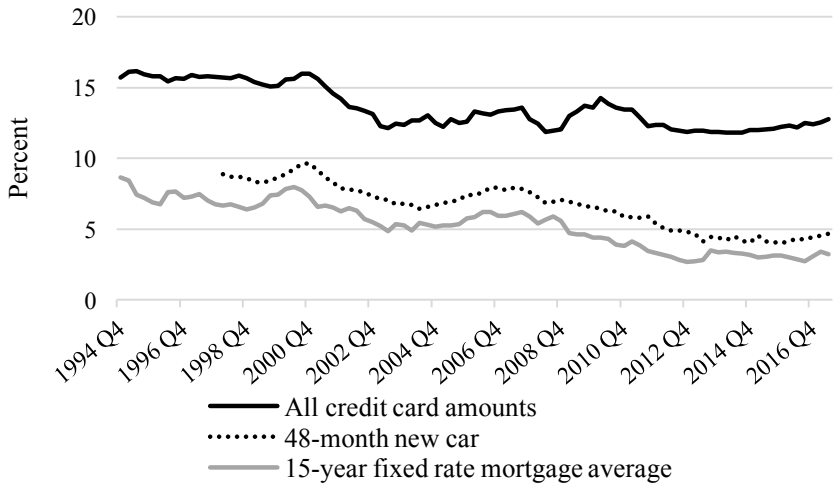
Given these unresolved debates on the intersectional dimension of wealth and income inequality with race, gender, and generations, in this thesis we are not be able to surpass the explanatory limits to the identification of cause-effect linkages. However, we are able to shed substantial light on an element that has received little attention in these debates, i.e. financial sector transformation, and to put forth strong evidence that this transformation, insofar as it has affected household balance sheets at all points of the income and wealth distribution, has played a key role in the dynamics of wealth and income polarization.

In light of the increased economic instability related to the processes of securitisation and subprime lending, empirical evidence has found that financial deepening (measured as the size of the financial sector relative to GDP) significantly affects income inequality (measured either as the Gini coefficient or the labour share of income). Zalewski/Whalen (2010), Assa (2012), Kus (2012), Arestis *et al.* (2013), Lin/Tomaskovic-Devey (2013), Van Arnum/Naples (2013) have

found a significant negative effect of financial deepening on inequality in the USA and in a panel of advanced economies. In earlier work, this author finds a significant positive impact of the GDP shares of the stock market, bank income, and private credit on the top 10% share of income in 16 OECD countries between 1995-2009 (Szymborska 2016). However, pre-crisis studies by Beck *et al.* (2004), Clarke *et al.* (2006) and others reviewed by Demirgüç-Kunt/Levine (2009) find that financial deepening reduces inequality, while Nikoloski (2013) argues that the relationship is non-linear. This disparity in results stems from the fact that the majority of these studies use macroeconomic aggregates to measure both inequality and financial sector transformation. We argue that the aggregate analysis of inequality obscures much of the mechanisms behind the relationship in question. This is because it doesn't explore the importance of balance sheet dynamics occurring at the household level in generating inequality and macroeconomic instability.

The key argument of this thesis is that the heterogeneity of household balance sheet composition generates wealth and income inequality as returns on wealth increase with its absolute size. This is because large wealth holdings enable access to profitable wealth management services, financial securities markets, purchases of corporate shares, and accumulation of secured debt, all of which require large initial downpayments. As will be shown in the next section, the middle- and low-income households rely more heavily on illiquid non-financial assets such as primary residence, low-yielding financial assets, and greater relative indebtedness dominated by unsecured debt, making their balance sheets more vulnerable to financial shocks (cf. Wolff 2014). In contrast, households at the top of the distribution hold diversified portfolios composed of various types of real estate, business equity, profitable financial investment assets (including the securitised financial instruments), and private pension wealth. These diversified assets serve as collateral for the accumulation of secured debt, which faces better conditions and lower rates than the unsecured types of credit. Figure 1.13 shows that interest rates on mortgages were lower than the terms of credit for consumer loans and credit card debt. Consequently, not only do households at the top of the distribution earn higher returns on their asset holdings than households towards the bottom of the distribution, but their high incomes and assets far outweigh their holdings and repayments of debt.

Figure 1.13 Commercial bank monthly rates by loan type, USA 1994Q4-2017Q2 (source: Federal Reserve Data, G.19 release and St. Louis Fed)



These stylised facts on household balance sheet composition across the distribution indicate how the interplay between the dynamics of wealth and income before and after the 2007 crisis contributed to inequality. The fact that the richest households directed a large part of their wealth into profitable business equity and financial assets meant that their annual rates of return were comparatively higher than for households relying on leveraged homeownership and other low-yielding and illiquid forms of wealth (Wolff 2014:30-31). Crucially, these dynamics of household balance sheet structures were directly related to the political economy of securitisation and household indebtedness outlined above. Consequently, a powerful case for the impact of financialisation on inequality emerges from the disparities of wealth holdings and leverage across households.

1.3. Evolution of household balance sheet structures in the USA since the 1980s

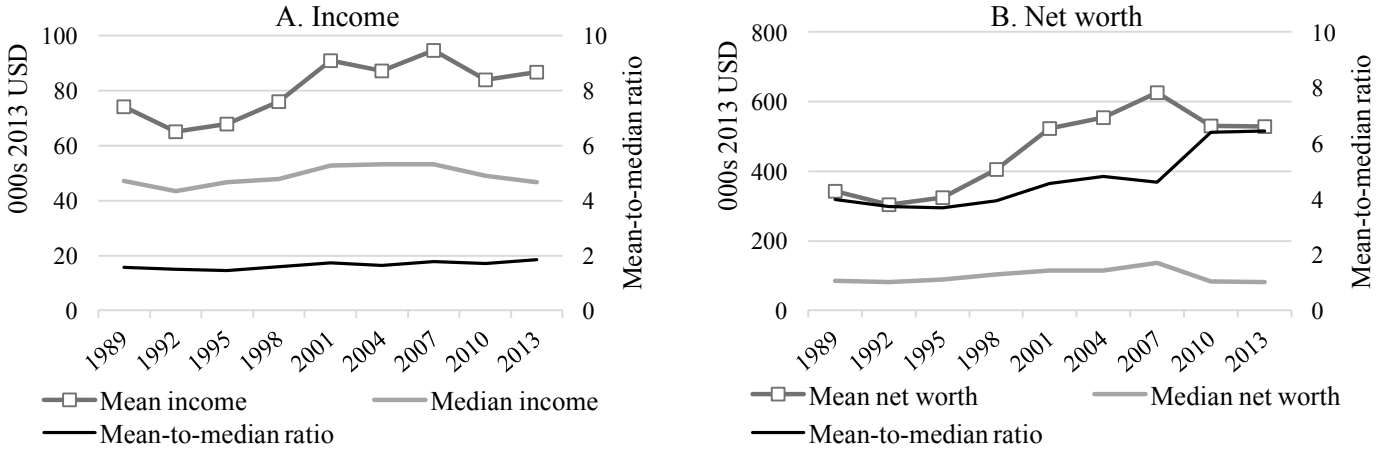
In the previous section, we showed that the transformation of financial sector operations since the 1980s had clear consequences for income and wealth distribution, and contributed to rising financial fragility. In this section, we show that changes in housing wealth induced by the asset price movements and the housing market collapse shortly before the Great Recession shaped the patterns of wealth accumulation for the low- and middle-income households. We argue that the emergent differences in the asset and debt composition across the distribution generated disparate returns to wealth depending on the size of wealth holdings, which is gauged by the analysis of income flows associated with ownership of specific assets and liabilities.

Figure 1.14 presents the mean and median values of income and net worth between 1989 and 2013[23]. Data show great disparities in trends of before-tax income and net worth in the period. Between 1989 and 2013, the median income stagnated. It rose from $46,500 in 1989 to its peak of $53,300 in 2004. However, in the aftermath of the financial crisis, the median income fell from $53,100 in 2007 to $46,700 in 2013. Similarly, the median net worth increased from $84,800 in 1989 to its peak of $135,400 in 2007, plummeting by 40% after the crisis to $81,200 in 2013, which is below its 1989 level.

In contrast, mean income increased by 28.8% from $73,400 1989 to its peak of $94,600 in 2007. After the 2007 crisis, mean income suffered less than the median, falling by 7.8% to $87,200 in 2013. Furthermore, mean wealth more than doubled between 1989 and 2007, growing from $336,100 in 1989 to $626,300 in 2007. Since the 2007 crisis, mean net worth decreased to $534,600 in 2013.

These disparate trends in the mean and median values highlight the need for an individual consideration of wealth and income. Over the whole period, not only was the mean-to-median ratio for net wealth consistently higher than the ratio for income, but it also increased more rapidly between 1989 and 2013. Moreover, as in the case of the overall inequality indices analysed in section 1.1.2., the ratio between the mean and median wealth and income experienced different trends during the crisis, with the mean-to-median ratio for net worth increasing and the ratio for income falling between 2007 and 2010. The mean-to-median ratio of income increased from 1.58 in 1989 to 1.78 in 2007, declining to 1.72 in 2010 before increasing to 1.87 in 2013. Simultaneously, the mean-to-median ratio for net worth rose from 3.96 in 1989 to 4.63 in 2007, and continued to increase to 6.58 in 2013.

Figure 1.14 Median and mean values of before-tax family income and net worth, USA 1989-2013 (source: U.S. Survey of Consumer Finances)



[23] All magnitudes estimated from the U.S. Survey of Consumer Finances which are presented in this thesis are given in terms of 2013 USD.

We argue that these changes in income and wealth were induced by differences in the accumulation of various assets and liabilities. To understand this wealth heterogeneity, Table A1.3 in Appendix I presents trends in asset and debt accumulation over time, distinguishing between the different types of non-financial and financial assets[24,25,26].

The decline in the median net wealth over 1989-2013 can be explained by the faster growth of the median value of debt than assets. Moreover, debt holdings decreased by 20% in the aftermath of the recession, which is less than the decline in asset holdings of 28.5% between 2007 and 2013, although the percentage of households holding debt fell by 3.2% between 2007 and 2010. During the 2007 crisis, the mean values of both assets and debt decreased by less than the median. However, over 1989-2013 and between 1989 and 2007, the conditional median debt holdings increased more rapidly than the mean, indicating growing indebtedness of the median household.

Looking into the different components of wealth, we observe a rapid increase in the mean value of primary residence between 1989-2007, followed by a massive drop after the Great Recession. This was paralleled by a rise in the value of mortgages, which more than doubled between 1989-2007, declining to a smaller extent after the 2007 crisis than the holdings of real estate. This suggests increasing financial fragility of homeowners in the aftermath of the crisis. Moreover, we note substantial increases in the mean value of business equity, financial investment

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[24] Note that due to the specific survey design, questions about respondents' gross values of income and net worth were asked separately to questions regarding the ownership of individual components of income, assets, and debt (see *Codebook for 2013 Survey of Consumer Finances*). Consequently, estimates of the mean and median values of income and wealth components may not always add up to the estimated means and medians of the total income and net worth. This could be the case either when the respondent miscalculated any of the individual component's value relative to the total income or wealth reported, or because of item nonresponse i.e. if they refused to answer the question on the individual component while still reporting their overall income or wealth (cf. Korinek *et al*. 2006). In order to provide the most representative picture of income flows and net wealth holdings in the sample, unless indicated we *do not* restrict the data presented here to complete observations (where the reported component values add up to the total).

[25] We report only the mean values of the income sources and the detailed balance sheet components. The main reason for this is that due to low asset and debt ownership rates across the lower income groups, there is not enough observations to calculate the median values of these variables for the same sample of households. Thus, in order to provide a consistent comparison of income sources and wealth components across all subgroups, we limit our analysis to the mean values only, keeping in mind their sensitivity to outliers. However, wherever possible, we prefer to compare the median values (such as in the case of total assets, total debt, and the leverage ratios).

[26] Note that we report conditional values for holders of assets and debt only. This is because by limiting the calculation of mean to holders we are able to provide more accurate estimates of the mean values, which would otherwise be underestimated due to the large number of zero observations for non-holders.

assets, and private pension wealth in the period, with the latter rising after the Great Recession. Similar trend can be observed for the mean holdings of instalment loans, which, unlike the other types of debt, continued to increase between 2007-2013. This indicates that households compensated for the falling mortgage holdings by taking on unsecured debt.

Overall, the observed differences in the values and trends of the mean and median income and wealth indicate that income growth and wealth accumulation have not been equal across the distribution. We argue that this is because of the differences in balance sheet composition across households, which generated unequal flows of capital income and debt repayments dependent on the absolute size of wealth holdings. In the next subsection, we analyse changes in the detailed components of income, assets, and debt across the quintiles of income distribution, with the top quintile broken down into households in the 80^{th}-90^{th} percentile and the top 10%[27].

1.3.1. Evolution of balance sheet composition by income group

In the previous subsection we showed that disparities in the mean and median income and wealth were driven by the heterogeneity of wealth composition and its associated income flows across households. To illustrate this argument, in this subsection we analyse the trends in income and wealth across the income distribution between 1989-2013, finding that income and net worth grew systematically faster for rich households at the top of the distribution. We argue that the dramatic disparities in the growth and values of income and wealth across the distribution were determined by differences in the accumulation of various assets and debt. These influenced the returns to wealth earned by different households depending on the size of the accumulated wealth. This is reflected by the analysis of capital income flows and debt payments associated with ownership of the different types of wealth. To demonstrate this distributional impact of wealth composition, we analyse the cumulative structure of asset portfolios and liabilities, relating it to the emergent differences in leverage across households.

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[27] The rationale for analysing balance sheet composition of households across the distribution of income rather than wealth is theoretical. Firstly, it reflects the analysis of class, which is often conceptualised in terms of income differences in the theoretical literature on inequality reviewed in Chapter 2 and extended in the theoretical model developed in Chapter 3. Moreover, by limiting the scope of analysis to the examination of wealth structures across the distribution of income, we highlight the inherent conceptual differences between income and wealth, which are often conflated in the literature on inequality and in popular discourse. Simultaneously, however, we are able to show the interrelation between both concepts. In fact, the shape of the balance sheet composition across wealth deciles is consistent with wealth structures among income groups reported in this thesis. Consequently, the approach taken here emphasises the dialogue with the existing literature and introduces the concept of wealth heterogeneity in the field dominated by the analyses of income. In the future, similar analysis can be extended to examine income composition and wealth structure across the distribution of wealth, but this is not undertaken in the present work.

Table A1.4 in Appendix I presents the median and mean values of before-tax family income and net worth across income groups between 1989-2013. The second, third, and fourth quintile experienced the slowest mean and median income growth over the period, largely due to the negative effects of the financial crisis since 2007. In particular, the median and mean income growth of the middle quintile was practically wiped out during the Great Recession, declining by 0.1% and rising by merely 0.7% respectively over the whole period. In contrast, the top decile experienced the fastest growth of the mean income of 29.4% over the period. Furthermore, the impact of the financial crisis on income of the top quintile was weaker compared to the middle quintiles.

The bottom 20% of households experienced moderate increases of 25.5% and 23.3% in their mean and median incomes respectively between 1989 and 2013. However, the mean and median net wealth of this group was expanding the fastest before the crisis compared to the rest of the distribution, rising by 188% and 166.3% respectively between 1989 and 2007. Nevertheless, some of these gains in wealth turned out to be illusory, as the median and mean net worth of the bottom quintile saw large declines of 38% and 26.4% respectively in the aftermath of the Great Recession. Net wealth losses were the most striking for the second and third quintile, with a staggering decline in the median net worth of 51.6% and 18.6% respectively between 1989 and 2013 due to a large fall in the value of the median net wealth between 2007 and 2013 of 48.9% and 37.6% respectively. Households in the fourth quintile and in percentile 80^{th}-90^{th} experienced a similar fall in their median net worth of 31.1% and 25.4% respectively between 2007 and 2013. In contrast, the rate of wealth accumulation of the top decile was higher than among households between 20^{th} and 90^{th} percentile, particularly in terms of the mean net wealth, which expanded by 104.2% over 1989 and 2007. Moreover, net wealth losses were the smallest for the top 10% after the Great Recession, with the mean and median net worth falling by 12.5% and 9.6% respectively between 2007 and 2013. Thus, unlike in the case of income, the richest households suffered the smallest losses in terms of wealth compared to the rest of the distribution.

We argue that these changes in income and wealth across the distribution were driven by disparities in asset and debt accumulation. Table A1.5 in Appendix I presents trends in asset holding across income groups between 1989-2013. We observe that asset accumulation has been uneven across the distribution, with mean asset holdings increasing systematically faster than the median.

The bottom quintile saw the largest growth in asset holdings in terms of the percentage of households owning assets from 78.8% in 1989 to 92.2% in 2013. This was driven by an increase in households owning primary residence (32.3% rising to 41.6% between 1989 and 2007, and

falling to 37.5% in 2013, which constituted the largest increase in homeownership rate across the distribution), transaction accounts (55.3% in 1989 increasing to 78.9% in 2013, which is the highest among all types of assets for this group), as well as vehicles and other non-financial assets (53.3% increasing to 63.1% over 1989-2013). In the similar period, however, there was a fall in the percentage of households in the bottom quintile owning other property (6.1% in 1989 rising to 7.5% in 2007, but declining after the crisis to 4.4% in 2013, which is the lowest participation rate for this group together with business equity), and financial investment assets (19.9% in 1989 falling to 18.3% in 2013, with an increase before the Great Recession).

Between 1989 and 2007 asset holdings of the bottom 20% increased the most rapidly compared to the other households, with the median value rising from $14,099 in 1989 to $26,610 in 2007 and the mean holdings more than doubling in that period from $62,284 to $152,383. Despite that, households in the bottom 20% saw the slowest overall growth in their median asset value of 6.5% over 1989-2013. This is because these households experienced the greatest declines in their asset value relative to the rest of the distribution in the aftermath of the 2007 crisis.

Between 2007 and 2013, the median asset holdings of the bottom quintile declined by 43.6%, compared to an average decrease of 29% for households in percentile 20^{th}-90^{th}, and a 8% fall for the top 10%, while the mean asset value fell by 23.6% compared to an average 23.5% decline for households in percentile 20^{th}-80^{th}, and an average fall of 11% for the top 20%. These trends were driven mainly by changes in the holdings of real estate, particularly primary residence, which more than doubled between 1989 and 2007, rising from $28,971 to $72,285, but declined by 30% to $50,710 in 2013. Similarly, the mean value of other property held by households in the bottom quintile increased from $4,597 in 1989 to $31,108 in 2010, but it fell dramatically to $6,857 in 2013. While the mean values of financial investment assets and business equity have also increased over time for the bottom quintile (from $9,493 to $17,989 and $6,160 to $23,204 respectively between 1989 and 2013), the percentage of households owning these assets was low relatively to the other types of assets, averaging 22.4% and 4% respectively.

In terms of households in the middle of the distribution, increases in their asset holding rates were more stagnant between 1989-2013 compared to the households in the bottom and at the top. Moreover, the second quintile saw the greatest losses in the median value of assets of -11.8% over the whole period, and a sluggish growth of 6.5% in their mean assets, with the Great Recession virtually wiping out the value of assets accumulated between 1989 and 2007. These trends were driven by the falling values of business equity and transaction accounts (which was also the case among households in the third quintile), which declined by 59.9% and 24.9% respectively over 1989-2013. In contrast, holdings of real estate and retirement accounts expanded the most rapidly

between 1989 and 2007 for households in the 20th to 90th percentile, followed by more moderate increases in financial investment asset and vehicles holdings.

In the aftermath of the Great Recession, between 2007 and 2013, the value of all types of non-financial asset holdings declined across all income groups. However, these decreases tended to be the highest for households in the middle of the distribution, particularly in the middle three quintiles. Moreover, households in 20th-80th percentile experienced losses in the value of their financial assets, which was driven by the declines in financial investment assets and retirement account holdings between 2007 and 2013 as transaction accounts continued to increase. Furthermore, in terms of asset participation rates, there was a decline in the percentage of households owning business equity and retirement accounts after the Great Recession, as well as an overall decrease in the proportion of households holding financial investment assets and other real estate between 1989 and 2013.

The top decile of the income distribution experienced the largest increases in the value of their asset holdings between 1989 and 2013, as well as the smallest asset losses in the aftermath of the 2007 crisis compared to the rest of the distribution. Both the median and the mean asset holdings nearly doubled between 1989 and 2007, rising from $853,900 to $1,525,200 and from $1,935,700 to $4,062,800 respectively. This was driven by increases in the value of retirement accounts, business equity, and financial investment asset holdings, which rose by 190.6%, 127.7%, and 124.8% respectively over 1989-2007. Moreover, increases in the mean holdings of real estate were also substantial, with the value of primary residence expanding by 95.4% and other real estate increasing by 50.6% in the period. Between 2007 and 2013, the median and mean value of assets among the top decile fell by 8.2% and 11.1% respectively, compared to an average decline of 31.9% and 20.8% for the bottom 90%. The fall was the smallest for the mean holdings of vehicle and other non-financial asset holdings, decreasing from $82,965 to $78,512 over 2007-2013, as well as financial investment asset, which fell from $903,163 to $831,500. Other real estate, business equity, and primary residence holdings experienced the largest declines in the period, falling from $488,424 to $362,340, from $1,126,670 to $875,360, and from $802,643 to $640,610 respectively. In contrast, transaction accounts holdings increased from $150,033 to $193,261 over 2007-2013, as did the mean value of retirement and insurance assets, rising from $498,445 to $569,300.

In terms of the asset ownership rates, there were substantial declines in the percentage of households in the top decile holding financial investment assets, other real estate, and business equity between 1989 and 2013, which fell by 18.9%, 8.9%, and 5.4% respectively. This indicates the growing concentration of these assets among fewer rich households, with an average of just

37.6% households in the top 10% owning business equity, 47.9% holding other real estate, and 81.7% owning financial investment assets in the period, compared to the above 90% average participation rates for the other types of assets. The overall declines in the ownership rates of these assets were the largest during and after the Great Recession, particularly for business equity which fell by 13% over 2007-2013, offsetting the 8.8% increase between 1989 and 2007. In contrast, the percentage of households in the top 10% owning retirement accounts and insurance assets continued to expand throughout the Great Recession, resulting in an overall increase of 5.6% between 1989 and 2013.

Overall, asset accumulation was the most rapid between 1989 and 2013 for households in the top 10% of the income distribution. Nevertheless, asset holdings, particularly in terms of primary residence, also expanded substantially among households in the bottom 20%, albeit at lower median and mean values. Increases in asset ownership were the most sluggish for households in the middle of the distribution, particularly between the 20th and 80th percentile. This was driven primarily by large wealth losses in the aftermath of the Great Recession for this group. Asset holdings of households in the bottom quintile also suffered, mainly due to decreases in the value of primary residence and other real estate. In contrast, the top decile experienced the smallest losses of their wealth between 2007 and 2013, unlike in the case of income, where losses were somewhat more equally distributed across households.

The fact that households in the top 10% accumulated more high-yielding assets in the period meant that they had more collateral to access debt at lower interest rates and more favourable conditions than households towards the bottom of the distribution (see Figure 1.13 above). Table A1.6 in Appendix I shows changes in the mean and median values of total debt holdings as well as participation rates and holdings of the different types of liabilities across the distribution. Debt accumulation rates were varied across the distribution between 1989 and 2013. While all households increased their debt holdings over time, the rise was the highest towards the bottom of the distribution and continued throughout the Great Recession for the bottom 40%. In contrast, debt holdings of the top 60% declined between 2007 and 2013. Moreover, there was an overall increase in the percentage of households in the bottom 80% holding debt, particularly for the first and the second quintile, whose debt ownership rate increased from 47.1% to 52.1% and 59.5% to 66.9% respectively. Given their higher asset holdings serving as collateral, the top 20% of households were the most indebted in the period, both in terms of the value of debt holdings and participation rates. Nevertheless, the percentage of households in the top quintile holding debt decreased between 1989 and 2013, from 93.7% to 87.2% for households in the 80th-90th percentile, and from 87.6% to 84.5% for the top 10%.

Households in the bottom 20% saw the most rapid debt accumulation over the period, with the mean and the median debt holdings increasing more than threefold from $9,523 to $37,739 and from $3,073 to $11,000 respectively between 1989 and 2013. The peak of debt accumulation for this group, as well as for the second and third quintile occurred in 2010, suggesting that during the crisis in 2007 households in the bottom 60% of the distribution continued to accumulate debt, perhaps to refinance debt payments on previous loans. Increases in debt holdings of the bottom quintile between 1989 and 2010 were driven mainly by secured debt, particularly debt secured by primary residence, which rose from $3,717 to $27,331. The proportion of households in the bottom 20% holding mortgages secured by primary residence increased from 7.5% in 1989 to 14.7% in 2010, peaking at 15.7% in 2004. Moreover, debt secured by other real estate increased substantially from $366 to $4,583 between 1989 and 2010, although the participation rate remained low, averaging approximately 1% over the period.

Furthermore, unsecured debt holdings increased over time among households in the bottom quintile. Between 1989 and 2007, the mean instalment debt holdings increased from $4,194 to $8,632, while credit card balances rose from $304 to $1,897. The proportion of households in the bottom quintile owning credit cards doubled between 1989 and 2004 from 15% to 30.4%, decreasing thereafter to 19.5% in 2013, while the ownership rate of instalment debt fell from 33.4% in 1989 to 27.1% in 2004. After the Great Recession, instalment debt holdings expended significantly rising to $15,945 in 2013 as the holdings of credit card balances and secured debt declined. This increase in the mean value of instalment loans was paralleled by a rise in the proportion of households in the bottom quintile owning this type of debt from 27.8% in 2007 to 32.4% in 2013, peaking at 34.1% in 2010. Moreover, immediately after the crisis between 2007 and 2010, households in the bottom 20% increased their holdings of other debt and other unsecured lines of credit, which rose from $518 to $787 and $370 to $2,854 respectively. However, while the average percentage of households owning these types of liabilities increased slightly in 2010, it remained low at 4.2% and 1.3% respectively compared to the other forms of debt. The increased accumulation of unsecured debt by the bottom 20% after the Great Recession signifies that they compensated for the falling holdings of mortgages to afford the repayments of existing loans.

Households in the middle of the distribution experienced similar trends over time in their holdings of secured debt, instalment loans, and credit card balances compared to the bottom quintile, although their ownership rates and values of debt were higher. Accumulation of mortgage debt was the most rapid among the third and fourth quintile, and these households reduced their holdings of secured debt the most in the aftermath of the Great Recession compared to the other households. This reflects that debt accumulation of these households was directly related to the

processes of securitisation and subprime lending described in section 1.2. Moreover, in contrast to the other income groups, households in the third and fourth quintile did not increase their instalment loans holdings between 2007 and 2013. Importantly, the ownership rate of unsecured debt was the highest among households in the middle of the distribution compared to households in the bottom and the top, particularly in terms of instalment debt ownership for households in the 40^{th}-90^{th} percentile, as well as credit card balances, other debt, and other unsecured lines of credit for households in the 80^{th}-90^{th} percentile.

Similarly to the rest of the distribution, households in the top decile increased their debt holdings over time, particularly between 1989 and 2010. In that period, the mean value of debt holdings of the top 10% rose from $187,676 to $403,305, while the median increased from $133,760 to $286,357. The median debt holdings of the top 10% continued to rise during and after the 2007 crisis, increasing from $265,429 in 2007 to $271,000 in 2013, while the mean value of debt declined from $387,700 to $358,225 in that period. Households in the top decile had the highest albeit declining ownership rate of secured debt in the period compared to the other income groups, averaging 74.2% and 18.2% for debt secured by primary residence and other property respectively, which reflects their greater ability to use assets as collateral. Moreover, reliance on unsecured debt among the top 10% was lower than for the other households, as their accumulation rate of unsecured debt between 1989 and 2013 was comparatively the slowest, particularly in terms of instalment loans and credit card balances.

Overall, the observed disparities in asset and debt accumulation across the distribution reflect the influence of financial sector transformation on inequality described in section 1.2. This is highlighted by the dependence of net wealth accumulation on housing among households in the bottom and the middle of the income distribution. The emergence and the subsequent burst of the housing bubble induced by the processes of securitisation and subprime lending generated substantial volatility of wealth accumulation by the low- and middle-income households. This resulted in slower growth of their overall net wealth compared to households at the top of the distribution, which indicates deepening wealth inequality. We argue that these differences in the accumulation of various assets and liabilities influenced income inequality by generating disparate income flows across the distribution related to the absolute size of wealth holdings.

To gauge this impact of wealth distribution on income inequality, we analyse changes in the receipts of various types of income across the distribution. As in the analysis of the trends in inequality in section 1.1, we distinguish between wage, capital, and transfer income, assuming that higher capital income flows reflect greater returns to wealth.

Table A1.7 in Appendix I reveals that while the bottom 90% of households experienced decreases in mean inflows of the majority of income sources, households in the top 10% saw most of their types of income increase, particularly in terms of wages, business income, and transfer income. Wage receipts of households in the bottom 80% decreased in real terms between 1989 and 2013, which was driven by a fall throughout the 2000s. In contrast, wages of households in the top 20% increased over time, and the growth was particularly rapid at 41.5% for the top 10% between 1989 and 2007. This rise in wage inequality can be explained by the increasing compensation among financial sector executives identified with households at the top of the distribution (cf. Kaplan/Rauh 2010; Philippon/Reshef 2012; Arestis *et al*. 2013)

Importantly, while wage income declined after the Great Recession, capital income inflows for the top 10% increased in the most recent wave of the data between 2010 and 2013. Households in the bottom 60% experienced capital losses around the time of the Great Recession, which we expect is driven by losses in home values given the declining house prices (see Figure 1.12 above). Conversely, households in the top 20% earned positive albeit diminishing capital gains throughout the whole period, picking up between 2010 and 2013. Furthermore, the top 10% saw their business income inflows nearly double between 1989 and 2007, declining slightly over 2007 and 2010, and recovering by 2013. In contrast, households in the bottom 90% experienced declines in their business income inflows in the whole period, apart from the bottom quintile whose mean business income grew substantially albeit averaging only $254 over the whole period. Similarly, interest and dividend income inflows decreased for the majority of income groups between 1989 and 2013, apart from the bottom 20%, for whom the amounts earned were nevertheless unsubstantial, averaging only $325 in the period. In contrast, social security and retirement income was the only income source which increased for all households across the distribution between 1989-2013, although the growth rate was declining towards the bottom of the distribution.

Similarly, there was an overall decrease in the mean inflows of transfer income across all households between 1989 and 1995, increasing thereafter for the bottom 90%, and continuing to fall for the top 10%. However, in the aftermath of the 2007 crisis the inflow of transfer income more than tripled for households in the top 10%, compared to a more modest average increase of 33% between 2007 and 2013 for the bottom 90%. In fact, households in the bottom 20% saw an overall decline in their transfer income from $3,412 in 1989 to $2,915 in 2013. This suggests that social transfers did not target those households towards the bottom of the distribution that were the most in need of income support.

Overall, not only did the top decile experienced more rapid increases in wages between 1989 and 2013 than the rest of the distribution, but their capital income receipts also grew systematically

faster. Importantly, these differences in capital income inflows across the distribution reflected disparities in wealth accumulation and the respective returns earned on different assets. In addition to affecting capital incomes, these wealth disparities translated into income inequality by influencing the amount of debt repayments across households. This is because the extension of subprime mortgage lending described in the previous section was characterised by higher interest rates charged to low-income borrowers. High debt repayments continued after the Great Recession, as holdings of unsecured debt, characterised by higher interest rates than mortgages, increased towards the bottom of the distribution.

This is highlighted by Table A1.8 in Appendix I, showing changes in the annual debt payments on mortgages, revolving credit (i.e. payments on credit cards), and consumer debt (i.e. payments on instalment loans) across the distribution. We observe that increases in debt payments between 1989 and 2013 were the highest for households in the bottom quintile. Mortgage payments for this group rose from $525 to $1,153 in this period, peaking at $1,626 in 2010, while revolving debt payments increased from $58 in 1989 to $568 in 2010, falling to $197 in 2013. Apart from a 7.3% rise for the top decile, consumer debt payments decreased over time for the bottom 90% of households. Nevertheless, immediately after the Great Recession, the mean consumer debt payments of households in the bottom 20% increased from $765 in 2007 to $1,054 in 2010. Furthermore, we observe that here are much smaller disparities in debt payments among households than they are in terms of income, suggesting that households towards the bottom of the distribution bear a greater burden of their debt holdings relative to their income.

In order to understand how differences in asset and debt holdings translated into disparities in capital income flows and leverage across the distribution, Figure 1.15 presents the cumulative asset and debt composition of households in the bottom quintile, the 20th-90th percentile, and the top 10% between 1989-2013[28]. Across all households non-financial assets contributed more to the asset portfolio than financial assets. Importantly, the share of non-financial assets (particularly primary residence) in total assets peaked before the 2007 crisis and declined since.

Asset holdings of the bottom 20% were composed primarily of non-financial assets in the period studied. Vehicles, consumer durables, and other non-financial assets were the largest component of total assets, although their share declined initially from 32% in 1989 to 26.9% in 2001, before rebounding to 33.6% in 2013. The share of principal residence in total assets increased before the 2007 financial crisis from 30.4% in 1989 to 34% in 2004 and 2007, falling to

[28] This graph is restricted to complete observations only, including households who provided responses to all types of assets and debt.

30.6% in 2013. Financial asset holdings of the bottom quintile were focused around the ownership of low-yielding transaction accounts, contributing between 20% and 22% to total assets over the whole period.

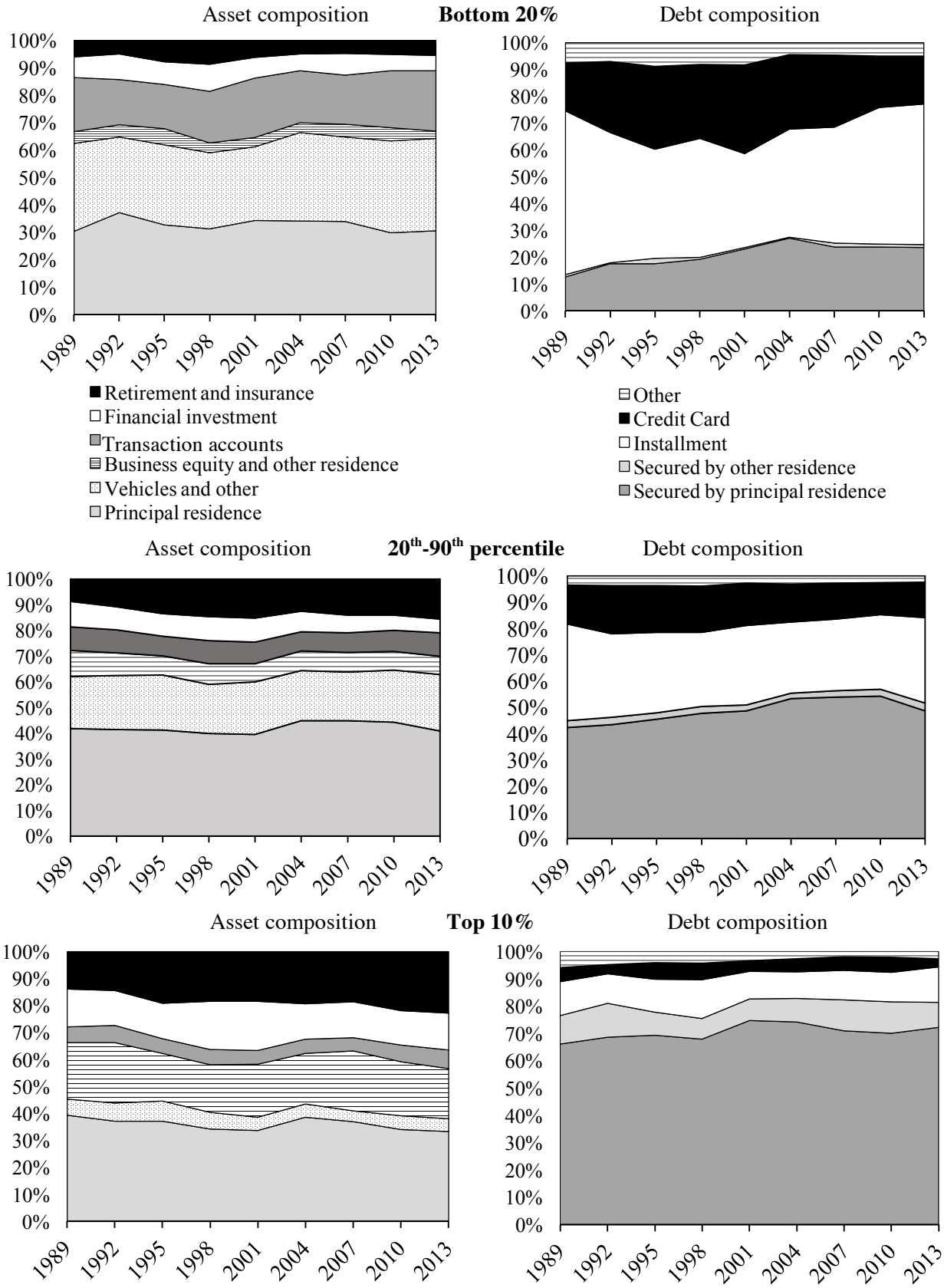
Similarly, balance sheets of the middle-income households relied heavily on primary residence, whose contribution to total assets increased from 40.8% in 1989 to 44.3% in 2004, before falling to 40.2% in 2013. Vehicles and other non-financial assets were the second largest component of the asset portfolio of households in the 20^{th}-90^{th} percentile, rising steadily from 21.8% in 1989 to 24.1% in 2013. Among financial assets, retirement and insurance assets contributed the most to the overall portfolio, and this share increased from 8.2% in 1989 to 14.4% in 2013. Transaction accounts contributed between 8-9% of total assets over the whole period, while the share of high-yielding financial investment assets decreased systematically from 10.2% in 1989 to 5.2% in 2013.

In contrast, the asset portfolio of the top 10% was much more diversified compared to the rest of households. In 2013, financial assets contributed 43.5% to the overall asset holdings of the top decile, up from 33.8% in 1989. Among financial assets, the largest contribution came from high-yielding retirement and insurance assets (23% share of total assets in 2013), as well as financial investment assets, which accounted for 13.5% of the total asset portfolio in 2013. Among non-financial assets, the contribution of business equity and other residence to total assets was the largest compared to the other income groups, accounting for around a fifth of the total portfolio between 1989 and 2013. Moreover, the share of principal residence in total assets of the top 10% decreased from 39.2% in 1989 to 33.3% in 2013.

Given these disparities in the asset composition, we observe clear differences in the structure of liability holdings across the distribution. Households in the bottom quintile relied on unsecured debt holdings, primarily instalment debt (whose share in total debt decreased from 61% in 1989 to 35% in 2001 before rising to 52.3% in 2013) and credit card debt (which became more important in the run up to the crisis, increasing from 18% in 1989 to 33% in 2001, before reaching its earlier level of 18% in 2013). The extension of mortgages to low-income households in the period raised the contribution of mortgages secured by principal residence, increasing their share in total debt from 12.7 % in 1989 to 27% in 2001 and 23.6% in 2013. Furthermore, debt accumulated by households in the 20^{th}-90^{th} percentile between 1989-2013 was composed mainly of debt secured by primary residence, instalment debt and credit card balances. The latter two became less important over time, and their shares in total debt decreased before the Great Recession, reaching 34.8% and 14.8% respectively in 2013. The share of debt secured by primary residence in total debt increased rapidly for this group from 39.6% in 1989 to 50.4% in 2004. Importantly, it kept

rising during the 2007 crisis to 51.7% in 2010, before declining to 45% in 2013. In contrast, debt holdings of households in the top decile were dominated by debt secured by primary residence and other real estate, whose share in total debt was ranging between 75% and 82% over the whole period.

Figure 1.15 Balance sheet composition by income group, USA 1989-2013 (source: U.S. Survey of Consumer Finances)



These differences in portfolio composition show that balance sheets of the middle- and low-income households were composed primarily of low-yielding assets between 1989-2013 and were thus volatile to property price movements. This is highlighted by the earlier argument that the housing market collapse shortly before the Great Recession generated a larger drop in net wealth for the middle- and the low-income households, and deepened wealth inequality. The volatility of balance sheet positions to financial shocks among these households arose due to their reliance on greater relative indebtedness driven mainly by unsecured types of debt and subprime mortgages. In contrast, the top 10% had access to more diversified financial assets with higher returns. Moreover, greater holdings of mortgages than unsecured debt towards the top of the distribution meant that these households faced more favourable borrowing conditions than households at the bottom of the distribution.

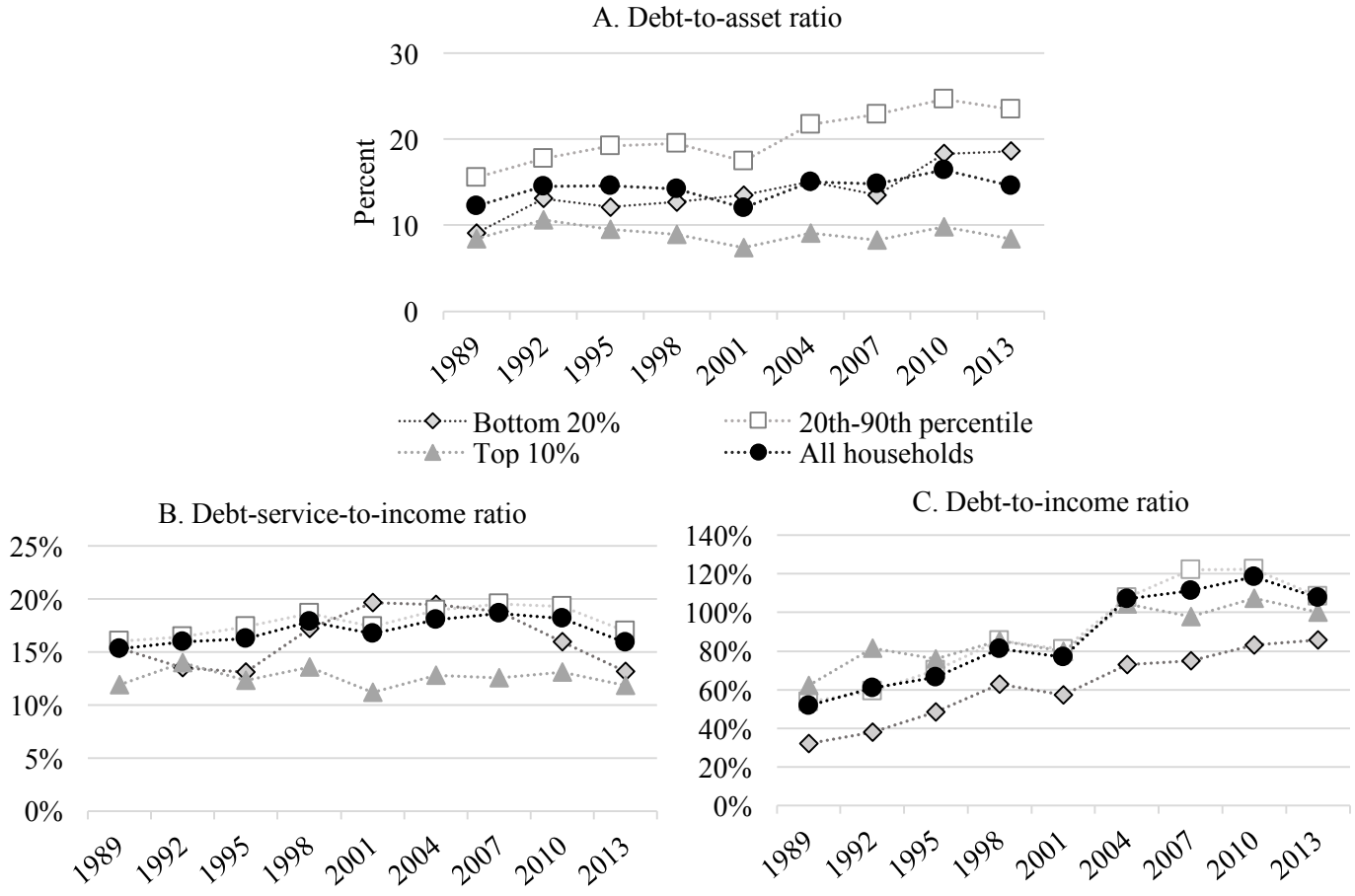
To illustrate this argument, Figure 1.16 shows changes in the conditional median of various measures of leverage across the distribution, including the debt-to-asset ratio, the debt-service-to-income ratio[29], and the debt-to-income ratio. Over the whole period, households in the middle of the distribution had the highest leverage, although the bottom 20% experienced large growth in their leverage ratios, particularly in the run up to and immediately after the Great Recession. Between 1989 and 2010, the debt-to-asset ratio of the bottom quintile increased from 9.1% to 18.3%, while the ratio for households in the 20th to 90th percentile rose from 15.6% to 24.7% (Panel A in Fig.1.16). The increase in the debt-to-asset ratio of the top 10% was substantially lower compared to the rest of the distribution, rising from 8.4% to 9.8% in the period. After the crisis, between 2010 and 2013 the debt-to-asset ratio of the top 10% and households between 20th-90th percentile declined to 8.4% and 23.5% respectively, while the ratio of the bottom 20% continued to increase to 18.6%.

The increase in leverage for the bottom 20% was particularly large in the case of the debt-service-to-income ratio, which rose from 15.3% in 1989 to 19.5% in 2004 (Panel B in Fig.1.16). The ratio among the other households rose less rapidly before the Great Recession, from 16% in 1989 to 19.5% in 2007 for households in the 20th to 90th percentile, and from 11.9% to 12.8% for the top 10% between 1989-2004. After the Great Recession, all households experienced declines in their debt-service-to-income ratio, and the fall was the highest among the bottom quintile, although in 2013 the debt-payments-to-income ratio among this group remained higher than the ratio of the top 10%. In contrast, the top decile experienced the highest levels of the debt-to-

[29] Here, the debt-service-to-income ratio is defined as the ratio of total monthly debt payments to total monthly income. The remaining two indicators are defined in terms of total debt, total assets, and total income.

income ratio, while the ratio of the bottom 20% was the lowest across all income groups in the period (Panel C in Fig.1.16). This is expected given the higher value of assets held at the top of the distribution, which serve as collateral and allow for accumulation of greater debt levels relative to income. Nevertheless, the bottom quintile experienced the most rapid increases in their debt-to-income ratio over time. Moreover, while all income groups experienced a rise in their debt-to-income ratio before the Great Recession, the ratio for households in 20th to 90th percentile and in the top decile declined between 2010 and 2013. In contrast, the debt-to-income ratio was rising steadily for the bottom quintile from 32% in 1989 to 83.2% in 2013. The sustained increase in the debt-to-income ratio and the debt-to-asset ratio for the bottom 20% suggests that these households did not deleverage after the Great Recession and their balance sheet position became increasingly fragile.

Figure 1.16 Leverage by income group, USA 1989-2013 (source: U.S. Survey of Consumer Finances)



Overall, these trends in wealth holdings and leverage reveal that there is significant heterogeneity in asset and debt accumulation across households in the different parts of the income distribution. These differences in balance sheet composition have been generated by changes in financial sector operations described in the previous section. While households at the bottom of

the distribution increased their homeownership, this was underpinned by high levels of debt. This credit was eagerly provided by subprime lenders and banks, who transformed these loans into profitable securitised instruments. This in turn benefited households at the top of the distribution, who accumulated an increasing amount of high-yielding financial investment assets and business equity in the same period. Despite increasing their debt holdings, households in the top decile were able to afford multiple types of real estate and business equity, building a diverse portfolio of assets. This had direct consequences for the returns to wealth earned through capital income flows and the stability of household financial positions across the distribution, and thus influenced wealth and income inequality.

As indicated in the previous section, the impact of financial sector transformation on inequality had specific gender, racial, and generational effects, as subprime lending targeted women, minorities, and the young. Table A1.9 in Appendix I compares the socio-economic characteristics of households in the bottom 20% and the top 10% of the income distribution. The intersectional dimension of inequality is evident, as between 1989-2013 the top decile was composed mainly of married households headed by White men. The proportion of Blacks and Hispanics in the top 10% averaged 3% and 2% respectively between 1989 and 2013, and the percentage of female-headed households decreased in the period from 5.3% to 4.2%. Moreover, households in the top decile are found to be highly educated at the college level, with the majority being employed, and around a third being self-employed, while only an average of 10% and 11% is found to be retired or out of labour force respectively. In contrast, we observe the bottom quintile to be more ethnically diverse, with an average of over a third of Black and Hispanic households. Moreover, female-headed households constituted the majority of households in the bottom 20% at an average of 57% in the period. Around a fifth of households in the bottom quintile was single in the period studied. An average of only 6% was self-employed, while more than a half of households in the bottom 20% were retired or out of labour force in the period studied. Furthermore, while on average a third of households in the bottom quintile were below 35 years old, this proportion was substantially lower among the top decile. The percentage of households in the top 10% aged less than 35 was 10.9% in 1989, and it almost halved in the period studied falling to 5.3% in 2013.

Overall, there are vivid disparities in the socio-economic characteristics of households along the distribution. These are particularly striking in terms of the gender, racial, and generational composition of the top decile, which is dominated by households headed by White males. In the next subsection, we examine the evolution of household balance sheet composition across these characteristics, in order to analyse the role of the heterogeneity of wealth composition on the trends in income and wealth accumulation across gender, race, and generations.

1.3.2. Evolution of balance sheet composition by gender

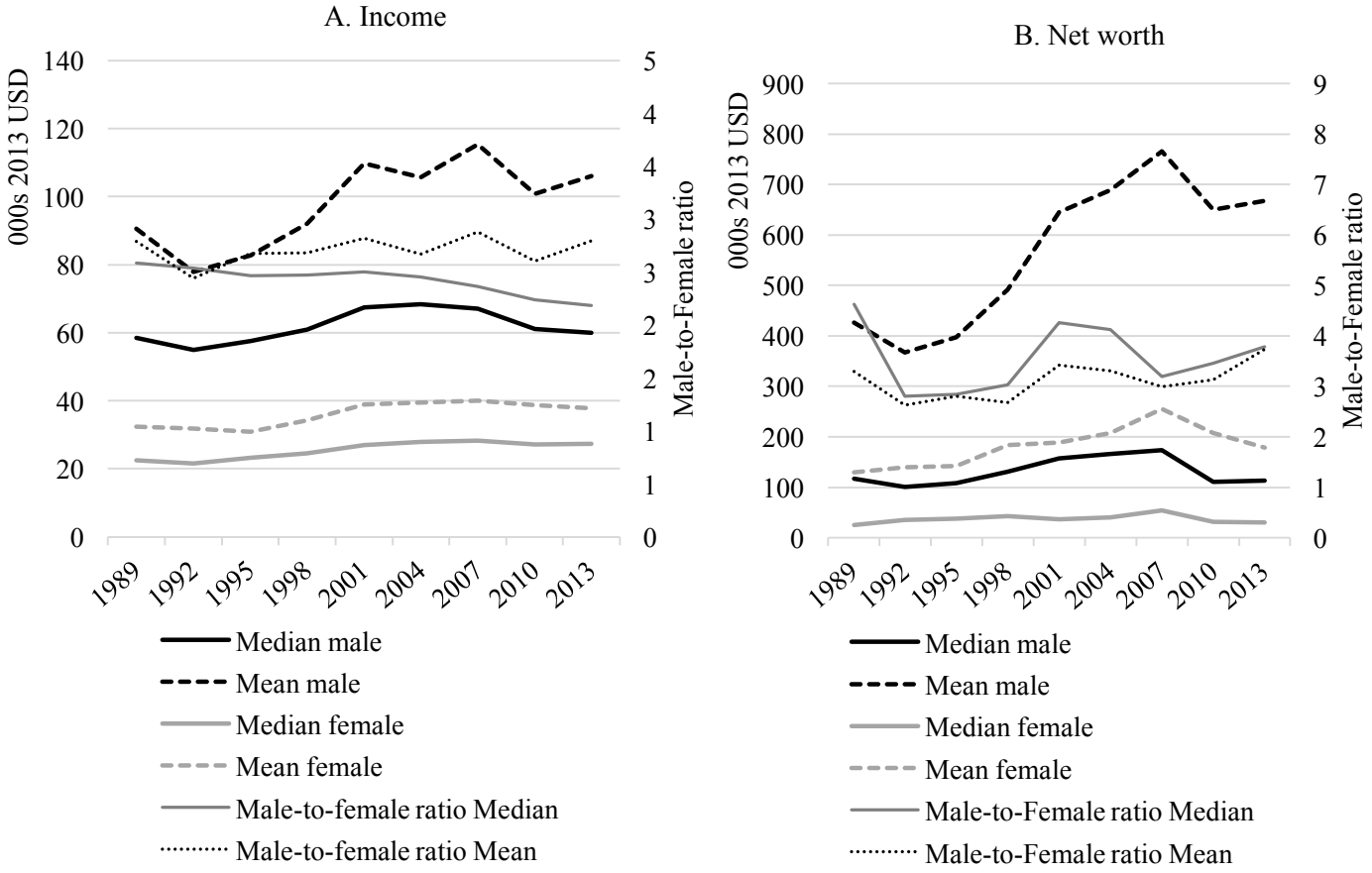
In the previous section we showed that differences in balance sheet composition across the income distribution influenced wealth and income inequality by generating disparities in capital income flows and leverage depending on the size of wealth holdings. We observed that the richest households who own the most diversified asset portfolios were characterised by a specific racial, gender, and generational profile.

Figure 1.17 compares trends in income and net worth across male and female-headed households. Table A1.10 in Appendix I presents the distribution of households across gender and the remaining social categories. Figure 1.17 shows that both the median and mean income of males was consistently higher than the mean and median income of females. The disparity between the mean and median income was higher among men than women, indicating greater inequality within this group. Growth of the mean income between 1989 and 2013 was similar across gender at around 17%, increasing from $90,500 in 1989 to $105,945 in 2013 for males and from $32,400 to $37,858 for females in the period. In contrast, the median incomes of male households rose from $58,500 to $59,900 between 1989-2013, while the median income of female-headed households increased in the period from $22,600 to $27,400. Moreover, in the aftermath of the Great Recession, male-headed households experienced greater losses in their median and mean income of 10.6% and 8.1% respectively, compared to the corresponding declines of 3.1% and 5.5% for women. Nevertheless, the ratio of male to female income did not change dramatically over time – while the median ratio decreased from 2.6 to 1989 to 2.2 in 2013, the mean ratio rose from 2.79 to 2.8 in the period, peaking at 2.9 in 2007.

In terms of wealth, disparities among men and women have increased over time, particularly in regard to the mean net worth. The median and mean net worth of female-headed households increased by 18.1% and 38.1% respectively between 1989 and 2013, rising from $25,400 to $30,000 and from $129,300 to $178,500. In that period, the mean net worth of male households expanded at a faster rate of 56.8%, increasing from $425,700 in 1989 to $667,300 in 2013. In contrast, the median net worth of male households decreased in the whole period from $117,400 in 1989 to $113,600 in 2013. This larger gap between the mean and the median net wealth for males indicates that wealth disparities were greater among male-headed households than among females. However, the Great Recession brought larger net wealth losses for women. Both the median and mean net worth of female-households fell at a greater rate of -44.8% and -30.2% respectively than the net worth of males, which declined by 34.6% and 12.9% in terms of its median and mean value respectively. In result, the ratio of male to female net worth increased after the Great Recession, rising from 3.2 in 2007 to 3.8 in 2013 in terms of median net worth and from 3 to 3.7 in terms of

the mean. Consequently, there was an overall increase in the mean male-to-female net worth ratio in the period up from its 1989 value of 3.3, while the median ratio declined from 4.6 in 1989. Moreover, since both the mean and the median ratios for net worth were higher than for income, wealth inequality across gender was higher than income inequality.

Figure 1.17 Median and mean income and net worth by gender, USA 1989-2013 (source: U.S. Survey of Consumer Finances)



As in the case of the income classes, we argue that income and wealth inequality across gender was influenced by differences in wealth composition, inducing unequal capital flows and leverage. To analyse the impact of wealth heterogeneity on gender income and wealth inequality, we analyse changes in holdings of assets and debt across male and female households, followed by the examination of differences in capital income receipts and debt payments.

Table A1.11 in Appendix I presents trends in the total asset holdings and their components across gender over time. Between 1989 and 2013, a smaller proportion of female households held assets compared to the average of 98.3% of males, although the ownership rate for females increased from 87.1% in 1989 to 95.8% in 2013. This is explained mainly by the higher proportion of women holding primary residence (an increase from 45.1% in 1989 to 53.6% in 2013), vehicles and other non-financial assets (a rise from 64.1% to 74.3% in that period), transaction accounts (75.6% increasing to 89.9%), and retirement and insurance assets (33.7% rising to 46.1%). In

contrast, the proportion of female households holding other real estate and financial investment assets declined between 1989 and 2013, from 10.3% to 8.8% with a peak of 12.1% in 2007 in terms of other property, and from 39.2% to 27.5% with a high of 45% in 1998 for financial investment assets. Moreover, while the ownership rate of business equity among females increased slightly in the period, the percentage of female households holding this asset was low, rising from 4.6% in 1989 to 5.1% in 2013.

Furthermore, there were large disparities in the values of asset holdings across gender between 1989 and 2013, with men holding approximately three times more assets than women in terms of both median and mean values. Between 1989 and 2007, asset holdings of female-headed households increased by more than holdings of males, rising from $59,650 to $122,609 in terms of the median and from $167,626 to $316,570 in terms of the mean value, compared to a corresponding increase from $180,848 to $311,598 and $496,659 to $912,296 for male households. This was driven by greater increases in the value of primary residence, business equity, and retirement and insurance assets among female-headed households. Primary residence holdings of women increased by 90% from $75,247 in 1989 to $142,860 in 2007 compared to a 84.5% rise from $148,513 to $274,056 for men. Business equity holdings of females more than doubled in the period, rising from $8,762 to $30,409, while holdings of males increased by 88% from $100,606 to $189,250. Similarly, holdings of retirement and insurance asset holdings among female-headed households more than doubled from $10,018 in 1989 to $35,607 in 2007, and continued to rise to $39,392 in 2013, while holdings of male households increased from $43,168 in 1989 to $120,949 in 2007 and $134,434 in 2013. In contrast, holdings of financial investment assets, transaction accounts, and vehicles and other non-financial assets increased to a smaller extent for women compared to men.

Despite higher increases in the overall asset accumulation between 1989 and 2007, female asset holdings declined by more during and after the Great Recession compared to males. The median asset holdings of women fell by 41.3% between 2007 and 2013 reaching $72,000 that year, while the mean holdings decreased by 26.7% to $232,033. In comparison, the median asset holdings of male households declined by 29.3% to $220,190 in 2013 as mean holdings fell by 13.8% to $786,823. This difference is explained by greater relative declines in the holdings of primary residence (32.6% fall for women to $96,310 in 2013 compared to a 25.3% fall to $204,835 for men), other real estate (50.1% decline for females vs. 20.4% for males, leading to an overall decline from $20,401 in 1989 to $14,528 in 2013 for women), business equity (59.7% fall for women to $12,265 in 2013 compared to a decline of 20.3% to $150,896 for men), and financial investment assets (19.5% decline for females from $54,693 in 1989 to $44,022 in 2013 vs. a 10%

fall for males from $159,823 to $143,861). Moreover, increases in holdings of transaction accounts and retirement and insurance assets after the crisis were lower for women than men.

Overall, higher asset ownership among male households allowed them to accumulate more secured debt than women, thus facing more favourable borrowing conditions. Table A1.12 in Appendix I examines differences in the liability holdings across gender between 1989-2013. Despite higher overall ownership rates and holdings of debt among males, female-headed households accumulated increasingly more debt between 1989 and 2013. While the debt ownership rate among males oscillated between 78% and 81% in the period, the proportion of female households holding debt increased substantially from 57.5% in 1989 to 66.2% in 2013, with a peak of 67.2% in 2010. This was driven mainly by an increase in the percentage of women holding mortgages secured by primary residence (rising from 20.2% in 1989 to 33.2% in 2007 before falling to 29.2% in 2013), and credit card debt (increasing from 30.9% to 34.1% in 2013, with a peak of 44.1% in 2004). Moreover, the proportion of women holding instalment loans increased from 38.6% in 1989 to 40.4% in 2013, with an initial decline to 31.4% in 1998. On the whole, more women held unsecured debt than mortgages in the period, while this proportion was more even among men. Furthermore, the percentage of female households owning debt secured by other real estate, other unsecured lines of credit, and other debt was small compared to men, with an average ownership rate of 2.1%, 1.5%, and 5.5% for women vs. 6.2%, 2.3%, and 8.2`% for men respectively for each of these types of debt.

In addition to the increases in the debt ownership rate for female households, the value of their liabilities rose dramatically faster compared to men. The median value of debt for female households increased from $7,953 in 1989 to $32,151 in 2010, while the mean debt holdings rose from $29,118 to $79,292 in that period. In contrast, the median debt holdings of male households nearly tripled from $37,218 in 1989 to $94,315 in 2007, while their mean debt value increased from $75,770 in 1989 to $163,211 in 2007. This is explained by higher increases in the value of mortgages secured by primary residence among female-headed households – $18,179 in 1989 rising to $57,743 in 2010, compared to an increase from $52,519 in 1989 to $121,385 in 2007 for men. In contrast, male households experienced faster growth in the mean value of debt secured by other property and credit card debt. Both groups decreased their holdings of other unsecured lines of credit over time. Furthermore, the growth rate of instalment debt holdings between 1989 and 2007 was similar across gender at approximately 34%. However, the mean value of instalment debt increased more rapidly for female households since the Great Recession, rising by 31% from $9,267 in 2007 to $12,140 in 2013, with a peak of $12,293 in 2010, compared to an increase of 7.5% from $16,094 in 2007 to $17,303 in 2013 for men. Moreover, while holdings of other debt

declined among male households, they increased for females, although the average mean value of female holdings of other debt was only $626 in the period.

These differences in the timing of the maximum value of debt holdings across gender (2010 for female vs. 2007 for males) suggest that throughout the 2007 crisis female households continued to accumulate debt (perhaps to repay the existing debt obligations), deleveraging only between 2010 and 2013, while male debt holdings continued to decrease in 2010 and 2013. The holdings of debt among male households declined by more than of women particularly in terms of mortgage debt and credit card balances, while female households continued to accumulate more instalment loans and unsecured lines of credit than men. This suggests that the debt burden continued to be higher among women after the Great Recession.

These disparities in asset and debt accumulation across gender influenced income and wealth inequality by generating differences in capital income flows and debt repayments dependent on the size of wealth holdings across these groups. To illustrate this argument, Table A1.13 in Appendix I presents the patterns of the receipts of the various types of income over time across male and female households.

The widening of the gender income gap was particularly striking in the case of capital income, specifically business income. While receipts of this type of income increased from $9,984 to $14,846 for male-headed households between 1989-2013, women saw a decline from $4,432 to $2,088 in the period. Moreover, women experienced a greater fall in their receipts of interest and dividend income than men – a 61% decline from $2,704 to $1,060 between 1989-2013 compared to a 35.5% decrease from $5,759 to $3,717 for men. Similarly, the rise in the inflows of social security and retirement income between 1989 and 2013 was lower for women than for men – a 69.3% increase from $5,587 to $9,459 compared to a 84.4% rise from $6,464 to $11,920 for male households. Moreover, while receipts of capital gains income among female-headed households declined in the period to a smaller extent than for males – a 2.3% decrease between 1989-2013 compared to a 4.7% fall for men – male-headed households earned nearly nine times more in capital gains compared to women in 2013 – $5,294 for males vs. $602 for females.

Furthermore, we observe large disparities in wage income across gender. While wages were the principal source of income for both subgroups in the period studied, the employment income of male-headed households was around three times higher than that of females. However, women experienced slightly greater growth rate in wage receipts over time – a 22.5% increase from $18,630 in 1989 to $22,814 in 2007 compared to a 20% rise from $62,166 to $74,729 for men. In the aftermath of the 2007 crisis, between 2007 and 2013, wages of females fell by less than those of males – a 7.3% decline to $21,140 in 2013 compared to a 10.4% decrease to $66,997 for males.

Nevertheless, the gender wage gap remained substantial, with males earning more than triple the amount of wages earned by female households.

Furthermore, we observe dramatically different trends in the receipts of transfer income across gender. While male households saw their transfer income inflows rise from $1,399 in 1989 to $2,948 in 2013, transfer income of women declined from $6,149 to $3,407 in this period. Given large gaps in all the other sources of income, this suggests that the policy of social transfers in the period was not sufficient to alleviate the gender income gap between 1989-2013. Table A1.15 in Appendix I shows that this is particularly worrying given that female-headed households in our sample are predominantly single (an average of 98% in the period compared to the average of 20% for males), more likely to be out of labour force (40% average in the period compared to the average of 22% among males), and with dependents (an average of 63 children per 100 single female-headed households compared to the average of 18 children per 100 single male households). Moreover, there is a degree of intersectionality within the social dimension of inequality, as on average a third of female-headed households between 1989-2013 were Black or Hispanic, compared to 18% of male households. This indicates that female-headed households constitute a particularly vulnerable group in terms of their income receipts and wealth accumulation possibilities.

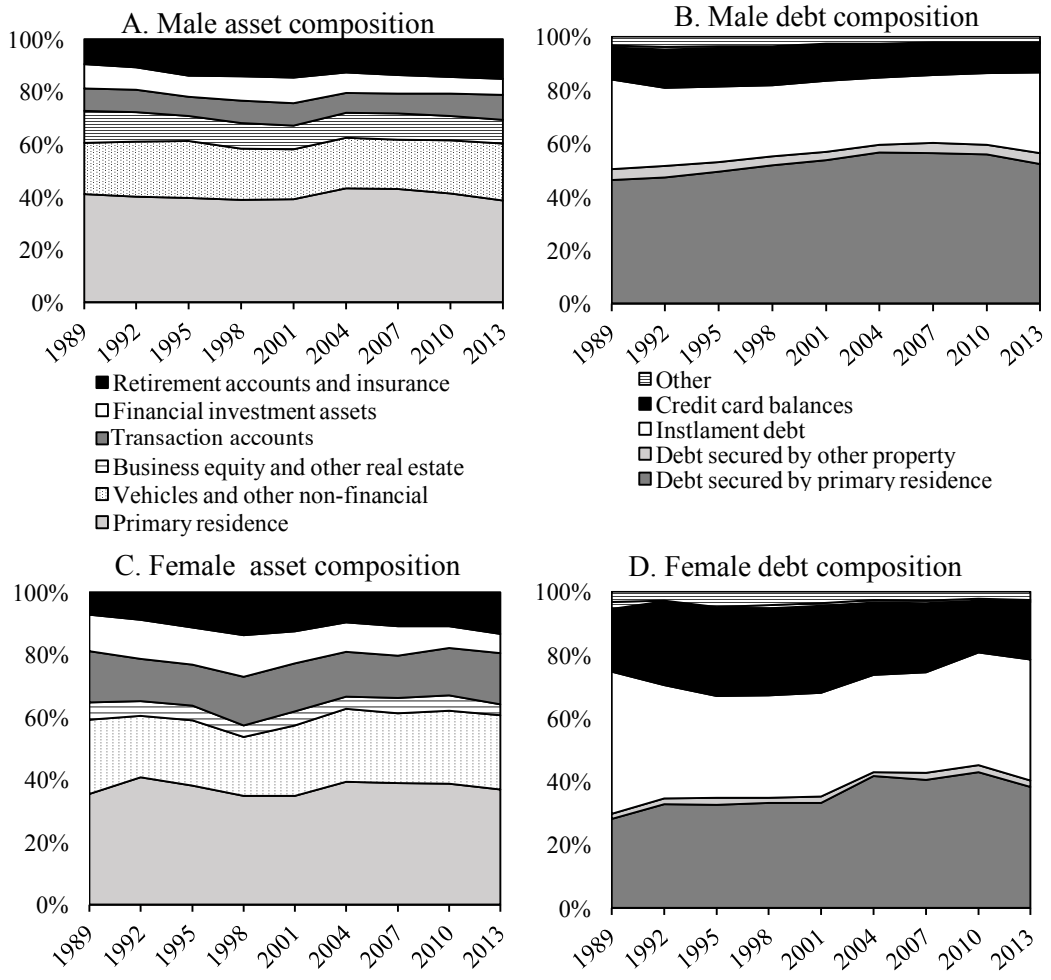
In addition to differences in capital income flows, the disparities in wealth accumulation ownership influenced debt repayments across gender. Table A1.14 in Appendix I shows that debt payments increased particularly rapidly among female households in terms of mortgage repayments, rising from $1,924 in 1989 to $4,317 in 2010 and falling to $3,368 in 2013. In contrast, mortgage payments among males grew at a slower rate, increasing from $7,009 in 1989 to $11,661 in 2007, and declining more compared to female households after the Great Recession, reaching $8,604 in 2013. Trends in payments on revolving debt were similar across gender in the period. Similarly, both groups decreased their payments on non-revolving consumer debt between 1989 and 2013, although the decline was smaller for women. Overall, given the increasing disparities of income documented above, these faster increases in debt payments among female-headed households indicate their rising debt burden.

Overall, these observed disparities in debt payments and capital income flows across gender can be understood by examining the composition of assets and debt among male- and female-headed households. Figure 1.18 shows trends in the cumulative balance sheet composition for male and female households between 1989-2013. Asset portfolios of both groups were dominated by non-financial assets, although women relied more on vehicles and other non-financial assets, which contributed approximately 23% to the overall asset holdings in the period, with a low of

19% in 1998 (Panel C). The share of primary residence in total assets of female households increased over time from 36% in 1989 to around 39% before the 2007 crisis, reaching 37% in 2013. Business equity and other real estate holdings constituted around 6% of female asset holdings in 1989, decreasing to 3% in 2013. In contrast, the asset side of men's balance sheets (Panel A) was composed to a greater extent of other real estate and business equity, which accounted for around 12% of the total asset holdings in 1989, falling to 9% in 2013. Moreover, primary residence constituted a greater share of total asset holdings among men than women, with the contribution increasing from 42% in 1989 to 43% before the 2007 crisis, and decreasing to 39% in 2013. In addition, the share of vehicles and other non-financial assets was lower for males than for female households, although it increased over time from 20% in 1989 to 22% in 2013. Among financial assets, transaction accounts contributed a greater portion to women's balance sheets, which was approximately stable over time at 16%. In contrast, the contribution of transaction accounts to male households' asset holdings increased over time from 8.5% in 1989 to 9.4% in 2013. Moreover, the share of retirement and insurance assets was higher for men, rising from 9.5% in 1989 to 15% in 2013, compared to an increase from 7% to 13% among female households. Lastly, financial investment assets initially contributed more to women's asset holdings – 12% compared to 8.5% for men – but by 2013 the share fell to 6% for both groups.

In terms of debt composition, female-headed households relied more on unsecured debt than men. Instalment loans and credit card debt contributed 45% and 20% respectively to the total debt of females in 1989, compared to a 34% and 12% share for male households. However, the contribution of unsecured debt to total liabilities decreased over time among both groups, with the share of credit card debt in total debt peaking at 28% in 2001 among female households. In contrast, the contribution of mortgages to total debt increased over time for both men and women, although the share was higher for male households. Debt secured by primary residence accounted for 46.5% of the male debt holdings in 1989, increasing to 56.6% in 2007, and falling to 52% in 2013. For female households, this type of debt contributed 28% to total debt holdings in 1989, rising to 43% in 2010, and declining to 38% in 2013. The share of debt secured by other real estate was higher for males, averaging approximately 4% between 1989-2013, compared to the average contribution of 2% to total debt holdings of female households. The average share of other types of debt (other debt and other unsecured lines of credit) averaged approximately 3.5% and 4% in the period for male and female households respectively.

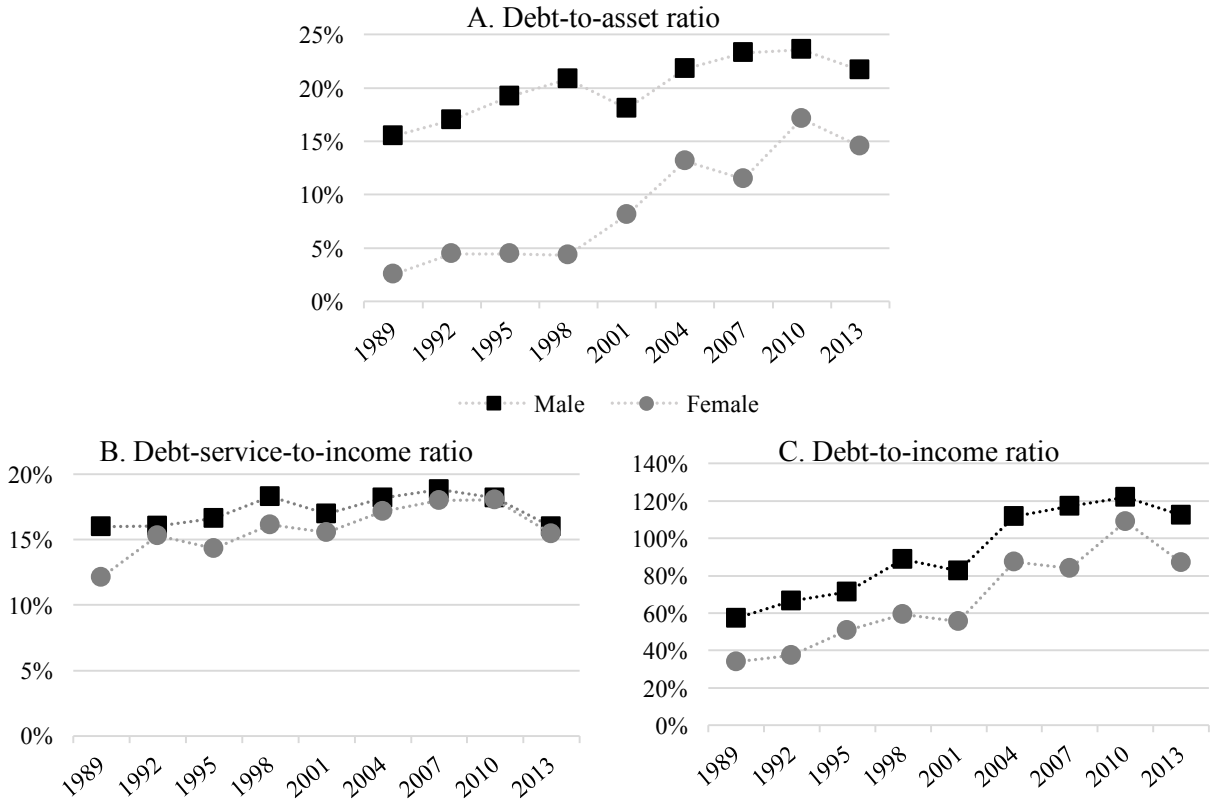
Figure 1.18 Cumulative balance sheet composition by gender, USA 1989-2013 (source: U.S. Survey of Consumer Finances)



Overall, we find that wealth portfolios of male households were more diversified than of females. This was related to the greater share of retirement assets, business equity, real estate, and secured debt in the balance sheets of males compared to females. In contrast, reliance on low-yielding or illiquid non-financial assets and transaction accounts, as well as the greater share of unsecured debt in women's balance sheets translated over time into increasing leverage of female households. Figure 1.19 shows changes in the median debt-to-asset ratio, debt-service-to-income ratio, and debt-to-income ratio conditional on holding debt across gender. While leverage was lower among female households than for males in the period, females experienced substantially faster increases in all indicators of leverage, particularly before the Great Recession. The debt-to-asset ratio of female households rose from 2.5% in 1989 to 14.5% in 2013, with a peak of 17% in 2010. In contrast, the ratio for males increased from 15.5% in 1989 to 21.6% in 2013. Importantly, while the debt-to-asset ratio among males declined in the aftermath of the Great Recession, falling from 23.3% in 2007 to 21.6% in 2013, the ratio for female households continued to rise in this period from 11.4% to 14.5%.

Moreover, due to larger increases before the Great Recession, the debt-service-to-income ratio for female households caught up with the ratio of males by 2010, rising from 12% in 1989 to 18% in 2010. The debt-payments-to-income ratio for males increased from 15.9% to 18.2% in the period. Both male and female households experienced similar decreases in their debt-service-to-income ratios in 2013 to 16% and 15.4% respectively. Similarly, the debt-to-income ratio increased faster for women than men, rising more than three-fold from 34% in 1989 to 109% in 2010. In contrast, the ratio for male households increased from 57% to 122% in the period. As in the case of the debt-service-to-income ratio, the debt-to-income ratio declined for both men and women between 2010 and 2013 to 113% and 87% respectively.

Figure 1.19 Leverage by gender, USA 1989-2013 (source: U.S. Survey of Consumer Finances)



In sum, we observe clear differences in the structure of wealth ownership and income receipts across gender. Rising inequality was particularly vivid in the case of asset ownership. Not only did fewer women hold assets compared to men, particularly in terms of business equity, financial investment assets, and real estate other than main residence, but the values of their holdings were also persistently lower than for men. Moreover, while more female households became homeowners in the run up to the Great Recession, this was associated with increasing indebtedness of this group. Consequently, female households did not deleverage in the aftermath of the 2007 crisis, continuing to accumulate debt until 2010. By 2013, decreases in debt holdings

of females were smaller than those of male households, indicating growing leverage as well as increasing debt burden on incomes. Thus, balance sheet heterogeneity emerges as a substantial determinant of wealth and income inequality across gender since the 1980s.

1.3.3. Evolution of balance sheet composition by race

In this subsection, we explore the role of wealth heterogeneity in driving the changes in income and wealth across race. This is because we observed a distinctive racial dimension of wealth and income inequality, as the top decile of the income distribution was found to consist almost exclusively of Whites.

We distinguish between four ethnic groups of the household head – White, Black, Hispanic, and other. Figure 1.20 shows trends in income and net worth across race, while Table 1.6 presents the mean and median ratios of income and wealth between White households and the other ethnic groups. We observe large disparities in both income and wealth across race, which tended to decrease over time in the median terms, but increase for mean values. All types of racial disparities analysed below increased in the aftermath of the Great Recession. The largest differentials are observed between White and Black households, as well as between Whites and Hispanics.

In terms of income, the median White household earned $54,681 in 1989, which was 2.6 times more than $20,741 earned by the median Black household. This ratio declined to 1.8 in 2013, as the median incomes of White and Black households rose to $54,788 and $30,436 respectively. The mean ratio of White to Black income increased from 2.38 to 2.41 between 1989-2013, as mean income of White households rose from $85,084 to $101,731, while Black households' mean income increased from $35,788 to $42,208 in this period. Similarly, the White-to-Hispanic median income ratio declined from 2.1 in 1989 to 1.7 in 2013, as the median income of Hispanics increased from $26,398 to $32,465. In contrast, the mean income ratio between Whites and Hispanics increased from 2.1 to 2.2 between 1989-2013, with the mean income of Hispanic households rising from $40,371 to $45,420. Conversely, the median and the mean income ratio between Whites and households from other ethnic groups averaged approximately 1 in the period, suggesting little income differentials between these groups. The median and mean income of other ethnic groups increased from $41,482 to $58,842 and from $60,256 to $92,203 respectively between 1989-2013. Furthermore, White households had the greatest differentials between the mean and median income over time, indicating higher intra-group inequality compared to the remaining ethnic groups. Overall, income increased across all races between 1989 and 2013. However, while White households experienced the slowest growth of the median and mean income between 1989 and 2007, their income losses in the aftermath of the Great Recession were comparatively the lowest.

Differences in net wealth across ethnic groups in the period were more pronounced than for income. The ratio of the median net worth of White households to Black fell from 16.8 in 1989 to 12.2 in 2013. White households increased their median wealth from $130,471 to $134,230 and the median net worth of Blacks rose from $7,773 to $11,030. In contrast, the mean White-to-Black net wealth ratio increased from 5.6 to 7.1, as mean net worth of White households rose from $418,124 to $678,737 between 1989-2013 compared to an increase from $75,008 to $95,262 for Blacks. Similarly, the ratio of the median net worth of White to Hispanic households decreased from 14.4 to 9.8 in this period, with the median net wealth of Hispanics increasing from $9,038 to $13,730. In turn, the mean ratio rose from 5.1 to 6.1, as the mean net worth of Hispanic households increased from $81,761 in 1989 to $112,227 in 2013. In contrast, wealth differences between Whites and other ethnicities were smaller compared to Blacks and Hispanics and declined over time. Between 1989 and 2013, White households held on average 1.3 and 1.8 times more wealth in the mean and median terms respectively than households from other ethnic groups. On the whole, all groups experienced increases in their net worth between 1989 and 2013, decelerating after the Great Recession. The mean net worth of White households, as well as the median and mean wealth of households from other ethnic groups increased at the highest rates. This was largely due to greater wealth losses among Black and Hispanic households during and after the 2007 crisis, which offset the net worth increases for these groups between 1989 and 2007. Furthermore, as in the case of income, disparities between mean and median net worth were the largest among White households, which indicates that within-group wealth inequality was the highest among this ethnic group.

Figure 1.20 Income and net worth by race, USA 1989-2013 (source: U.S. Survey of Consumer Finances)

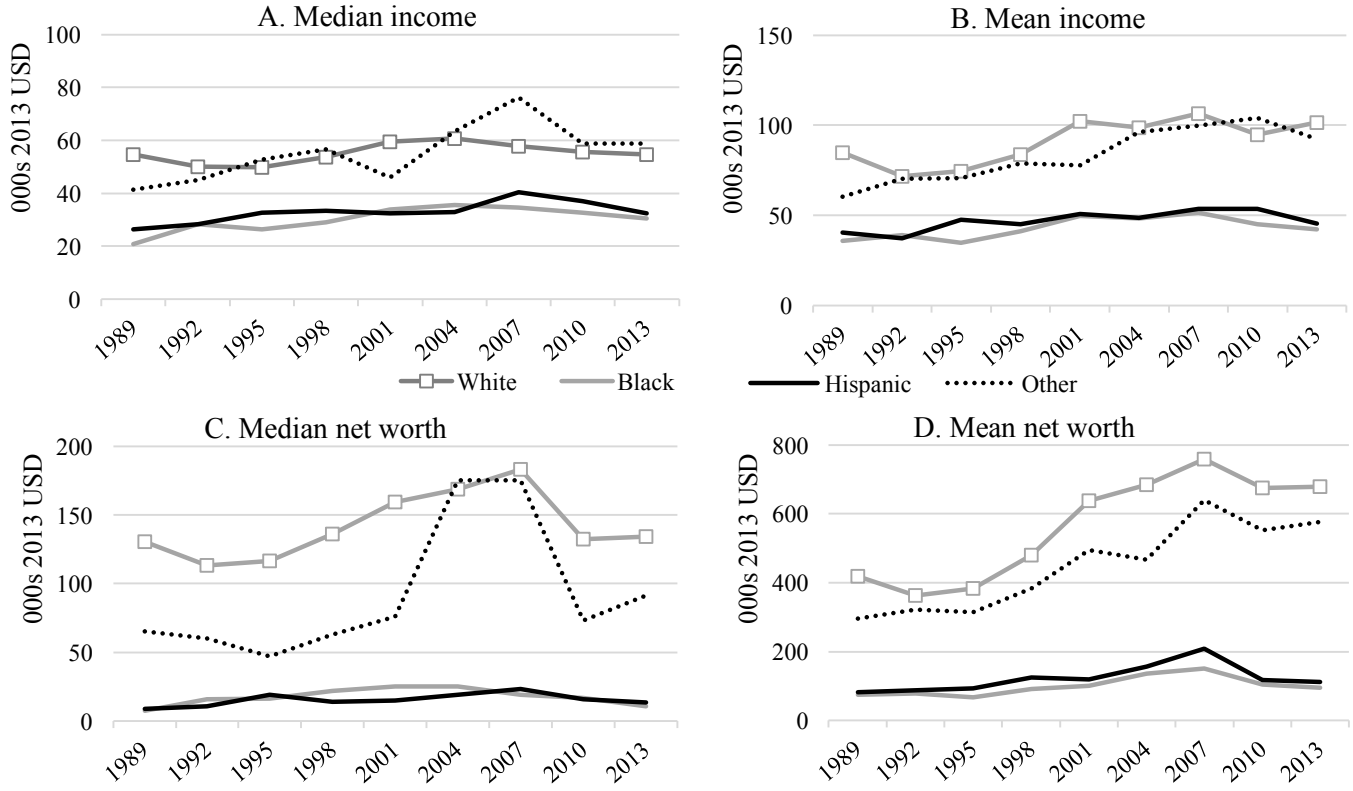


Table 1.6 Income and wealth ratios by race, USA 1989-2013 (source: U.S. Survey of Consumer Finances)

	Income						Net worth					
	White-to-Black		White-to-Hispanic		White-to-Other		White-to-Black		White-to-Hispanic		White-to-Other	
	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean
1989	2.64	2.38	2.07	2.11	1.32	1.41	16.79	5.57	14.44	5.11	1.99	1.41
1992	1.76	1.85	1.76	1.92	1.11	1.02	7.04	4.63	10.27	4.12	1.88	1.13
1995	1.88	2.15	1.52	1.57	0.94	1.05	7.03	5.74	6.14	4.10	2.47	1.22
1998	1.85	2.03	1.61	1.86	0.95	1.07	6.13	5.23	9.67	3.87	2.15	1.26
2001	1.76	2.06	1.83	2.02	1.29	1.32	6.35	6.35	10.47	5.30	2.09	1.29
2004	1.71	2.04	1.85	2.03	0.96	1.02	6.67	5.02	8.81	4.39	0.96	1.47
2007	1.67	2.07	1.43	1.99	0.76	1.07	9.55	5.02	7.77	3.64	1.05	1.18
2010	1.70	2.10	1.50	1.77	0.94	0.91	7.92	6.43	8.23	5.78	1.81	1.22
2013	1.80	2.41	1.69	2.24	0.93	1.10	12.17	7.12	9.78	6.05	1.47	1.18

We argue that these trends in income and wealth contributing to higher racial inequality, particularly in the mean terms, were shaped by the differences in wealth accumulation across race. Table A1.16 in Appendix I shows trends in asset ownership across ethnic groups. We observe substantial disparities in asset holdings across race, with Whites and households from other ethnic group owning systematically more assets than Blacks and Hispanics. Between 1989 and 2013, the percentage of Black households holding any asset increased dramatically from 76.7% to 93%. Similarly, the proportion of Hispanic households owning assets rose from 86.5% to 95.6% in the period. Asset ownership rates were higher among White and other households, averaging 99% and 97% respectively.

The increases in asset ownership among Blacks and Hispanics were driven primarily by a rise in the proportion of households owning vehicles and other non-financial assets (rising from 57.6% in 1989 to 73.7% in 2013 for Blacks, and from 77% to 81% for Hispanics), transaction accounts (an increase from 56.7% to 83.3% for Blacks, and 63.5% to 85.4% among Hispanics), and, to a smaller extent, retirement and insurance assets (ownership rate of 33% in 1989 rising to 44.4% in 2013 among Blacks, and 26% increasing to 28.7% for Hispanics, with higher values in the 1990s), as well as primary residence. The homeownership rate was the lowest among Hispanics compared to the remaining ethnic group, increasing from 42% in 1989 to 49.2% in 2007 before declining to 44% in 2013. The homeownership rate of Black households rose from 42.4% in 1989 to 50.2% in 2004 before the crisis, falling to 44% in 2013. In contrast, the homeownership rate of White households increased from 70.5% in 1989 to 75.8% in 2004, decreasing to 73% in 2013, while among other ethnic groups the rate rose from 53.9% in 1989 to 60% in 2013, with a peak of 63.4% in 2007.

Moreover, while the percentage of Black and Hispanic households owning business equity increased over time from 5.5% to 6.3% and from 4.8% to 6.1% respectively, the proportion remained small, especially relative to White and other households, whose business equity ownership rate averaged 15% and 14% respectively between 1989-2013. In contrast, the percentage of households owning financial investment assets and other real estate decreased between 1989 and 2013 across all ethnic groups. The average ownership rate of other real estate among Blacks and Hispanics was 11% and 9% respectively, which constituted approximately half of the average ownership rate among Whites and other households of 21% and 17.5% respectively in the period. Similarly, the percentage of households owning financial investment assets averaged 25.7% and 18.7% among Blacks and Hispanics respectively, compared to the average rate of 55% among Whites and 44.5% for households from other ethnic groups.

These differences in asset ownership rates race were mirrored by disparities in the value of asset holdings. While increases in the median and mean asset value were the highest for Black, Hispanic, and other households, they experienced the greatest asset losses in the aftermath of the Great Recession compared to Whites. Moreover, the value of asset holdings among Blacks and Hispanics was systematically lower than that of Whites and other ethnic groups. The median asset value of Blacks increased from $48,497 in 1989 to $76,013 in 2007, declining to $44,120 in 2013, while the mean value rose from $124,000 to $245,352 between 1989-2007, falling to $157,722 in 2013. The median asset value of Hispanics increased from $29,283 in 1989 to $79,303 in 2007, declining to $39,870 in 2013, and the mean value rose from $137,535 in 1989 to $322,496 in 2007, decreasing to $175,513 in 2013. In contrast, the median value of asset holdings among Whites surpassed the mean of both Hispanics and Blacks at $179,727 in 1989, rising to $295,744 in 2007 before falling to $231,500 in 2013. Moreover, mean asset holdings of Whites increased from $477,934 to $881,188 between 1989-2007, declining to $786,532 in 2013. Similarly, the median asset holdings of other ethnic groups rose from $87,306 in 1989 to $328,755 in 2007, decreasing to $190,200 in 2013, while the mean value increased from $364,556 to $804,212 between 1989-2007, falling to $717,768 in 2013.

The growth of asset holdings among Blacks and Hispanics is explained by increases in the value of primary residence, retirement and insurance assets, and business equity. Between 1989 and 2007, Blacks increased their mean holdings of primary residence from $61,636 to $124,715, while the holdings of Hispanics rose from $72,630 to $159,945. However, the value of homes among these groups declined substantially after the Great Recession, to $70,605 for Blacks and $86,779 for Hispanics in 2013. In contrast, the mean value of primary residence among Whites and other ethnic groups increased from $143,957 to $263,465 and from $127,826 to $289,684 respectively between 1989-2007, decreasing to a smaller extent after the crisis, reaching $202,566

and $254,371 respectively in 2013. Furthermore, despite rapid increases of retirement and insurance asset holdings among Blacks and Hispanics, the rise was higher for Whites and other ethnic groups. The mean holdings of retirement and insurance assets increased from $10,408 to $36,434 for Blacks between 1989-2007, and from $10,427 to $24,872 for Hispanics, declining to $23,003 and $13,521 respectively in 2013. In contrast, the value of holdings for Whites rose from $40,837 in 1989 to $139,925 in 2013, continuing to expand during and after the 2007 crisis, while the mean holdings of other ethnic groups increased from $21,351 to $85,450 in that period, peaking at $112,941 in 2010. Similarly, while the mean holdings of business equity expanded the most among Blacks and Hispanics, their value was substantially lower than that of Whites and other ethnic groups. The mean value of business equity of Blacks increased from $5,070 to $22,449 between 1989-2013, with a high of $23,397 in 2004, while holdings of Hispanics rose from $6,224 to $31,185 in these years, peaking at $41,219 in 2007. In contrast, the mean value of business equity among Whites increased from $91,127 in 1989 to $176,695 in 2007 before falling to $139,222 in 2013, while holdings of other ethnic groups rose from $106,673 to $195,360 between 1989-2007, decreasing to $151,040 in 2013.

Moreover, increases in the value of financial investment assets holdings were substantial among Hispanics before the 2007 crisis, rising from $5,414 in 1989 to $21,150 in 2004, but they fell steeply after the Great Recession to $9,072 in 2013. The holdings among Blacks rose from $9,445 in 1989 to $17,171 in 1998, declining thereafter to $9,135 in 2013. In contrast, holdings of financial investment assets among Whites nearly doubled from $86,848 to $155,005 between 1989-2013, while the mean holdings among other ethnic groups increased from $19,505 in 1989 to $80,510 in 2013, peaking at $109,219 in 2010. Furthermore, while Blacks and Hispanics experienced increases in the value of other real estate between 1989-2007, large losses in the aftermath of the Great Recession resulted in an overall decline in the value of these holdings in the whole period. The mean value of other real estate among Blacks expanded from $17,790 in 1989 to $29,492 in 2007 before declining to $13,429 in 2013, while the holdings of Hispanics grew from $23,124 to $59,107 between 1989-2007, falling to $14,058 in 2013. In contrast, the post-crisis losses in the value of other real estate were relatively lower among Whites and other ethnic groups, leading to an overall increase in these holdings between 1989 and 2013. The mean value of other real estate among Whites rose from $62,837 to $77,794 in 2013, peaking at $91,271 in 2007, while the holdings of other ethnic groups increased from $56,937 to $81,478 between 1989-2013, with a high of $115,014 in 2007.

Similarly, Whites and other ethnic groups saw larger increases in the value of transaction accounts compared to an overall zero and negative growth for Blacks and Hispanics respectively. The mean holdings of Whites rose from $28,046 to $43,544 between 1989-2013, while the

holdings of other ethnic groups increased from $13,008 to $41,099 in the period. In contrast, the mean value of transaction accounts for Blacks was $6,534 in 1989, rising to $7,515 in 2007 before declining to $6,558 in 2013. The holdings among Hispanics decreased over the period from $8,365 to $5,949 between 1989-2013, with a peak of $13,321 in 1998. Moreover, due to large losses in the Great Recession Blacks experienced an overall decrease in their holdings of vehicles and other non-financial assets from $13,116 to $12,543 between 1989-2013, peaking at $15,570 in 2007. In contrast, the holdings of Hispanics rose from $11,330 in 1989 to $18,921 in 2004 before falling to $14,949 in 2013. In addition, vehicles and other non-financial assets holdings among Whites and other ethnic groups increased between 1989 and 2013 from $24,282 to $28,477 and from $19,256 to $23,820 respectively, with comparatively smaller reductions in the value of these assets after the Great Recession.

The above disparities of asset holdings influenced debt accumulation possibilities across race. Table A1.17 in Appendix I presents changes in debt holdings across ethnic groups. The percentage of households owning debt was more uniform across race than in terms of assets. The debt ownership rate among Blacks increased the most compared to the remaining ethnic groups, rising from 65% in 1989 to 77.2% in 2007, and declining to 75.4% in 2013. Similarly, the proportion of White households holding debt increased in the period from 73.2% in 1989 to 77.9% in 2004, falling to 75% in 2013. In contrast, the percentage of Hispanics and households from other ethnic groups holding debt decreased between 1989 and 2013, which was driven by declines after the Great Recession. The proportion of Hispanics owning debt rose from 72.4% in 1989 to 74% in 2007, declining to 70.6% in 2013, while the debt ownership rate for other ethnic groups rose from 76.6% in 1989 to 82.6% in 2007 before decreasing to 72.5% in 2013.

The increase in the percentage of Blacks holding debt between 1989 and 2013 is explained by higher proportion of these households holding mortgages secured by primary residence (an increase from 24.8% in 1989 to 38.2% in 2007, declining to 30% in 2013), instalment debt (47.4% ownership rate in 1989 increasing to 55.7% in 2013, with a low of 39.3% in 1998), and credit card balances (33.4% rising to 52% in 2001 before declining to 36.1% in 2013). The expansion of debt ownership among Hispanics can be attributed to rapid increases in the percentage of households owning credit card debt (34.7% in 1989 rising to 41.8% in 2013, with a peak of 56% in 1995), and mortgages secured by main residence (31% increasing to 37.9% between 1989-2010 before declining to 29% in 2013). In contrast, the proportion of Hispanics holding instalment debt declined in the period from 52% in 1989 to 43% in 2013. Similarly, ownership of instalment loans decreased over time for Whites and households from other ethnic groups, from 49.3% to 46.1% and 51.6% to 45.5% respectively. In addition, Whites and other households decreased their ownership rate of credit card debt between 1989 and 2013, from 41.4% to 38.6% and 36.9% to

29% respectively. In contrast, the percentage of Whites and households from other ethnic groups holding mortgages increased over time. The ownership rate of debt secured by primary residence among Whites rose from 43% in 1989 to 51.8% in 2007, declining to 47.9% in 2013, while the rate among other ethnic groups increased from 36.6% to in 1989 to 51.9% in 2007 before falling to 40.4% in 2013. Moreover, the ownership rate of debt secured by property other than main residence increased for both groups, from 5.8% to 6.1% for Whites between 1989-2013, and from 5.7% in 1989 to 6.1% in 2010 for other ethnicities, falling to 5.7% in 2013. In contrast, the ownership rate of debt secured by other real estate averaged just 3% for both Blacks and Hispanics in the period. Lastly, the ownership rate of other unsecured lines of credit averaged approximately 2% across all races between 1989-2013, while the average ownership rate of other debt averaged 7% for all groups.

Despite similarity of debt ownership rates across race, the value of debt holdings of Blacks and Hispanics was lower between 1989 and 2013 than for Whites and other ethnic groups. The value of debt holdings increased for all ethnicities in the period, with Blacks and Hispanics deleveraging more than Whites and other ethnic groups in the aftermath of the Great Recession. Debt holdings of Black households increased rapidly in the period, with the median value rising from $9,038 in 1989 to $32,561 in 2007, decreasing to $25,540 in 2013, and the mean value increasing from $30,972 to $98,621 between 1989-2007 before declining to $68,216 in 2013. Similarly, the median debt holdings of Hispanics rose from $15,943 in 1989 to $58,835 in 2007, falling to $25,000 in 2013, while their mean holdings increased from $51,347 to $131,971 between 1989-2007, decreasing to $78,706 in 2013. Among White households, the median debt holdings expanded from $34,037 to $89,379 in 2010, indicating continued debt accumulation immediately after the 2007 crisis, falling to $80,000 in 2013. The mean value of debt for White households rose from $71,275 in 1989 to $153,565 in 2010, decreasing to $135,831 in 2013. Moreover, the median debt holdings of other ethnic groups rose from $19,883 to $109,313 between 1989-2010, falling to $83,000 in 2013, while the mean value of debt increased from $76,441 in 1989 to $202,027 in 2010, declining to $184,280 in 2013.

Increases in debt holdings among Blacks and Hispanics were driven primarily by the rising value of credit card debt and mortgages secured by main residence. The rise in the mean value of credit card balances was particularly high among Hispanics, increasing from $1,585 to $4,343 in 2007 before falling to $2,512 in 2013. The holdings of Blacks rose from $1,967 to $3,666 in 2007, but declined to $1,667 in 2013, resulting in an overall decline in the period. Similarly, other ethnic groups experienced an overall reduction in the value of their credit card debt between 1989 and 2013, decreasing from $2,263 to $1,884, with a peak of $4,775 in 2004. In contrast, the holdings of credit card balances increased over time among Whites, from $1,864 in 1989 to $3,323 in 2013,

peaking at $5,249 in 2007. Furthermore, the mean value of mortgages secured by primary residence among Blacks rose from $18,785 in 1989 to $73,885 in 2007, decreasing to $45,820 in 2013, while holding of Hispanics increased from $36,133 to $92,607 between 1989-2007 before falling to $60,810 in 2013. Similarly to the other types of debt, the value of mortgages secured by main residence was higher among Whites and other ethnic groups. The mean holdings of Whites increased from $49,049 in 1989 to $99,886 in 2013, peaking at $114,438 in 2010, which suggests continued accumulation of mortgages by Whites immediately after the Great Recession. The holdings of other ethnic groups rose from $54,723 to $159,398 between 1989-2007, falling to $149,089 in 2013.

Moreover, the value of mortgages secured by other real estate among Blacks and Hispanics grew rapidly between 1989 and 2007, but it declined substantially in the aftermath of the Great Recession. Moreover, the overall value of these holdings was small compared to the other types of debt. The mean value of mortgages secured by other property increased from $1,442 in 1989 to $8,166 in 2007 among Blacks, falling to $4,586 in 2013, while the holdings of Hispanics rose from $3,582 to $18,568 between 1989-2007 before declining to $3,369 in 2013. In contrast, these holdings increased for Whites and other ethnic groups between 1989 and 2013, rising from $5,506 to $13,169 and from $8,890 to $14,832 respectively, with a high of $15,862 for Whites and $21,540 for other ethnic groups in 2010.

Furthermore, the mean value of instalment loans increased across all ethnic groups over time, although the increases were the fastest among Blacks and Hispanics. Holdings of instalment debt among Blacks rose from $8,448 in 1989 to $15,720 in 2013, peaking at $16,861 in 2010. Similarly, the mean holdings of instalment debt among other ethnic groups increased from $9,710 to $16,480 between 1989-2007, with a high of $19,114 in 2010. The continued rise in instalment debt holdings between 2007 and 2010 among Blacks and other ethnic groups indicates that they may have accumulated this type of unsecured debt to compensate for the falling value of mortgages and credit card balances. In contrast, while the holdings of instalment loans among Hispanics increased from $7,879 in 1989 to $13,948 in 2007, they declined steadily after the Great Recession to $11,278 in 2013, suggesting that these compensation effects were weaker among this group. Moreover, White households experienced a steady increase in the value of their instalment loans between 1989-2013, rising from $11,635 to $16,701. Lastly, the mean value of other unsecured lines of credit was particularly small relative to the other types of debt across all racial groups, averaging $950, $396, $238, and $106 among Whites, other ethnic groups, Hispanics, and Blacks respectively between 1989-2013. Moreover, the value of other debt holdings decreased in this period among all groups, and averaged $2,230 for Whites, $1,616 for other ethnic groups, $972 for Hispanics, and $705 for Blacks.

The above differences in wealth accumulation across race influenced income inequality by generating disparate capital income flows and leverage dependent on the size of wealth holdings. Table A1.18 in Appendix I presents trends in wages, capital income, and transfer income across race. We observe that income from capital gains increased over time among Whites and other households, rising from $5,456 in 1989 to $5,525 in 2013, with a peak of $8,118 in 2007 for Whites, and from $298 to $1,340 in 2013 for other ethnic groups, with recorded mean capital losses of $326 in 2007. In contrast, capital gains receipts declined for Black households in this period, from $185 in 1989 to $141 in 2013, with a pre-recession peak of $1,003 in 2007. Similarly, Hispanic households experienced decrease in their realised capital gains inflows from $587 in 1989 to $53 in 2013, with a peak of $796 in 2007 followed by capital losses of $520 in 2010. Furthermore, Blacks and Hispanics experienced smaller increases in their receipts of social security and retirement income in the period, rising from $4,479 to $7,446 and from $1,925 to $3,384 respectively between 1989-2013, while White households recorded an increase from $7,147 to $13,649 in the period.

In contrast, Blacks and Hispanics experienced greater increases in their business income receipts than White and other households, although at substantially lower magnitudes. Business income inflows for Black households rose from $689 in 1989 to $3,759 in 2007, declining to $2,096 in 2013, while Hispanics saw an increase from $2,911 in 1989 to $4,694 in 2013, with a peak of $5,780 in 2001. The receipts of income from business ownership were substantially higher among White and other households, rising from $10,238 to $14,156 and from $9,787 to $10,585 respectively between 1989-2013. Similarly, the inflows of interest and dividend income were higher for White and other households, decreasing from $6,232 in 1989 to $4,004 in 2013 for the former, and rising from $1,756 to $2,215 for the latter. In contrast, Black households received $435 in interest and dividend payments in 1989, declining to $319 in 2013, while the mean value of the receipts among Hispanic households fell from $1,298 in 1989 to $58 in 2013.

Furthermore, we observe that Whites and households from other ethnic groups experienced greater increases in their wage income between 1989-2007 and lower losses after the 2007 crisis compared to Black and Hispanic households. Wages of White households rose from $55,449 in 1989 to $65,072 in 2007, declining to $60,838 in 2013, while wages of other ethnic groups increased from $44,486 to $79,931 between 1989-2007, falling to $71,540 in 2013. In contrast, wage receipts of Black households rose from $28,706 to $38,978 in 2007, decreasing to $29,033 in 2013, while wages of Hispanics increased from $34,887 to $43,698 between 1989-2007, falling to $35,259 in 2013. This volatility indicates greater degree of employment insecurity among minority households.

Lastly, transfer income inflows were more uniform across the analysed ethnic groups, with the highest values recorded in 1992. Hispanic households experienced the largest increase in their transfer income receipts, rising from $1,445 in 1989 to $2,116 in 2013. Similarly, transfer income of White households increased from $2,734 to $3,254 in the period. In contrast, Black households saw their transfer income receipts fall between 1989 and 2013, from $2,973 to $2,835, as did households from other ethnic groups, whose inflows decreased from $4,345 to $3,404. Given large disparities in the other sources of income, this indicates that policy of social transfers in the USA in the period did not do enough to alleviate racial disparities in income, particularly for Blacks.

Apart from the disparities in capital income flows, balance sheet composition influenced the amount of debt repayments across race. Table A1.19 in Appendix I presents trends in payments on various types of debt by race. Mortgage payments constituted the largest source of debt payments across all groups. Black households experienced the fastest increases in mortgage repayments, which nearly tripled form $2,513 in 1989 to $6,883 in 2007, declining to $3,970 in 2013. Mortgage payments of Hispanic households more than doubled in that period, rising from $3,963 in 1989 to $8,275 in 2007, before falling to $4,421 in 2013. Similarly, other ethnic groups increased their payments on mortgages more than twofold from $6,410 in 1989 to $13,925 in 2007, falling to $10,096 in 2013. Mortgage payments of White households increased to a smaller extent in the period, rising from $6,200 in 1989 to $7,983 in 2013, with a peak of $9,971 in 2007. Furthermore, revolving debt payments increased between 1989-2013 for Whites and Hispanics, but declined among Blacks and other households, Moreover, there was an overall decrease in the mean consumer debt payments across all ethnic groups, with a rise between 1989-2007 for Hispanics and other households. Overall, the disparities in debt payments across ethnic groups were substantially lower than the differences in income. This indicates that the debt burden was higher for Blacks and Hispanics, whose incomes were systematically lower than those of White and other households.

The above differences in debt payments and capital income flows across ethnic groups stem from the disparate composition of asset and debt holdings across race. Figure 1.21 shows the cumulative balance sheet composition of the analysed ethnic groups. Between 1989 and 2013, asset holdings of Black and Hispanic households relied more on vehicles and other-non-financial assets compared to Whites and other ethnic groups. These assets comprised 26% of the total assets of Blacks in 1989 increasing to 30% in 2013, and the average of 37% of total assets of Hispanics (with a low of 33% in 2007), compared to the average share of 18% and 21% for White and other households respectively. In contrast, asset holdings of Whites and households from other ethnic backgrounds were composed in greater part of business equity, other real estate, and financial investment assets. The share of business equity and other real estate declined over time from 11%

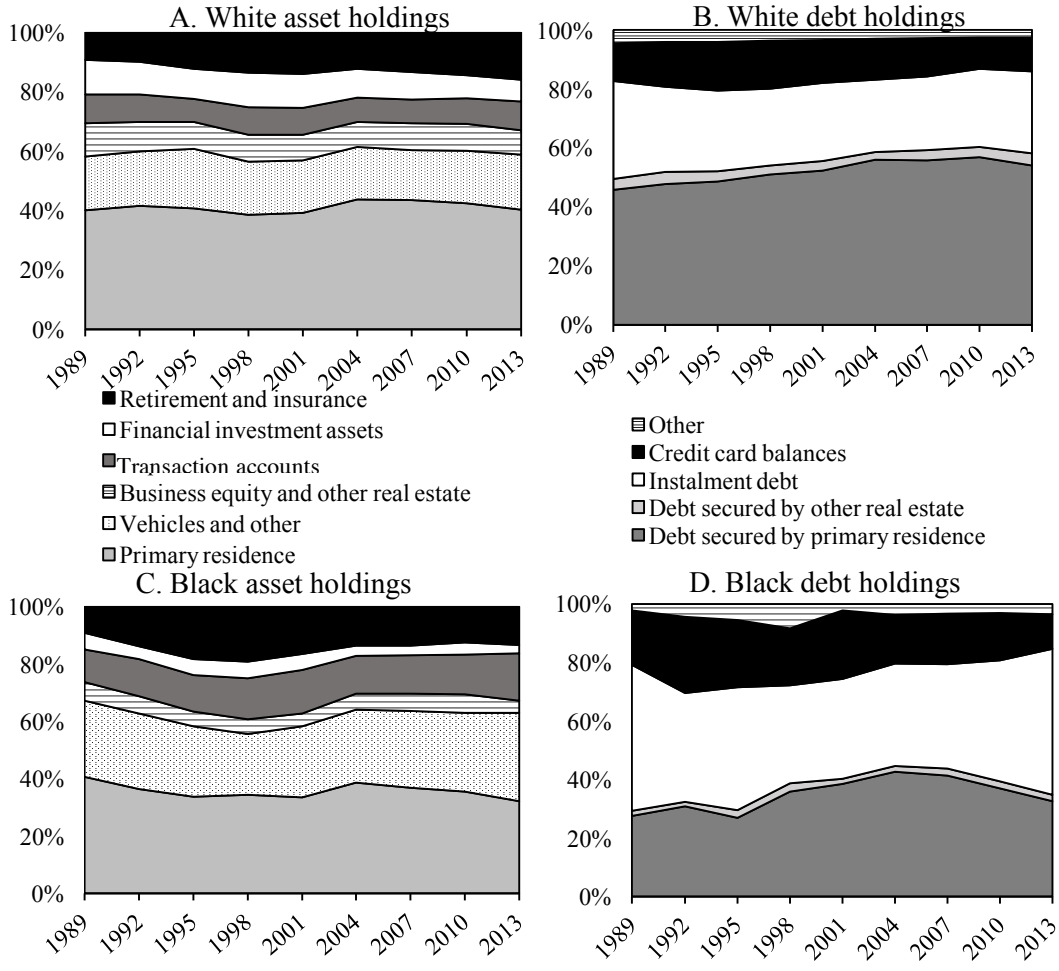
to 8% for Whites and from 12% to 8.7% for other ethnic groups, compared to an average contribution of 5% for both Blacks and Hispanics between 1989 and 2013. Similarly, the share of financial investment assets fell from 11% to 7.5% between 1989 and 2013 for Whites, and averaged 7.5% in the period for other ethnic groups, compared to an average contribution of 3% for Hispanics, and a share of 6% decreasing to 3% for Blacks.

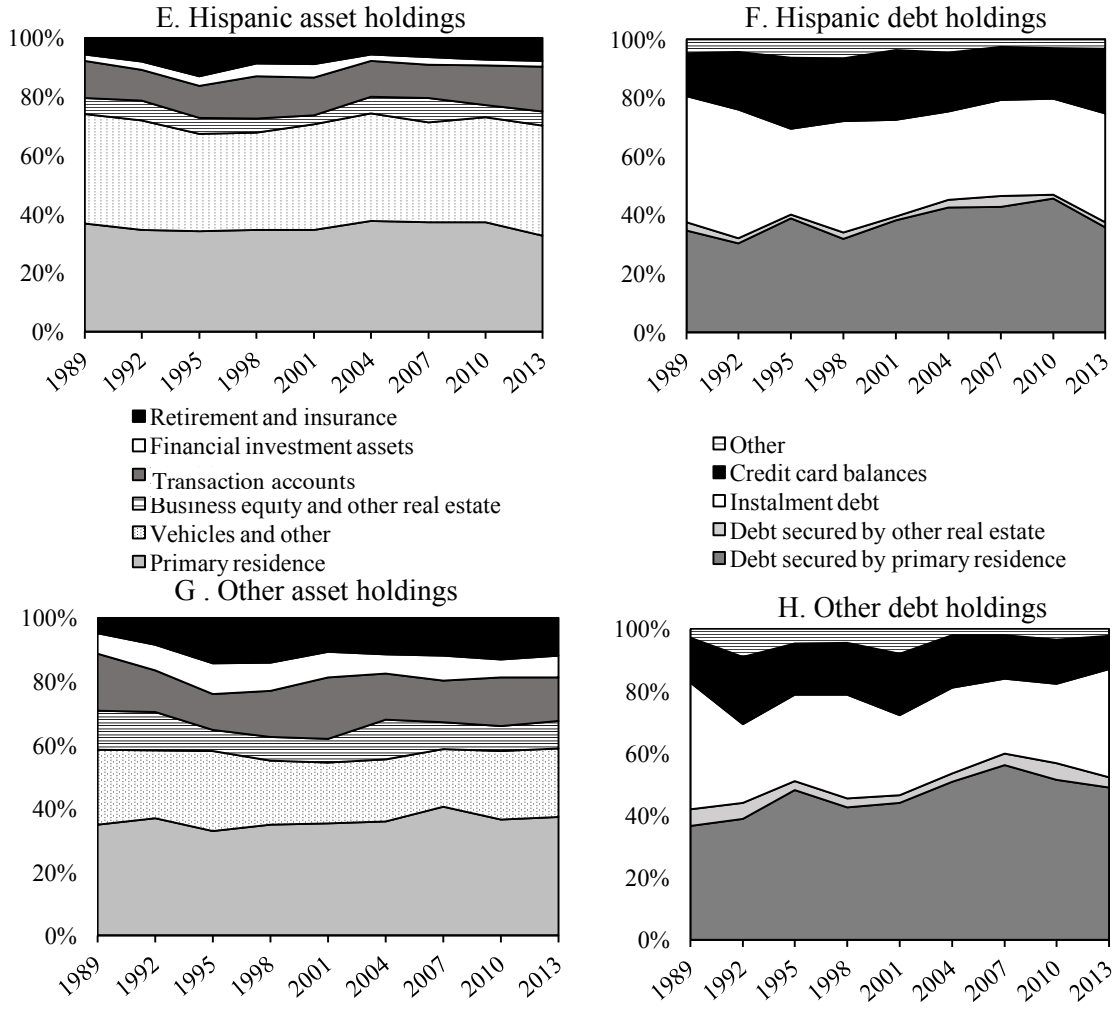
Moreover, primary residence accounted for more than a third of total assets across all groups. The share of primary residence in total assets was the highest among Whites and other households, averaging 41% and 36% respectively between 1989 and 2013, with a peak of 43.7% in 2004 for Whites and 40.5% in 2007 for other ethnic groups. The contribution of primary residence was the lowest among Hispanics, falling from 36.8% in 1989 to 32.5% in 2013 (increasing before the Great Recession to 37.6% in 2004), as well as for Blacks, declining from 40.5% in 1989 to 32.1% in 2013, with a pre-crisis peak of 38.7% in 2004. In contrast, the share of transaction accounts increased over time for Blacks and Hispanics, rising from 11.4% to 16.5% and from 12.6% to 15% respectively between 1989 and 2013, while this contribution declined for Whites and other households in this period, from 9.8% to 9.6% and 18% to 13.7% respectively. Lastly, the share of retirement and insurance assets increased for all ethnic groups between 1989 and 2013. The rise was the highest for Whites and other households, from 9.4% to 16% and 5% to 12% respectively. For Blacks, the contribution increased from 9% to 13%, while for Hispanics it rose from 6% to 8%, with the highest proportion between 1995 and 1998 for Black, Hispanic, and other households.

On the liability side of household balance sheets, Blacks and Hispanics relied more on unsecured debt holdings. Instalment debt accounted for 50% of the total liabilities of Blacks in 1989, falling to 33% in 1998, while for Hispanics the share decreased from 43% in 1989 to 29% in 1995. In the later waves of the data, the contribution of instalment debt rebounded among Blacks and Hispanics, rising to 50% and 37% respectively in 2013. The share of instalment loans in total debt of White households declined from 33% to 24.5% between 1989-2004, increasing to 27.8% in 2013, while the share for other ethnic groups fell from 40.8% to 24% between 1989-2007 before rising to 34.7% in 2013. Conversely, credit card balances contributed 18.6% and 14.7% to total debt of Blacks and Hispanics respectively in 1989, increasing to 23.4% and 23.7% in 2001 before declining to 11.6% for Blacks and 22.1% for Hispanics in 2013. The share of credit card balances in total debt of Whites declined between 1989-2013 from 12.8% to 11.5%, with a peak of 16.6% in 1995, while the share for other ethnic groups increased initially from 14.3% in 1989 to 21.6% in 1992 before decreasing to 11% in 2013.

In contrast, debt holdings of White and other households in the period studied consisted mainly of mortgages. Debt secured by primary residence accounted for 46% of all liabilities of Whites in 1989, rising to 54% in 2013, with a peak of 57% in 2010. For other ethnic groups, the contribution increased from 37% in 1989 to 56% in 2007 before falling to 49% in 2013. Moreover, the share of mortgages secured by other property in total debt averaged 3.5% in the period for Whites, declining from 5% to 3% for other ethnic groups. The contribution of mortgages secured by primary residence to total debt was lower among Blacks and Hispanics. For Blacks, the share increased from 28% to 43% between 1989 and 2004, declining to 33% in 2013, while among Hispanics the contribution rose from 35% in 1989 to 45.5% in 2010 before falling to 36% in 2013. Furthermore, the share of debt secured by other real estate averaged only 2% for both Blacks and Hispanics. Lastly, other types of debt (i.e. other debt and other unsecured lines of credit) contributed 4% on average to total liabilities across all ethnic groups between 1989 and 2013.

Figure 1.21 Cumulative balance sheet composition by race, USA 1989-2013 (source: U.S. Survey of Consumer Finances)



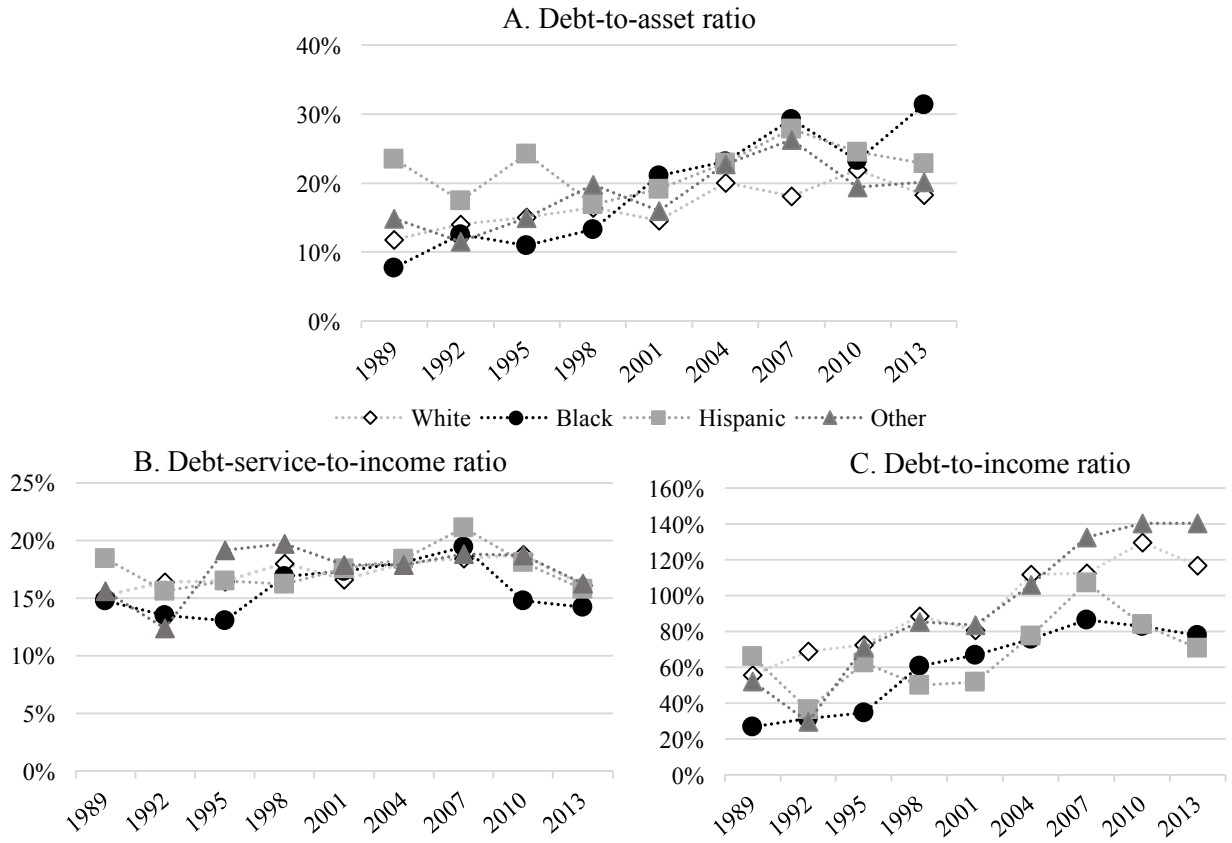


This heterogeneity of balance sheet composition across race had a direct impact on the degree of leverage among ethnic groups. Figure 1.22 shows changes in the median debt-to-asset ratio, debt-service-to-income ratio, and debt-to-income ratio by race between 1989-2013, conditional on holding debt. Blacks and Hispanics experienced rapid increases in their leverage in the run up to the Great Recession. The debt-to-asset ratio of Hispanics rose from 23.5% in 1989 to 27.8% in 2007, while the ratio of Black households nearly quadrupled in the period, rising from 7.7% in 1989 to 29.2% in 2007. The increase in the debt-to-asset ratio was also substantial among households from other ethnic groups, rising from 14.9% to 26.3% in that period, while the ratio among White households increased to a smaller extent, from 11.8% in 1989 to 18.1% in 2007. However, trends in the median debt-to-asset ratio were drastically different across race in the aftermath of the Great Recession. Notably, while Black households initially deleveraged, reducing their debt-to-asset ratio to 23.3% in 2010, their leverage increased in 2013 as the debt-to-asset ratio rose to 31.4%, surpassing its 2007 level. Similarly, the ratio of households from other ethnic groups decreased initially to 19.4% in 2010 before rising to 20.2% in 2013, which was nevertheless below the 2007 peak. In contrast, while the debt-to-asset ratio of White households

initially increased to 21.9% in 2010, it declined to 18.3% in 2013. Lastly, the ratio of Hispanic households declined steadily in this period, reaching 22.8% in 2013.

The increases in leverage for Blacks and Hispanics were also substantial in terms of the debt-service-to-income ratio, which rose from 14.8% to 19.5% between 1989 and 2007 for Blacks and from 18.4% to 21.1% in that period for Hispanics. However, after the Great Recession the ratio fell for these groups, to 14.2% and 15.8% respectively in 2013, resulting in an overall decrease between 1989 and 2013. In contrast, the ratio of both Whites and other ethnic groups rose from approximately 15% in 1989 to ca 19% in 2007, declining to 16% in 2013. Furthermore, Whites and other ethnic groups had the highest levels of the debt-to-income ratio in the period, increasing from 52.3% to 140.5% between 1989 and 2010 for other ethnic groups, and from 56% to 130% for Whites. This is explained by greater asset holdings serving as collateral among Whites and other households, which allowed for larger debt accumulation. Despite the overall lower level, Blacks experienced one of the most rapid increases in the debt-to-income ratio before the Great Recession, rising from 27% in 1989 to 86.7% in 2007. Moreover, the ratio for Hispanics nearly doubled between 1989 and 2007, rising from 66.4% to 107.2%.

Figure 1.22 Leverage by race, USA 1989-2013 (source: U.S. Survey of Consumer Finances)



In sum, the analysis of changes in the value and composition of wealth across race over time, as well as the corresponding trends in income and debt repayments reveals that Blacks and Hispanics were systematically disadvantaged in terms of the size of their asset holdings and income receipts compared to Whites and other ethnic groups. Moreover, they experienced the largest losses of income and wealth in the aftermath of the Great Recession. Greater reliance on low-yielding or illiquid assets and unsecured debt among Blacks and Hispanics, coupled with the sluggish growth of income and rising mortgage repayments, translated into increasing fragility of their financial positions before and after the Great Recession. This was directly related to the expansion of subprime credit by financial intermediaries, leading to unsustainable increases in homeownership and subsequent losses in their asset values due to the collapsing housing market and foreclosures. Consequently, financial sector transformation contributed to racial inequality of income and wealth by shaping the aforementioned differences in asset and debt ownership among ethnic groups. Thus, based on the above examination of the data, in the remaining analysis in this thesis we cluster ethnic groups into two categories – White/Other and Black/Hispanic – due the similarity of their experiences between 1989 and 2013.

1.3.4. Evolution of balance sheet composition by age group

Lastly, since many of the subprime borrowers targeted by financial intermediaries in the run up to the Great Recession were young, we examine changes in wealth composition and income receipts across age groups to understand their role in raising intergenerational inequalities. We distinguish between six age groups: households below 35 years old, those aged 35 to 44, 45 to 54, 55 to 64, 65 to 74, and those 75 years old and above[30]. As we are inherently interested in changes among the youngest group of households, the analysis below is focused mainly on households aged less than 35. However, by looking at all the age profiles, we are able to gauge any potential life-cycle effects across households. These effects are based on the life-cycle theory of consumption, which postulates an inverse U-shaped relationship between age and income/wealth[31].

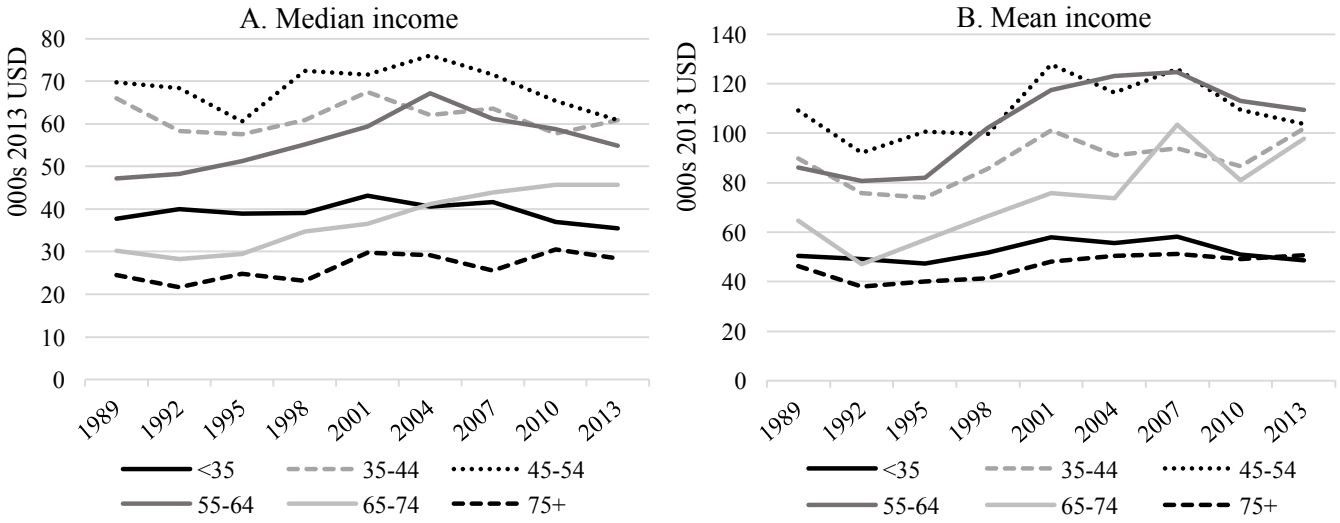
Figure 1.23 presents trends in the median and mean before-tax income across age groups between 1989 and 2013. Households above 75 years old had the lowest median income in the period (Panel A of Fig.1.23), increasing from $24,512 in 1989 to $28,407 in 2013. Until 2010,

[30] Note that the U.S. Survey of Consumer Finances is a repeated cross section rather than a panel (see Chapter 4, section 4.1. for methodological details). Consequently, the analysed age groups are not continuous over time as they would be in a longitudinal setting. Thus, we are comparing how each age group has fared over the years of the survey, rather than following the evolution of incomes and wealth across the age profile of a household.

[31] Further description as well as empirical evaluation of the life-cycle theory of consumption is presented in Chapter 2, section 2.2.

these households also had the lowest levels of mean income in the sample rising from $46,211 in 1989 to $49,138 that year, but their mean income of $50,728 in 2013 surpassed the value for households below 35 years old (Panel B of Fig.1.23). The youngest group experienced a fall in both the median and the mean value of income. This was driven by large losses in the aftermath of the Great Recession. The median income of households younger than 35 increased initially from $37,711 in 1989 to $43,203 in 2001, declining to $35,509 in 2013, while their mean income rose from $50,420 in 1989 to $58,100 in 2007 before falling to $48,700 in 2013. Households between 45 to 64 years old earned the highest levels of the median and the mean income in the period, followed by households aged between 35 and 44. Households between 65 and 74 years old initially had one of the lowest income levels across all age groups ($30,169 median and $64,620 mean income in 1989), but substantial income growth of this group allowed them to catch up with the richest households by 2013, particularly in the mean terms. Overall, we seem to observe a non-linear hump-shaped relationship between age and income, confirming the presence of the life-cycle effects. However, these had become less clear-cut over time, with uneven income growth across age groups in the period studied. Moreover, we observe that the youngest households in the earlier waves of the data, corresponding to the baby boomers born between the mid-1940s to the mid-1960s, faced better income prospects compared to their peers in the later waves of the data.

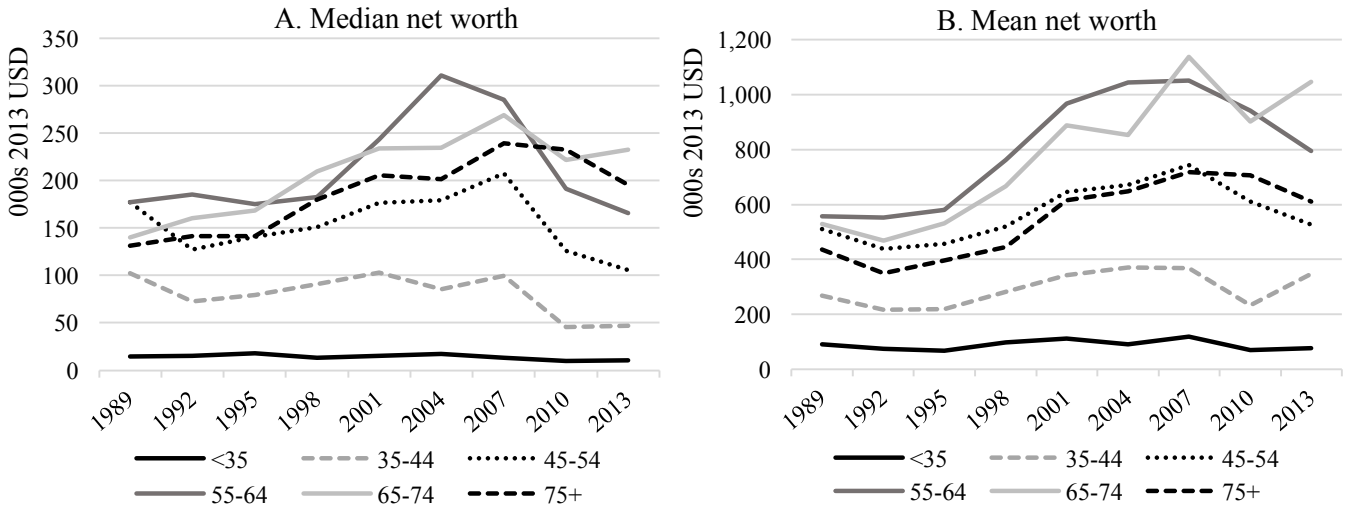
Figure 1.23 Income by age group, USA 1989-2013 (source: U.S. Survey of Consumer Finances)



These trends were somewhat different in the case of wealth. Figure 1.24 shows changes in the median and mean net worth by age group between 1989 and 2013. In this case, households below 35 years old lagged behind the other age groups, and this wealth gap increased over time. The median net worth of the youngest group initially rose from $14,696 in 1989 to $17,511 in 2004 (Panel A in Fig.1.24), while their mean wealth increased from $90,062 to $119,048 between

1989 and 2007 (Panel B in Fig.1.24). However, large losses around the time of the Great Recession led to an overall decline in the median and the mean net worth of the youngest group to $10,460 and $75,432 respectively in 2013. Furthermore, households between 35 and 64 years old experienced an overall decrease of their median net worth in the period, following a peak in the mid-2000s. This suggests that as the young households got older, their median wealth accumulation decreased relative to their peers in the previous waves of the survey. In the case of mean net worth, households aged between 35 and 64 experienced sluggish increases in their wealth. Overall, the highest levels of median and mean wealth in the period were observed for households aged 55-74. Moreover, unlike in the case of income, households aged 75 and above had one of the highest median and mean values of wealth relatively to the other age groups. This suggests that the life-cycle effects were less pronounced for wealth, with net worth increasing somewhat with age in the period studied.

Figure 1.24 Net worth by age group, USA 1989-2013 (source: U.S. Survey of Consumer Finances)



We argue that these differences in income and wealth across age groups were related to disparities in asset and debt ownership between 1989-2013. Table A1.20 in Appendix I presents trends in the ownership of various assets by age groups between 1989 and 2013. The percentage of households owning assets was high and exceeding 90% across all age categories. The youngest group experienced the largest increase in their asset ownership rate before the Great Recession, rising from 92.3% in 1989 to 97.1% in 2007. However, after the 2007 crisis there was a substantial decline in the percentage of households below 35 owning assets, reaching 92.2% in 2013. In contrast, the proportion of households owning assets among the other age groups increased over time, reaching 100% among households aged 45 and above by 2013.

The rise in the asset ownership rate of households below 35 years old was driven by an increase in the ownership rate of primary residence (39.3% homeownership rate in 1989 increasing

to 41.6% in 2004, with a notable fall after the Great Recession to 35.6% in 2013), transaction accounts (80.2% rising to 90.2% in 2013), and retirement and insurance assets (38.5% increasing to 42.6% between 1989-2013, with a peak of 51.6% in 1995). Nevertheless, the youngest group had the lowest ownership rates for all types of assets in the period compared to the other age groups, averaging 7% for other real estate and 82.6% for vehicles and other non-financial assets. Moreover, the percentage of households below 35 owning business equity and financial investment assets decreased between 1989 and 2013 from 10.3% to 6.5% and from 43.6% to 28.3% respectively. In contrast, the ownership rate of primary residence, transaction accounts, and financial investment assets was increasing with age in the period, while the percentage of households owning other property, business equity, retirement and insurance assets, and vehicles and other non-financial assets was the highest among households aged between 35 and 74.

This relatively low asset ownership among the youngest group was paralleled by the systematically lower values of asset holdings compared to the other age categories. The median value of assets among households below 35 decreased from $36,513 in 1989 to $29,520 in 2013, peaking at $51,478 in 2001, while the mean value fell from $147,260 to $143,166 in the period, with a peak of $220,011 in 2007. The median asset holdings of households between 35 and 54 years old also decreased over time, while their mean holdings expanded, as did the mean and median holdings of households older than 54. All age groups experienced decreases in the mean and median values of assets in the aftermath of the Great Recession, although the losses were the highest for households younger than 54.

The increase in the value of asset holdings among the youngest group was driven primarily by the rising value of main residence, from $63,879 in 1989 to $109,782 in 2007. Growth in the value of other real estate and business equity was also substantial for this group, but the magnitude of their holdings remained low compared to primary residence. The mean value of other real estate among households aged below 35 increased from $8,862 to $15,533 between 1989 and 2007, and the value of business equity rose from $27,588 in 1989 to $42,731 in 2007. Moreover, the value of financial investment assets increased for the youngest group between 1989 and 2001, from $18,107 to $32,428. However, after the Great Recession households aged below 35 experienced substantial losses in their asset holdings, leading to an overall fall in the value of primary residence, business equity, and financial investment assets in the period, which declined to $61,443, $21,277, and $14,414 respectively in 2013. Holdings of the other types of assets also decreased among this group after the 2007 crisis, but the losses were relatively smaller. In the whole period the value of retirement and insurance assets among the youngest group expanded from $8,424 in 1989 to $12,697 in 2013, peaking at $21,740 in 2001, while holdings of other real estate reached $9,169 in 2013. Moreover, transaction accounts increased from $6,364 to $9,365

between 1989-2013, and the mean holdings of vehicles and other non-financial assets rose from $14,036 to $14,800 in this period, peaking at $19,102 in 2007.

This experience of the youngest group was dramatically different from trends in the value of assets among older households, whose holdings rose over time. Increases in holdings of all types of asset were particularly rapid for households aged 55 and above, especially in the value of profitable financial investment assets, retirement and insurance assets, and other real estate (except for the other real estate holdings of households aged 55 to 64). Overall, these trends suggest that younger households faced lower asset accumulation possibilities than the older households and their peers from the earlier waves of the data. Moreover, the Great Recession had uneven consequences for wealth across age groups, with a particularly damaging impact on asset accumulation possibilities of the young generation in the recent years.

These differences in asset holdings across age groups translated into disparities in the ownership of debt. Table A1.21 in Appendix I shows trends in debt ownership by age between 1989 and 2013. The proportion of households aged below 35 holding debt increased rapidly before the Great Recession, rising from 80% in 1989 to 83.6% in 2007. After the crisis, there was a large drop in the proportion of young households owning debt, to 77.1% in 2013. In the whole period, the debt ownership rate was the highest among households aged 35 to 54, declining steeply with age after that threshold. Nevertheless, the percentage of households aged 55 and above holding debt increased substantially between 1989 and 2013, which can be explained by low returns on pension wealth and annuities due to the prevalence of low interest rates (Ismail Ertürk, personal communication, 20th October 2017). The rise was particularly remarkable among households older than 64, whose debt ownership rate continued to increase after the Great Recession, unlike for households below 65.

These trends in the debt ownership rates across age groups were paralleled by changes in the value of liability holdings. Growth in the mean and median value of debt was rising with age over time, with the largest increases recorded for households aged between 55 and 74. Nevertheless, disparities in the value of debt holdings across age groups were significantly lower than the differences in asset holdings. Despite rapid growth, the value of debt holdings was the lowest among older households, particularly before the Great Recession and among those aged 65 and above. The highest value of the median and mean debt holdings in the period was observed among households between 35 and 64 years old, followed by those aged below 35 before the Great Recession. Households in the youngest group increased their median debt holdings between 1989 and 2013 from $20,642 to $31,000, peaking at $42,793 in 2010, which suggests continued debt accumulation immediately after the 2007 crisis. Moreover, the mean value of debt for this group

rose from $57,531 in 1989 to $113,110 in 2007, declining to $82,506 in 2013. The reduction in the value of debt in the aftermath of the Great Recession was the largest for households below 35, although debt holdings decreased also among households between 35 and 74. In contrast, households aged 75 and above continued to accumulate debt immediately after the crisis, reducing their holdings only in 2013, resulting in an overall increase in the value of debt between 2007 and 2013.

The increase in the value of debt among the youngest group between 1989 and 2013 was driven by the rising value of mortgages secured by primary residence, and instalment debt. The mean value of debt secured by main residence among households below 35 increased from $42,607 in 1989 to $83,445 in 2007, falling to $52,728 in 2013. In contrast, the mean value of instalment debt continued to rise after the 2007 crisis, rising from $10,920 in 1989 to $23,713 in 2013. There were also substantial increases in the value of mortgages secured by property other than main residence, and credit card balances among the youngest group, but the magnitude of these holdings was significantly lower than for the other types of liabilities. The mean value of debt secured by other real estate rose from $1,399 in 1989 to $5,364 in 2007, declining to $3,898 in 2013. Moreover, holdings of credit card balances among the youngest group increased from $1,900 to $3,351 between 1989 and 2007 before falling to $1,626 in 2013, resulting in an overall decrease in credit card debt in the whole period. In addition, the value of other types of debt, i.e. other unsecured lines of credit and other debt, decreased between 1989 and 2013 among the youngest group, averaging $230 and $563 respectively. In contrast, increases in the value of debt holdings among older households were driven mainly by the rising value of mortgages (secured by all types of property), and credit card balances.

We argue that these changes in asset and debt accumulation across age groups influenced the intergenerational income inequality by generating disparities in capital income flows and debt repayments. Table A1.22 in Appendix I shows changes in income sources by age group between 1989 and 2013. Over time, there was a decrease in the receipts of wages, capital gains, and interest and dividend income among households below 35. The decline in wages was driven by large losses after the Great Recession, as wage receipts initially increased for this group from $46,592 in 1989 to an average of $52,000 between 2001-2007, declining to $42,362 in 2013. The mean receipts of interest and dividend income declined steadily over time among this group, from $535 in 1989 to $149 in 2013, while inflows of capital gains fell from $1,642 to $486. In contrast, receipts of business income, transfer income, and social security and retirement income increased over time for households below 35. Business income rose from $1,900 in 1989 to $3,845 in 2007, falling to $2,723 in 2013, while transfer income increased steadily in this period from $2,031 to $3,146. Receipts of social security and retirement income for the youngest group rose from $262

to $357 between 1989 and 2013, remaining low compared to the magnitudes of inflows of the other income sources of this group. In contrast, wage receipts of the older households increased over time, particularly for households aged between 35 and 74, as did their inflows of business income, social security income, and transfer income. All age groups experienced declines in the mean value of interest and dividend income between 1989 and 2013. Moreover, households aged 75 and above increased their receipts of capital gains and social security income.

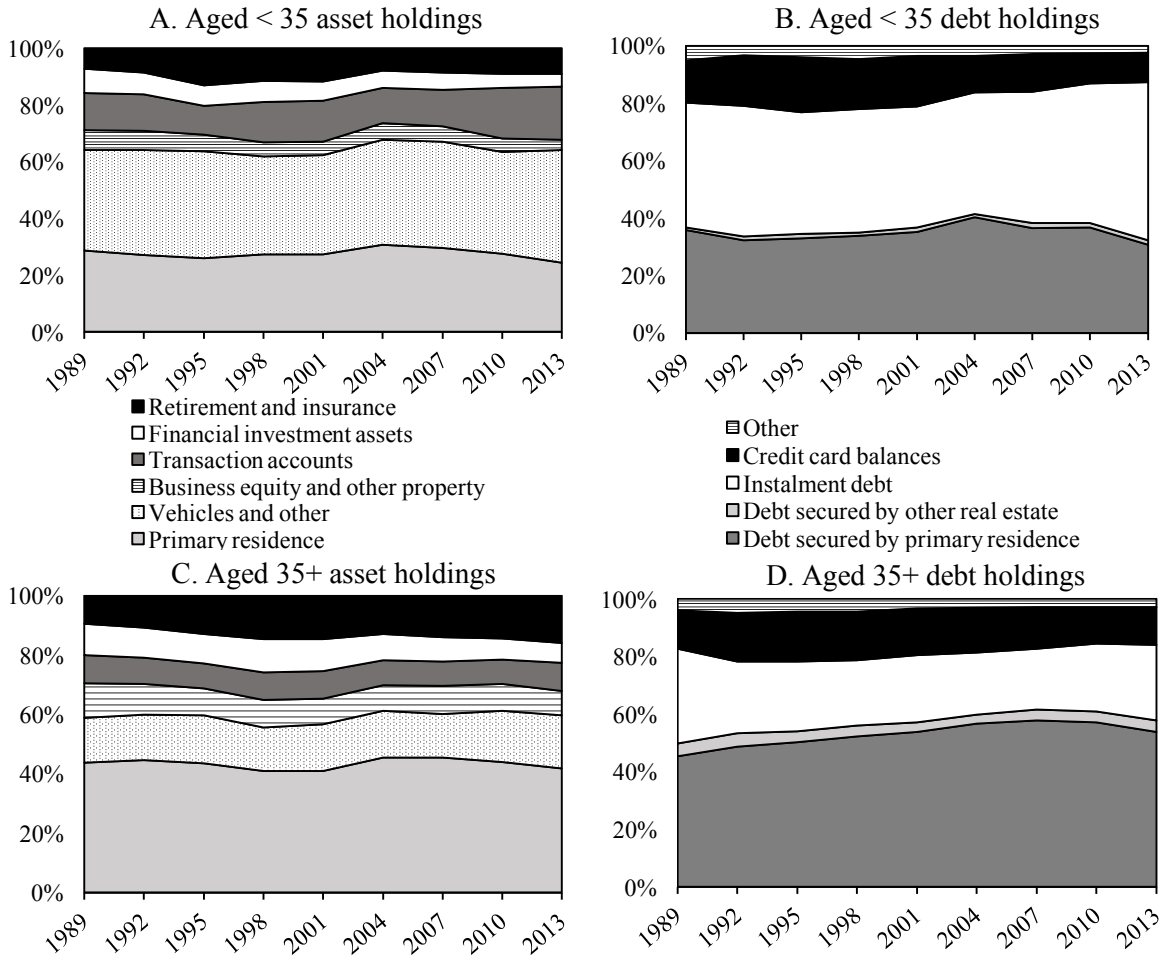
Moreover, the intergenerational income inequality was exacerbated by the relatively high magnitude of debt holdings among the youngest group, coupled with declining asset values and incomes among households below 35. Table A1.23 in Appendix I presents changes in debt payments across age groups between 1989 and 2013. The aforementioned trends in debt holdings across age groups were mirrored by changes in the amount of debt repayments between 1989 and 2013, with a rapid rise in mortgage repayments among the youngest group before the 2007 crisis. However, due to substantial decreases after the Great Recession, debt payments of households below 35 declined in the whole period. Between 1989 and 2007, mortgage payments of the youngest group increased from $5,074 to $6,984, falling to $3,915 in 2013. Payments on instalment loans rose from $3,439 in 1989 to $3,599 in 2007, decreasing to $2,921 in 2013, while payments on revolving debt (i.e. credit cards) increased from $582 to $887 between 1989 and 2007 before declining to $428 in 2013. In contrast, households older than 35 increased their payments on mortgage and revolving debt between 1989-2013, and the rise was particularly rapid among households aged 65 and above. The latter also experienced an increase in their consumer loans repayments in the period. This can be explained by the increasing incomes of the older households and the corresponding rise in their debt ownership rates.

Overall, we observe clear disparities in the trends of income and wealth between the youngest households and the rest related to the differences in wealth accumulation. Thus, in the subsequent analysis we cluster age groups into two categories, comparing households below 35 years old and those aged 35 and above. To understand how the differences in asset and debt accumulation across generations contributed to the aforementioned disparities in capital income flows and leverage, Figure 1.25 presents the cumulative asset and debt composition across the two age groups. While approximately 70% of asset holdings of both groups was composed of non-financial assets, households younger than 35 relied more on vehicles and other non-financial assets whose share in total asset holdings increased from 35.4% in 1989 to 39.6% in 2013 (Panel A in Fig.1.25). Primary residence accounted for 28.7% of the total assets of the youngest group in 1989, declining to 24.5% in 2013, with a peak of 30.7% in 2004. In contrast, assets of households older than 35 consisted primarily of main residence, which constituted 43% of their total assets in the period, peaking at 45.5% in 2004 before the crisis (Panel C in Fig.1.25). Moreover, asset holdings

of older households were composed to a greater extent of business equity and other real estate, accounting for 11.5% of total assets in 1989 before falling to 8.3% in 2013. In comparison, this contribution was 7% for the youngest group in 1989, declining to 3.7% in 2013. In terms of financial assets, households below 35 relied more on low-yielding transaction accounts, which contributed 13.1% to total assets in 1989 before increasing steadily to 18.6% in 2013, while this contribution averaged approximately 9% for older households. Furthermore, the share of retirement and insurance assets in the total asset holdings of the youngest group increased initially, from 7.2% in 1989 to 11.6% in 2001, but it declined to 9% in 2013. In contrast, this contribution rose for households older than 35, from 9.5% in 1989 to 15.9% in 2013. Moreover, assets of the older group consisted in larger part of financial investment assets, albeit the contribution fell from 10.5% to 6.7% between 1989 and 2013. Similarly, the share of financial investment assets in total asset holdings of the youngest group decreased over time from 8.5% in 1989 to 4.6% in 2013.

In terms of debt holdings, the youngest households relied increasingly on unsecured debt, particularly instalment loans, which accounted for 43.6% of the total debt holdings of this group in 1989, rising to 55% in 2013 (panel B in Fig.1.25). In contrast, this contribution declined for the older households, from 32.9% to 26.2% between 1989 and 2013, driven mainly by the reduction before the 2007 crisis (panel D in Fig.1.25). Moreover, mortgages secured by main residence contributed an increasing proportion to the total debt of the youngest group before the Great Recession, rising from 35.9% to 40.3% between 1989 and 2004, but it declined substantially since 2007, reaching 30.7% in 2013. The contribution of mortgages secured by other real estate to total debt of the youngest group was minimal, averaging 1.4% in the period. In contrast, liability holdings of households aged 35 and above consisted mainly of mortgages secured by main residence, whose contribution increased from 45.3% to 53.8% between 1989 and 2013, peaking at 57.8% in 2007. The share of mortgages secured by other property averaged 4% of the total debt of households aged 35 and above in that period. Moreover, both groups experienced a decline in the contribution of credit card debt to total liabilities between 1989 and 2013, from 14.6% to 10.3% for the youngest group, and from 13.3% to 13.2% for households aged 35 and above, with both shares peaking in 1995. Lastly, the share of other types of debt (including other debt and other unsecured lines of credit) declined for both groups over time, reaching approximately 3% in 2013.

Figure 1.25 Cumulative balance sheet composition by age group, USA 1989-2013 (source: U.S. Survey of Consumer Finances)

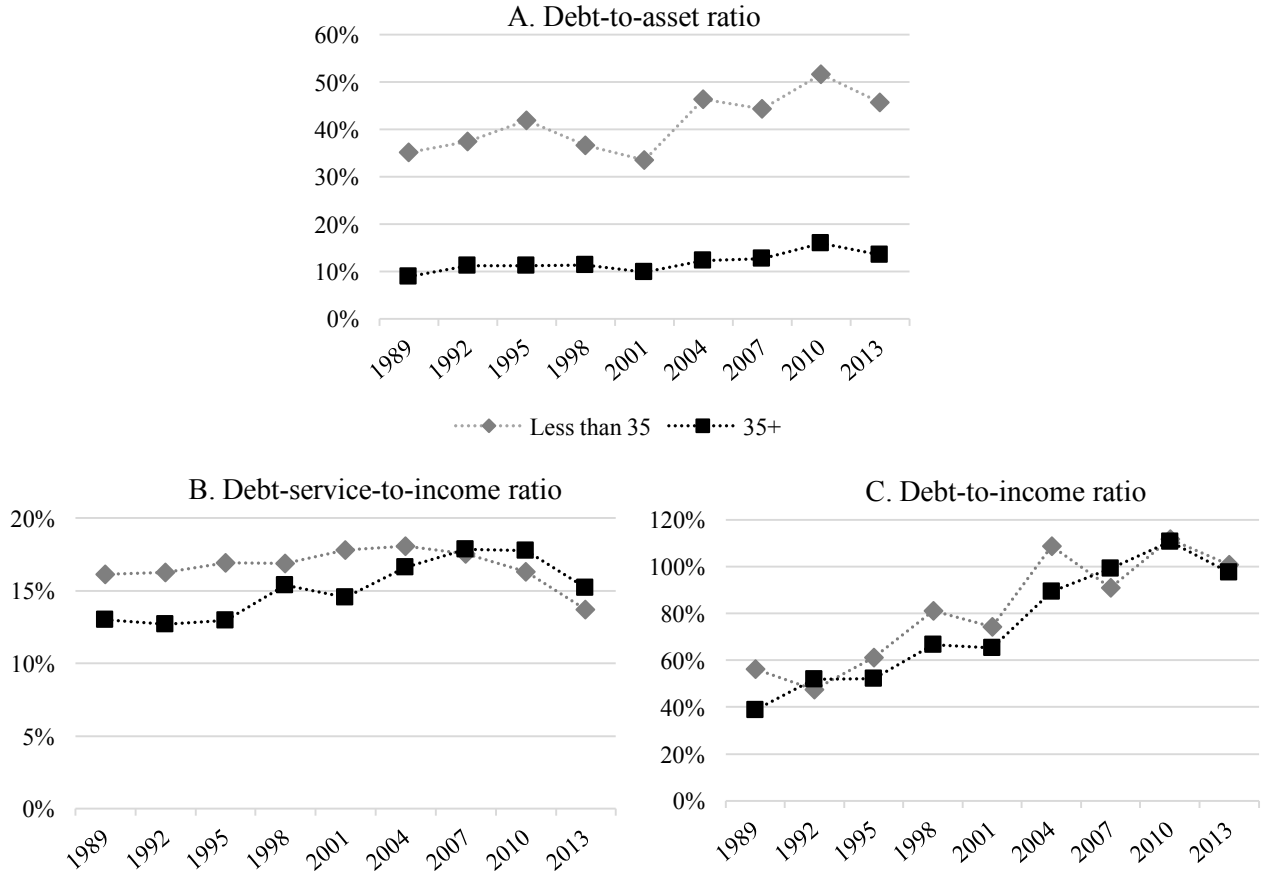


Overall, we find that the balance sheets of households below 35 relied on illiquid non-financial assets and low-yielding financial assets, which was related to the high proportion of unsecured debt, particularly instalment loans, in their total liabilities. In contrast, asset portfolios of households aged 35 and above consisted to a greater extent of more valuable real estate and business equity, as well as high-yielding financial investment assets and retirement accounts. Consequently, their liabilities were composed primarily on mortgages.

These differences in the balance sheet composition across generations led to disparities in their leverage levels. Figure 1.26 shows changes in the median debt-to-asset ratio, debt-service-to-income ratio, and debt-to-income ratio across age between 1989 and 2013, conditional on holding debt. Households aged below 35 had higher leverage than those aged 35 and above, particularly before the Great Recession. The debt-to-asset ratio of the youngest group increased more rapidly in the period than the ratio of the older households, rising from 35.1% in 1989 to 45.7% in 2013, with a peak of 51.6% in 2013 (Panel A in Fig.1.26). In contrast, the debt-to-asset ratio of households aged 35 and above increased from 8.9% to 13.5% between 1989 and 2013, peaking at

15.9% in 2010. Moreover, the debt-service-to-income ratio for the youngest group increased less rapidly before the 2007 crisis compared to the other leverage indicators, rising from 16% in 1989 to 18% in 2007 (Panel B in Fig.1.26). The increases were greater for households aged 35 and above, with the ratio rising from 13% to 17.8% between 1989 and 2007. Both groups experienced declines in their debt-service-to-income ratio after the 2007 crisis, declining to 13.7% for the young and to 15.2% for the older group in 2013. Furthermore, similar trends were observed across both age groups in their debt-to-income ratios, with the ratio for younger households exceeding that of the older group (Panel C in Fig.1.26). The debt-to-income ratio for households below 35 rose from 56.2% in 1989 to 111.6% in 2010, while the ratio for households aged 35 and above increased from 38.8% to 110.5% in that period. Both groups reduced their debt-to-income ratio between 2010 and 2013, to 100.7% for the younger group and to 97.4% for the older households.

Figure 1.26 Leverage by age group, USA 1989-2013 (source: U.S. Survey of Consumer Finances)



In sum, the above analysis of the differences in income, wealth, and leverage across generations between 1989 and 2013 suggests that the baby boomers (i.e. those born between the mid-1940s and the mid-1960s) fared better over time compared to the younger generation in the later waves of the data. This trend is worrying, as decreasing incomes and wealth of the young

indicate lower wealth accumulation possibilities in the future for this group compared to their peers in the past. Consequently, rising intergenerational disparities in one period perpetuate the overall wealth and income inequality in the subsequent years. Given the substantial differences in asset and debt holdings across age groups examined above, the heterogeneity of wealth and leverage emerges as an important determinant of the intergenerational wealth and income inequality.

1.4. Summary

This chapter developed the theoretical link between financial sector transformation and rising inequality observed in the USA since the 1980s. We documented increasing inequality of income and wealth between 1989 and 2013, analysing the overall inequality measures, the Lorenz dominance of the respective distributions, and the top decile shares of various types of income and assets. We observed disparate trends of falling income inequality and rising wealth inequality during the Great Recession, which motivated our explicit focus on the distribution of wealth in analysing inequality. Furthermore, we found that capital income was more unequally distributed than wages, although wage inequality increased over time. Moreover, inequality of assets was found to be higher and increasing in the period compared to the distribution of debt, which was lower and decreased over time. We noted that this signified growing leverage levels among households.

Figure 1.27 summarises the argument developed in this chapter. We connected these patterns of income and wealth inequality to the changes in the financial sector operations observed in the USA since the 1980s. We argued that financial sector transformation generated inequality by shaping differences in asset and debt accumulation across households in the process of securitisation and subprime lending. We illustrated this hypothesis by analysing trends in income, wealth, and their components across the income distribution between 1989-2013. We showed that there are substantial differences in asset and debt ownership in the US society, which translated into disparities in capital income receipts and leverage. We noted that households at the top of the distribution owned more diversified portfolios of assets, and experienced higher increases in wealth and income in the period and smaller losses after the 2007 crisis compared to households in the middle and the bottom of the distribution. This occurred because they had greater access to high-yielding financial investment assets, business equity, and retirement and insurance assets. In addition, greater contribution of real estate to their balance sheets allowed them to accumulate more secured debt compared to the other groups, thus facing lower repayment rates. In contrast, households towards the bottom of the distribution relied on illiquid or low-yielding assets, and

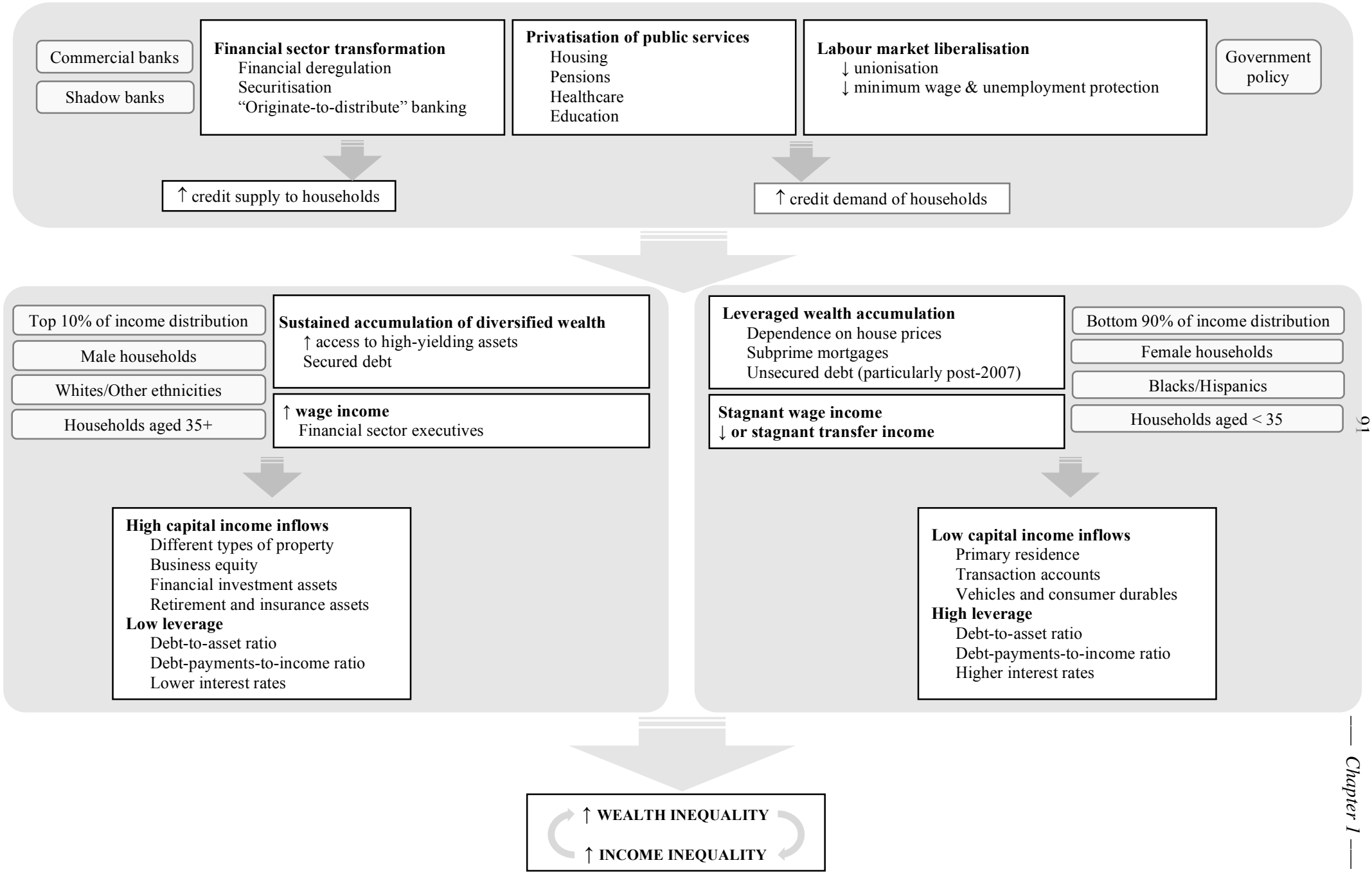
their debt holdings became dominated by unsecured debt, increasing their balance sheet fragility measured in terms of the debt-to-asset ratio and the debt-service-to-income ratio.

Moreover, we observed that the rising concentration of wealth and income at the top 10% of the income distribution had a clear intersectional dimension. We found that households headed by women, Blacks, Hispanics, and those below 35 years old experienced decreases or at most sluggish growth of their net wealth and income, driven primarily by large losses in the aftermath of the Great Recession. We noted that the increasing wealth of households aged 35 and above suggested that asset accumulation possibilities were more favourable for the generation of baby boomers compared to the young in the later waves of the data, particularly after the Great Recession.

We argued that asset accumulation among the vulnerable groups of low-income households, and those headed by women, Blacks, Hispanics, and the young was determined mainly by increases in the value of primary residence, which reduced their net worth as the housing market collapsed in the wake of the 2007 crisis. The increase in homeownership among these groups was enabled by the expansion of indebtedness, particularly mortgages and instalment loans. We noted that the sustained financial fragility and low capital income receipts among these vulnerable groups contributed to rising wealth and income inequality. Moreover, since the low-income households, ethnic minorities, women, and the young were targeted by the subprime lenders before the Great Recession, we observed a direct connection between financial deregulation and rising wealth inequality across these groups since the 1980s.

In sum, the original contribution of the analysis undertaken in this chapter is to demonstrate that there is an interplay between income and wealth influencing the inequality levels in the USA in the context of financial sector transformation since the 1980s, which generated high returns for a limited group of households while making others dependent on illiquid assets and debt accumulation. The examination of a variety of leverage measures shows the importance of analysing both the flows of income and holdings of assets and debt in understanding the impact of wealth heterogeneity on personal financial instability and inequality. We thus conclude that analyses that do not explicitly consider the heterogeneity of wealth composition cannot fully account for the rise in wealth and income inequality observed in the USA since the 1980s. In the next chapter, we analyse how these factors have been incorporated into the existing economic theories of inequality. We thus aim to understand what determinants of inequality have been put forward in the current literature and to what extend they account for the role of household wealth heterogeneity and financial sector transformation.

Figure 1.27 Finance – inequality nexus – a summary



Chapter 2

Economic theory of inequality determination

In the previous chapter we established the link between financial sector transformation and the observed increase in wealth and income inequality in the USA since the 1980s. We argued that the processes of securitisation and subprime lending, coupled with broader privatisation and liberalisation measures, influenced inequality by shaping differences in the structures of wealth accumulation across households. The heterogeneity of household balance sheets contributed to wealth and income inequality by generating disparities in leverage and capital income flows across the distribution. We argued that this occurred because wealth heterogeneity related the returns earned on wealth to the absolute size of wealth holdings. Moreover, we noted that the relationship between wealth composition and inequality had a distinct intersectional dimension, influencing the distribution of wealth and income across gender, race, and generations. We thus argued that the consideration of household wealth structures arising due to financial sector transformation is indispensable to fully account for the rise in income and wealth inequality in the USA since the 1980s. In this chapter, we review how the existing economic theories explain income and wealth inequality, and whether they consider the factors of wealth distribution and financial sector transformation highlighted above.

To analyse the current approaches to inequality determination, we divide the literature into two strands based on the type of analysis, distinguishing between the Keynesian and the classical equilibrium approaches to income and wealth distribution. Firstly, we analyse the Keynesian macroeconomic theories of inequality associated with Galbraith (2012), Stiglitz (2012), Piketty (2014), political economy, and the Post-Keynesian school of thought. These approaches are based on the work of Keynes (1936) and emphasise the key role of fundamental uncertainty, the non-neutrality of money, and aggregate demand in shaping economic processes[32]. We argue that while the theories of Galbraith and Stiglitz account for the socio-institutional structures of inequality

[32] Because economic agents do not have perfect information about the economy, their economic expectations are subject to uncertainty. In relation to this, Keynes (1936) argues that money is not neutral, so that economic output and employment are affected by changes in the stock of money. In this setting price adjustments are slow in the short run, which induces the economic equilibrium to adjust through changes in the demanded quantity of goods at a point where involuntary unemployment exists (Fontana 2009:2; Snowdon/Vane 2005:65). Consequently, aggregate demand has a leading role in economic growth by inducing investment. This stands in stark contrast to the classical view of well informed, rational, optimising agents, who don't suffer from money illusion, so that monetary expansion does not affect real economic values and there is automatic tendency towards full employment equilibrium in the short and the long run (*ibid*.:38)

associated with the financial sector transformation, they do not sufficiently explore the role of wealth, often conflating it with income. In contrast, Piketty's theory explicitly analyses inequality as an outcome of the differences in the dynamics of aggregate wealth and income. However, his proposition does not consider the role of finance in generating these disparities or the heterogeneity of changes in income and wealth across household. We find that these aspects have been integrated in the contemporary Post-Keynesian economic theory. This approach explicitly incorporates household heterogeneity, which is based on Kalecki's (1954; 1971) distinction between workers and capitalists, into the analyses of functional income distribution. Financialisation is argued to increase inequality by raising the capitalist share of income at the expense of workers. Firstly, this occurs because of changes in the corporate governance favouring the maximisation of shareholder value, which reduces the wage share of output (Hein/Van Treeck 2010). Secondly, the endogenous creation of money by commercial banks, and its circulation through the economy by other financial institutions, allows capitalists to monetise their profits as they are creditors in net terms (Graziani 2003; Fontana 2003). We argue that what the Post-Keynesian approach has not yet done is to examine how this dichotomous division of households has been complexified by the processes of financial sector transformation and the associated increase in the heterogeneity of wealth composition across households.

Secondly, to understand the theoretical determinants of wealth distribution and the differences in wealth accumulation across households we analyse the theories of household portfolio decisions. We identify these with the classical equilibrium theories of the life-cycle theory of consumption of Modigliani/Brumberg (1954), and the permanent income hypothesis of Friedman (1957). These approaches are based on the efficient-market perspective focused on the optimising behaviour of a representative economic agent[33]. They see inequality as the expected outcome of the intertemporal utility maximisation by households managing their wealth to smooth consumption across their life-cycle. These theories predict a hump-shaped relationship between age and wealth accumulation through saving, but this has been generally contradicted by empirical evidence. The empirical challenges have been addressed by incorporating factors impeding the accurate formation of future income expectations, such as liquidity constraints in credit markets, precautionary saving, bequest motives, and asset price increases. Consequently, financial innovation and subprime credit expansion have been seen as relief to credit-constrained households, allowing for a more optimal distribution of economic resources. We argue that the

[33] In the efficient markets view prices reflect all available information and are equal to the marginal costs of production so that no agent has market power and thus all economic agents within a particular sector (firms, households) are identical (cf. Gravelle/Reese 2012).

life-cycle theory and the permanent income hypothesis cannot fully explain high inequality levels in the modern advanced economies. This is because they neglect the socio-institutional structures of financial sector transformation and the impact of uncertainty on breakdowns in market efficiency. Thus, to understand the consumption and saving behaviour underpinning wealth distribution it is necessary to consider that markets generate endogenous economic fragility. We note that this is recognised in the Post-Keynesian analyses of consumption behaviour and indebtedness, found in Robinson (1956), Pasinetti (1981), Eichner (1986), Nell (1992), and Arestis (1992). Consequently, the Post-Keynesian literature is taken as a point of departure for the development of a theoretical model of inequality determination in the next chapter.

2.1. Keynesian approaches to distribution

According to the mainstream economic theory, income inequality is a natural outcome of market processes as it reflects the marginal contributions of each individual to production, rewarding those with high or scarce skills (Stiglitz 2012:37). Skill-biased technological change, differences in human capital, and trade openness increasing the supply of low-skilled workers are seen as the key determinants of inequality (Galbraith 2016:74). This approach has been largely dismissed by contemporary Keynesian economists researching inequality in high-income countries. This criticism has been made on the grounds that the mainstream view ignores the structural factors of the modern advanced economies related to market forces (Galbraith 2012), decreasing bargaining power of workers (the political economy approach), and economic policy (Stiglitz 2012), which have contributed to the unequal distribution of income and wealth.

Based on empirical research, Galbraith (2012) puts forward financial liberalisation as one of the main institutional determinants of inequality in the USA since the late 1970s, generating larger disparities in capital income than wage earnings. In his view, rising inequality has been caused by changes in capital income at the top rather than differences in wages at the middle or bottom of the distribution (*ibid*.:135). He argues that financial liberalisation boosted capital incomes of the rich through stock ownership, which is highly skewed towards the top of the distribution (Galbraith 2012:40,126). These changes were driven primarily by macroeconomic factors of booms and busts, which became dominated by financial sector activity in the run up to the 2007 crisis. While Galbraith recognises the importance of finance for increasing the top incomes through financial asset ownership, he does not consider its role in debt accumulation among the low- and middle-income households. As discussed in Chapter 1, through financial deregulation and the development of structured finance balance sheet stability of these households became dependent on financial market performance, which had powerful implications for deepening wealth inequality. Consequently, financial liberalisation has played a complex role in redefining

economic institutions to favour wealth accumulation among the rich and diffuse financial instability towards the middle and the bottom of the distribution.

The political economy approach explains the growing wedge between wage and capital income by the shifting balance of power between labour and capital (Stockhammer 2017). The main reason behind the declining bargaining power of workers is identified with global redistribution of rents owing to globalisation and capital mobility (Rodrick 1997), as well as retrenchment of the welfare state associated with privatisation of social services (Kristal 2010) and weakening of unions (Bengtsson 2014). While worsening of the workers' bargaining position cannot readily explain wealth disparities, the emphasis on the uneven distribution of power in the political economy approach is instrumental in understanding the structural forces generating inequality in modern capitalist societies.

Stiglitz (2012) highlights the role of government policy in shaping these institutional structures conducive to increasing income inequality in the USA. From a New Keynesian perspective[34], he argues that through privatisation, labour market liberalisation, as well as regressive taxation and social expenditure policies, the US government generated market forces that eroded the bargaining power of workers. This reduced the equality of outcomes in terms of the size of income and wealth, and raised the inequality of opportunity by increasing the costs of investment in human capital. Stiglitz argues that much of the increase in inequality owes to rent capture rather than wealth creation, which has arisen through the exploitation of market imperfections (Stiglitz 2012:40,51). An important factor in this rent seeking behaviour generating inequality is the lack of market transparency, as in the case of the derivative trading before the 2007 crisis, and the ability of the financial sector to lobby the government against policies alleviating informational asymmetries between financial institutions and borrowers. Stiglitz (2016) puts forward a similar mechanism to explain rising wealth inequality, which he argues is caused by

[34] The New Keynesian school of thought is concerned with the role of micro-founded market imperfections in driving macroeconomic processes. These include *inter alia* asymmetric information, credit rationing, liquidity constraints, and sticky prices, which prevent optimal equilibrium adjustments (Lavoie 2014:15). While they acknowledge the role of demand and uncertainty in driving economic dynamics towards the possibility of involuntary unemployment in the short run, the core assumption of this approach is that the behaviour of economic agents is determined by rational optimisation subject to perfect information, so that any imperfections are eliminated and full employment is restored in the long run (Fontana 2009:3). The New Keynesian views became the basis of the New Consensus macroeconomics, prioritising monetary policy based on market laws over fiscal policy (Arestis/Sawyer 2002). It stands in stark contrast to the Post-Keynesian view, which emphasises the role of liquidity preference and the distributional conflict in driving economic processes, which lead to inherent instability of the capitalist system and the persistence of involuntary unemployment in the long run, and invalidate the analysis of economic behaviour in terms of optimisation (Lavoie 2014).

the growing disparities in unproductive rents arising from the increased control over resources and productive capital.

The analysis of the link between inequality and financial sector transformation in the previous chapter supports Stiglitz's view that the increasing complexity and opacity of the financial sector operations has undermined the ability of regulators to control the rent seeking opportunities associated with the exploitation of market power by the rich financial investors. However, we contest the New Keynesian view of market imperfections highlighted by Stiglitz, seeing them as a symptom rather than a cause of the distributive forces generated by the financial sector. This is because they are endemic in the design and operations of the modern financial markets. Given the large stocks of wealth held in the financial sector and the increasing transaction volumes among financial institutions since the 1980s, financial markets are bound to violate the conditions of competitive markets and are prone to market power concentration among few players[35]. Financial deregulation culminating in the repeal of the Glass-Steagall act in 1999 resulted in the rise of megabanks, who were not only able to capture large returns on financial wealth, but they also became the source of economic instability. Consequently, the analysis of inequality in the USA in the context of financial liberalisation since the 1980s needs to go beyond market imperfections towards understanding of the exact channels through which the economic power associated with the ownership of wealth influences inequality.

The economic theory which puts the largest emphasis on the importance of wealth for inequality is found in the seminal work of Piketty (2014). The main premise of his *Capital in the Twenty-First Century* is that inequality is driven by the accumulation of persistently higher returns to wealth (r) relative to the growth of income (g), historically averaging at 5% and 1% respectively. Compounding of the aggregate returns to wealth over time generates higher income flows for wealth holders and their inheritors (identified with the top 0.1-1%) than for the rest of the society. In turn, higher capital income allows for greater saving, which facilitates further wealth generation and perpetuates inequality. Consequently, there is an interconnectedness between the aggregate levels of income and wealth which influences inequality. In other work (Piketty/Zucman 2014) it is emphasised that due to its high concentration and the aforementioned accumulation dynamics, wealth distribution is more important for the overall structure of inequality in the 21st century than it was in the post-war era. Piketty/Zucman (2014) argue that saving and consumption propensities are not enough to predict inequality levels in advanced countries. This is because

[35] This can be understood through the lens of Kalecki's concept of the degree of monopoly, as market power of financial institutions allows them to influence prices and set high mark-ups over costs, which reduces the wage share of output (cf. Rugitsky 2013).

capital gains (often driven by housing wealth) are found to account for around 40% of the increase in inequality measured by the national wealth-to-income ratios between 1970 and 2010 (Piketty/Zucman 2014:1288).

In line with our argument in Chapter 1, Piketty's insight regarding the interplay between income and wealth and its impact on inequality is particularly relevant in the age of financial sector transformation. We showed that financial innovation and securitisation influenced inequality by generating differential returns and degrees of volatility across the distribution. Large wealth holdings of the rich allowed them to invest in high-yielding financial instruments (often requiring large initial payments, which could only be afforded at high levels of net worth), which generated higher returns to wealth through sizeable capital income inflows compared to the rest of the distribution. Moreover, the rich were able to use their economic power to secure higher wages, particularly when employed as financial executives (cf. Foster/Holleman 2010).

Despite the importance of its general conclusions, Piketty's theory suffers from several drawbacks. The most relevant criticisms for our analysis concern the weakness of Piketty's theoretical explanation and insufficient emphasis on household debt and the heterogeneity of household wealth in contributing to inequality[36].

While Piketty's empirical work is to be applauded, his theoretical explanation for inequality based on "$r > g$" relies on the expectation that trends observed in the past would continue in the future (Pressman 2016:159). Hence, Piketty does not provide any explicit theoretical explanation for why returns to wealth should always exceed the growth of income. Consequently, despite the relevance of his conclusions, there is no formal link between inequality and financial sector transformation in Piketty's framework. Moreover, his argument relies on comparing the average growth rates of wealth and income. However, as shown in Chapter 1 there is substantial variability in income and wealth across the distribution, which is particularly important in understanding the impact of financial sector transformation on inequality. The analysis of household balance sheet structures across the distribution suggests that there is a positive relationship between the returns to wealth and its absolute size – richer households tend to earn higher returns on their assets than households with smaller wealth holdings. The impact of this heterogeneity on inequality is not explored by Piketty.

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[36] Other criticism of Piketty's theory highlighted in the literature include the lack of a distinction between capital and wealth (Blume/Durlauf 2015), the use of pre-tax data (Burtless 2014), the neglect of capital depreciation in the theoretical argument (Krusell/Smith 2014), the use of house prices rather than rental prices to measure wealth (Bonnet *et al*. 2014; Rognile 2015), and spreadsheet errors in data analysis (Giles 2014). See Pressman (2016) for the overview.

The alternative body of theoretical literature identified with the Post-Keynesian functional distribution approach explicitly takes into account the link between financialisation and household heterogeneity. Highlighting the inherent instability of the capitalist system, this literature focuses on the macroeconomic impact of the increasingly unequal functional distribution of national income between two factors of production – capital and labour – which are associated with higher propensity to save and consume respectively (cf. Kalecki 1971). Workers are assumed to rely on their labour to maintain their living standards, and to consume most of their wage earnings. While they are often assumed to consume all their income, savings by workers are incorporated into the Post-Keynesian framework by assuming that their savings rates are lower compared to capitalists, and thus do not influence income distribution (Kaldor 1956a; Pasinetti 1962). In turn, capitalists are assumed to derive their income from profits. A distinction can be made between capitalists as entrepreneurs, who realise variable profit income dependent on the difference between expected and actual investment, and more passive rentiers, who receive fixed income in the form of unproductive rents based on their ownership of companies and financial institutions (Hayes 2006; Toporowski 2015). In the context of financial sector transformation and the existence of derivative trading, the capitalist class can be analysed as including both entrepreneurs and rentiers, who pursue capital returns through investing in financial markets and ownership of financial assets (Toporowski 2001).

The distributive forces of financialisation in the Post-Keynesian framework are seen as the maximisation of shareholder value, proxied by a higher rentier (i.e. capitalist) income share, which is related to the increasingly short-term orientation of firm operations and their preference for financial rather than real investment, which skewed the corporate governance power towards shareholders (cf. Hein 2008, 2015; Hein/Van Treeck 2010; Palley 2012, 2013; Van Treeck 2009). Moreover, from the perspective of the endogenous money theory, financial sector complexity contributes to the redistribution of money created through the commercial bank loans to households (Michell 2016). This is because income gets transferred from debtor/worker households to creditors/rentiers through loan repayments (Palley 2002). Moreover, the existence of securitisation furthers the transfer of income towards rentiers through high returns on securitised instruments (Sawyer/Passarella Veronese 2017:17).

The Post-Keynesian functional distribution models are explicitly concerned with the macroeconomic implications of income inequality. They often draw from the Bhaduri/Marglin (1990) argument that the macroeconomic effects of income transfers between wage and profit earners hinge on whether the economy is wage- or profit-led. Onaran *et al*. (2011) establish that the majority of advanced economies are wage-led, which in the Bhaduri/Marglin framework signifies that the lower wage share resulting from the financial sector transformation has a

negative impact on aggregate demand and growth by undercutting the effective investment demand. This is because resources are taken away from those who are more likely to spend them to those who are more likely to hoard them.

However, what this theoretical approach has not yet done is to examine how the transformation in the nature of financial intermediation has complexified the social division into the two distinct categories based on their income sources. Both groups of workers and capitalists have become more heterogeneous, which complicates their analytical application. As shown in Chapter 1, in the course of financial sector transformation workers became the recipients of capital income through homeownership and participation in private pension schemes (due to the privatisation of public housing and state pensions), while capitalists became the recipients of the highest wages in the economy as financial executives. Consequently, not only are there large disparities in the aggregate characteristics of households within each category but also the boundaries between the two have become less clear.

Moreover, the Post-Keynesian macro-models are traditionally focused on investment as the most important variable for economic growth, treating savings and consumption as residual and passive (Setterfield/Kim 2013:2). However, since the 1980s consumption has become much more volatile and thus more important as an independent source of aggregate demand (*ibid*.). As indicated in Chapter 1, this is largely due to the increasing financial commitments and the massive expansion of credit to households, leading household spending to become increasingly disconnected from income.

Similar drawback can be identified in Piketty, who does not consider the role of household debt for wealth distribution and inequality. As shown in the balance sheet analysis in Chapter 1, while the top 10% experienced rapid growth in their income and net wealth over the past decades, wealth gains of the middle- and the low-income households were illusory as they were underpinned by the housing price bubble and large relative debt holdings. Consequently, differential degrees of leverage across the population turned to be an important driver of inequality, particularly during the 2007 recession. It is not only the access to financial resources but also the stability of that access over time across the population that has implications for inequality. For instance, financial investors owning a diversified portfolio of securitised assets with return guaranteed by the seniorage of their claims due to tranching are better able to bear financial losses than households whose portfolios are based on housing equity withdrawal. In the latter case, price deflation of collateralised assets before the Great Recession prevented further withdrawal of equity to cover outstanding loan repayments, generating higher volatility of their balance sheet positions relative to the rich households. Consequently, despite higher magnitudes of

debt holdings among the rich, there is a disproportionate impact of borrowing on financial stability of households in the bottom and the middle of the distribution due to differences in interest rates and borrowing conditions associated with subprime and unsecured debt (see Figure 1.13 in Chapter 1; cf. Pressman/Scott 2009). Consequently, as shown in Chapter 1 debt payments of the lower income households increased rapidly before the Great Recession. When debt payments are considered, a smaller portion of income is available for consumption and hence inequality is deepened.

Importantly, the problem of overindebtedness was not eliminated during the Great Recession. The balance sheet analysis in Chapter 1 showed that households have not deleveraged their massive debt levels after the 2007 crisis. Scott/Pressman (2015) argue that the declines in the monthly debt payments and the debt-payments-to-income ratio in the most recent years have been illusory, reflecting low interest rates and an increasing share of households filing for bankruptcy since 2010 rather than a real reduction in debt. Consequently, because households have not deleveraged properly after the Great Recession, there have been no increases in consumption and saving allowing for reduction in income and wealth inequality.

The issue of debt highlights the need for an explicit consideration of wealth in the economic theory of inequality. However, the theoretical literature has often conflated wealth with income, in the sense that they do not explicitly distinguish between these two concepts. However, in the analysis in Chapter 1 we noted that income inequality was not proportionally associated with wealth inequality. We argue that although income and wealth inequality share some common features, the analysis of wealth has certain distinct aspects distinguishing it from the analysis and measurement of income distribution such as the possibility of negative net worth (Cagetti/De Nardi 2008:286; Cowell/Van Kerm 2015). As argued in Chapter 1, unlike income, which is lower bound by zero, in its most analytically used definition of net worth a large part of wealth distribution can take negative values. Furthermore, while income reflects current living conditions, wealth provides an additional insight into their past levels (if savings are seen as excess income over consumption) and future possibilities, determining the capacity for investment in education and the quality of life (Cowell *et al*. 2012:1). This further emphasises the need for an explicit theory of what determines the distribution of wealth.

To identify the current theoretical analyses of wealth distribution, we turn to the economic theories of consumption. In the next section we review the theoretical insights seeking to understand household portfolio decisions due to their crucial implications for the analysis of wealth inequality.

2.2. Classical equilibrium theories of household portfolio decisions

In the previous section we argued that the Keynesian approaches to inequality tended not to pay explicit attention to the theoretical determinants of wealth distribution. We noted that while Piketty (2014) distinguished between the dynamics of income and wealth in generating inequality, he did not consider the heterogeneity of income growth and the returns to wealth across households. To understand the theoretical explanations of differences in wealth accumulation, in this section we analyse the theories of household consumption and portfolio decisions.

The empirical examination of the household balance sheet dynamics in the USA since the 1980s in Chapter 1 revealed that the composition of household portfolios underwent large changes over the past few decades. However, the developments in economic theory seeking to explain household portfolio decisions have not caught up with these pronounced shifts in household portfolio structures. On the one hand, despite the centrality of the consumption function for utility maximisation in the New Keynesian/New Consensus economics, the underlying theory of consumption has seen little review since the 1950s. On the other hand, as argued in the previous section, the Post-Keynesian functional distribution approach analysed the issue of consumption to a smaller extent, being traditionally focused on investment and the productive sector (Lavoie 1994:539). It is only in the recent years that household sector behaviour sparked more interest among researchers due to its key role in inducing the macroeconomic instability culminating in the Great Recession.

We identify two strands of the relevant economic theory seeking to understand the dynamics of wealth through examining household consumption and saving decisions. The first strand is associated with the classical quantitative general equilibrium models. This approach is dominated by the life-cycle theory of consumption (LTC), originating in Modigliani/Brumberg (1954), and the permanent income hypothesis (PIH) developed by Friedman (1957)[37], as well as their extensions analysing the wealth effects of asset price movements, liquidity constraints, precautionary savings, and bequest motives on household consumption spending. The second strand of the literature is associated with the contemporary Post-Keynesian insights into household

[37] Both Modigliani and Friedman represent the neoclassical Chicago school of economics, which evolved from monetarism and the new classical economics. This school of thought emphasises the supply-side determination of economic dynamics and is focused on developing the microfoundations of macroeconomics based on the efficient market perspective. The intertemporal optimisation of the representative agent is based on rational expectations, which state that agents use all publicly available information so that subjective expectations coincide with the actual mathematical expectations of economic variables. Together with the New Keynesian focus on market imperfections, the neoclassical school formed the new neoclassical synthesis in macroeconomics (cf. Snowdon/Vane 2005).

consumption behaviour found in Robinson (1956), Pasinetti (1981), Eichner (1986), Nell (1992), and Arestis (1992). This approach emphasises the social dependence of consumption and finds its roots in the works of Veblen (1899) and Duesenberry (1949).

To the proponents of the quantitative general equilibrium models, deepening wealth inequality and rising household debt are expected phenomena explained by households optimising their consumption spending. The microfoundations of these theories correspond to the behavioural assumptions of the standard microeconomic consumer theory, namely completeness, reflexivity, transitivity, and non-satiation of preferences, which yield a continuous, quasi-concave, and differentiable consumer utility function, and a unique solution to the utility maximisation problem (cf. Gravelle/Reese 2012:12-19)[38]. Consequently, consumer preferences are stable and exogenously determined by these consumption rankings.

The first generation of these wealth inequality models can be divided into the dynasty and the overlapping generation models (OLG). The former have been gradually replaced by the latter in the analyses of wealth due to their unsolvable empirical challenges. Specifically, the dynasty models assume *ex ante* identical infinitely living agents who hold a buffer stock of assets to insure against shocks to their labour income (Cagetti/De Nardi 2008:293). Inequalities in wealth are caused solely by random income shocks and imply that low-income households should have a higher saving rate than the rich as they need larger buffers to accommodate earnings fluctuations. Despite various extensions to the basic model (e.g. entrepreneurship, heterogeneity of preferences)[39], this class of models has been dismissed empirically, as saving rates have been documented to be the highest among the richest households (*ibid*.:295)

In contrast to such infinite horizon models, OLG models incorporating LTC and PIH assume finite living agents. According to LTC, households endowed with perfect information about the distribution of their lifetime income choose the optimal consumption path over their life-cycle in order to maximise their utility subject to the inter-temporal budget constraint (Debelle 2004:2).

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[38] Given three bundles of goods x, x', and x'', the strict preference ($>$) and indifference ($\gtrsim$) relations across these bundles are assumed to be reflexive (if $x \gtrsim x$ consumer is indifferent between the same bundle), complete (either $x \gtrsim x'$ or $x' \gtrsim x$, so that preferences can always be ranked due to perfect information), transitive (if $x \gtrsim x'$ and $x' \gtrsim x''$ then $x \gtrsim x''$), and non-satiated (if x is greater than x' then $x > x'$ so that consumer always prefers a bigger bundle). These allow for a formation of a utility function, which is assumed to have a unique optimisation solution. Based on these assumptions, price changes result in stronger substitution effects between goods rather than income effects, i.e. changes in the level of expenditure.

[39] In these extensions, wealth inequality is increased by assuming that agents choose whether to become entrepreneurs and save more or not, and by introducing the degree of patience in consumption, whose higher value leads to greater savings (cf. Cagetti/De Nardi 2008).

The constraint is given by the present discounted value of household labour income and its current net worth. The intertemporal income allocation is directly related to their current income expectations relative to the average lifetime income level. Households engage in consumption smoothing to avoid large fluctuations in consumption over their life-cycle, borrowing or running down assets in periods of lower-than-average income (when young), paying off loans, saving, and accumulating assets in periods of higher-than-average income (associated with productive years), and dissaving (consuming out of accumulated savings) on retirement (Bertola *et al*. 2006:6).

Friedman's PIH augments LTC by stating that consumption and saving decisions of households depend on the future income expectations rather than the current income levels (Bewley 1977; Bertola *et al.* 2006:4). Specifically, households undertake their spending decisions in reference to their permanent income, defined as the expected long-run average income (Friedman 1957:20). This implies that current income fluctuations may not influence current consumption expenditure if permanent income is expected to increase in the future (Karacimen 2013:5). Hence, households choose to borrow whenever they expect their future income to rise, and accumulate savings and assets when they expect their future income to fall. The main conclusion of PIH is that credit levels and saving rates should be non-linearly related to income and be the highest among low-income households. i.e. the young (Cagetti/De Nardi 2008:295). Moreover, socio-demographic characteristics related to income expectations matter for consumer behaviour — e.g. college graduates should borrow more than blue-collar workers when young as their permanent income is relatively higher (Bertola *et al*. 2006:6). These predictions have been generally rejected by empirical evidence (*ibid*.). Specifically, Fredriksen (2012) dismisses the hump-shaped evolution of net worth and financial assets holding along the life-cycle, finding instead a steady increase with age. This is consistent with our analysis of the trends in net wealth across age groups in Figure 1.24 in Chapter 1. In addition, Fredriksen (2012) finds that other socio-demographic characteristics matter little for explaining wealth inequality. Instead, he suggests that there are different determinants of wealth accumulation for the upper and the bottom ends of the distribution. While returns on assets and tax conditions are more important for the former, balance sheet composition is more relevant for the latter (*ibid*.). Moreover, Deaton (1986) and Dynan *et al*. (2004) reject the dependency of savings on the position in the life cycle. Furthermore, as shown in Chapter 1 at any point in time it is the wealthy households who take on more debt in terms value and participation, which contradicts the prediction of PIH that debt levels should be the lowest among these households.

Due to these empirical problems, the LTC/PIH framework has seen numerous extensions aiming to improve its explanatory power. The most relevant additions include the presence of liquidity constraints, precautionary savings, and bequest motives. Firstly, imperfections in credit

markets, namely the presence of asymmetric information, moral hazard, and adverse selection on part of the borrowers may restrict access to the desired amount of borrowing for certain households, which could explain why lower income households don't borrow as much as their higher income counterparts (cf. Gross/Souleles 2002). Importantly, this implies that financial deregulation and innovation in financial products should bring relief to credit-constrained households as it would ensure more optimal credit allocation and allow households to achieve their desired consumption smoothing patterns (Barba/Pivetti 2009:119, cf. Elul 1995). The second extension introduces uncertainty into household behaviour, and states that to insure against unexpected events (such as illness, divorce, natural disaster) households accumulate precautionary savings, which distorts the spending behaviour predicted by the standard theory. Hence, even if future income increases are expected, households may choose to save, which could explain why households borrow despite relatively high incomes (cf. Carroll 1997). Finally, the bequest motive accounts for the intergenerational wealth transfers, stating that "abnormal" household behaviour may result from altruistic motives to accumulate resources for the future generations.

Further attempts at improving the LTC/PIH framework incorporate the impact of changes in wealth (both actual and perceived) arising from asset price fluctuations on consumption spending, i.e. the wealth effects. This literature has been centred on the stock market and housing wealth, which underwent price bubbles in the 1990s and from the early until the mid-2000s respectively. The evidence of welfare increases from asset price inflation is ambiguous. Mehra (2001) estimates an empirical aggregate LTC model accounting for the stock market wealth effects in the USA between 1959-2000, finding strong predictive channels from equity wealth to future consumption. In contrast, Ludvigson/Steindel (1999) find that stock market wealth effects in the USA between 1953-1997 were unstable, arguing for contemporaneous rather than future relationship between changes in wealth and consumption spending. For housing, Duca *et al*. (2012) incorporate financial innovation and liberalisation into a credit-augmented life-cycle model, finding stronger housing wealth effects associated with household equity withdrawal defined as the difference between secured net borrowing and spending on housing. Moreover, they argue that financial sector transformation since the 1980s generated larger consumption increases and drops in booms and busts respectively than predicted by the traditional LTC. Sierminska/Takhtamanova (2007) compare the relative stock market and housing wealth effects to establish that wealth effects of housing are larger than those of financial assets in Canada, Italy, and Finland. Furthermore, they report that wealth effects are stronger for older households, which they argue is consistent with LTC/PIH. However, Debelle (2004:7) finds that while the positive effects of house price increases on the aggregate consumption have been empirically documented, the evidence is unclear at the microeconomic level. Similarly, Shen *et al*. (2015) show that wealth effects were asymmetrical in

14 OECD countries between 1975-2013, generating larger gains in consumption from price increases than drops from price falls. Additionally, they argue that the housing wealth effects were unequal between homeowners and renters. This arises because house price increases have two offsetting effects. On the one hand, the higher value of housing allows for more borrowing when the house serves as collateral. However, it also raises the expenses of house maintenance and creates greater costs for renters and first-time buyers, generating unequal wealth gains across the distribution. Consequently, the attempts to improve the explanatory power of LTC/PIH by accounting for price changes have largely been inconclusive.

Another criticism of LTC/PIH is that it does not pay enough attention to the macroeconomic implications of wealth inequality. However, as highlighted in the introduction, many researchers identify unsustainable household indebtedness as one of the causes of the 2007 crisis. In fact, the LTC/PIH framework cannot encompass the concept of over-indebtedness and unsustainability of household consumption decisions. Firstly, this is because growth of indebtedness is interpreted as the prediction of future income rises (Bertola *et al*. 2006:33). Secondly, borrowing is seen as a rational response to changing income expectations and is assumed to generate a future flow of funds matching any amount of debt. Hence, in theory no household should experience problems in loan repayment and no debt can be excessive. Default is only possible in case of external shocks to income, which are unexpected by households. For instance, Debelle (2004) argues that high levels of debt *per se* do not cause aggregate consumption to fall (which is associated with the recession) but they do magnify the effects of other shocks. Excessive indebtedness may increase household's sensitivity to the interest rate and income shocks, making consumption decisions more related to future income expectations. Consequently, in this framework any solvency problems for households are ultimately due to exogenous shocks (Bertola *et al*. 2006:18). The rise in household debt since the 1980s is seen as a rational outcome of easing liquidity constraints associated with financial deregulation and low interest rates. In light of our analysis of the link between financial sector transformation and inequality in section 1.2 of Chapter 1, we argue that the LTC/PIH framework is not suitable for the analysis of wealth distribution since the onset of the financial sector transformation in the 1980s.

Furthermore, none of the microeconomic models reviewed above explicitly considers the heterogeneity of assets and liabilities in household portfolios along the distribution highlighted in Chapter 1. Hence, the LTC/PIH-based models have not analysed the implications of the disparate rates of return and leverage associated with differences in the balance sheet composition for wealth inequality. Moreover, the liquidity constraints models put the "blame" of wealth inequalities on households, who exploit their information advantages and are "impatient" in their consumption by requesting credit in excess of their repayment capacities. This argument is devoid of understanding

of the institutional changes in financial markets outlined in Chapter 1 and ignores the massive expansion of credit via predatory lending practices induced by the high demand for securitised assets among financial investors. Lastly, despite the various extensions of the standard LTC/PIH framework, its basic premise of the rational optimising agents carefully planning their consumption patterns over the lifecycle remains. This obscures the complexity of household portfolio decisions in the age of active financial markets and thus renders this approach unsuitable to explain the mechanisms of wealth distribution in the 21st century.

2.3. The Post-Keynesian analyses of consumption

The above weaknesses of the LTC/PIH approach are addressed by the Post-Keynesian insights into household consumption behaviour. This is because they highlight the socio-institutional determinants of household portfolio choices, allowing for a more realistic examination of the mechanisms of wealth distribution in the USA since the 1980s. The Post-Keynesian analyses of consumer choice are based on radically different assumptions about consumer behaviour than the standard microeconomic theory underpinning the LTC/PIH. These have foundations in the work of Robinson (1956), Pasinetti (1981), Eichner (1986), Nell (1992), and Arestis (1992) (Lavoie 2014:95-96). Importantly, the conventional assumptions of substitutability, transitivity, and non-satiation are rejected in favour of social dependence, hierarchical ordering, and satiability of consumption choices.

The first assumption referring to the social dependence of consumption rejects the standard neoclassical notion that consumer preferences are consistent across all bundles of goods (i.e. are transitive) and respond in a predictable manner to price changes (i.e. that substitution effects dominate consumption responses). Rather, it states that preferences are socially shaped, which renders consumer choices inconsistent with the standard neoclassical assumptions as they do not respond to changes in prices of goods in a way predicted by the neoclassical consumer theory (Nell 1992:396). This idea draws from the relative income hypothesis (RIH), which emphasises the importance of the socio-institutional context in influencing household behaviour. Although the term originally refers to Duesenberry (1949), in the recent literature it encompasses a group of studies analysing the social aspects of consumption, many of which are on the brink of economics and sociology (Lavoie 2014:103). This strand of the literature is underpinned by Veblen's (1899) concept of conspicuous consumption (also referred to as positional or aspirational consumption) according to which the primary aim of consumption expenditure is a public display of the accumulated wealth levels to express economic power and association with a particular social status. Veblen stressed the importance of emulation of consumption behaviour of the upper classes by the lower (Barba/Pivetti 2009:126). Based on this concept, Duesenberry (1949) developed a

theory in which household consumption decisions are made not subject to individual income conditions but in reference to the incomes of others. From this framework, the contemporary Post-Keynesian analyses of consumption state that in the world of uncertainty consumer preferences are socially constructed rather than shaped by the absolute measures of living standards or individual characteristics (Cynamon/Fazzari 2008). This is because the visibility of consumption enhanced by mass media, advertising, trends, and repeated social interactions leads to the development of the social norms of consumption, which makes household spending preferences endogenously determined by the behaviour of peers and upper classes (*ibid*.). This stands in stark contrast with the exogenously given preferences in LTC/PIH.

Insights from RIH have been incorporated into the recent theoretical models in a variety of ways. Barba/Pivetti (2009) propose a class-determined aggregate consumption function accounting for the relative consumption effects between the lower-, middle-, and upper-income classes. Palley (2010) develops a combined "relative permanent income" theory of consumption, where consumption spending is negatively related to household permanent income which is determined by the relative consumption concerns. Kim *et al*. (2013) develop a Keynesian aggregate consumption model underpinned by RIH, explaining the accumulation of household debt. Cynamon/Fazzari (2008) study the formation of consumption norms arising from financial innovation, group identity, and the associated habit creation, which affect the consumption expenditure behaviour. From the institutionalist perspective[40], Frank (2005) discusses the "positional externalities" of consumption, arguing that choices of each consumer generate externalities in the consumption of others, which influences their spending decisions. Frank *et al*. (2014) develop a theory of expenditure cascades, in which the reference group determining household consumption is the next higher income group rather than the rich or the population mean.

According to the recent empirical evidence, analyses based on the RIH have proved to be more realistic than the LTC/PIH. This is because the institutional changes associated with the financial sector transformation and active engagement of consumers in financial markets generated behaviours which cannot by contained in the optimising framework of LTC/PIH (Cynamon/Fazzari 2008:2). As early as 2003, Morgan/Christen identified growing income disparities in the USA as a cause of the ballooning consumer credit demand at the bottom of the distribution in the attempt to "keep up with the Joneses" and maintain social position.

[40] Institutional economics emphasises the role of evolutionary processes and economic institutions in determining the behaviour of economic agents (cf. Lavoie 2014).

Krueger/Perri (2006) observe that inequality in consumption in the USA between 1980-2003 has grown less than income inequality due to the greater borrowing possibilities. Cynamon/Fazzari (2016) document systematic increases in the consumption-to-income ratio in the USA until the Great Recession, particularly for the bottom 95% of the population. This is consistent with RIH and suggests that the desire to maintain consumption norms, matched by the expansion of credit supply due to financial innovation, was an important factor behind the rising consumption share of income. In light of the slow income growth for the bottom 95% of the distribution, the rise in the consumption-to-income ratio was driven by the swelling share of debt in income, which led to the concentration of financial fragility at the bottom of the distribution during the Great Recession (*ibid*.:4). Furthermore, Bertrand/Morse (2013) find that consumption of the middle-income households in the USA was strongly responsive to consumption levels of high-income families (supporting RIH) but not to their future income expectations, asset price inflation, or the wealth effects associated with housing equity withdrawal (which rejects PIH), indicating that this was enabled by financial innovation and liberalisation policies since the 1980s. Carr/Jayadev (2014) find evidence for the relative consumption effects in the USA between 1999-2009, establishing that leverage grew the most rapidly among households with low relative income. However, empirical research on consumption has an important caveat, namely the difficulty in obtaining reliable consumption expenditure data (Steven Fazzari, personal communication, 18th June 2015; cf. Cynamon/Fazzari 2017). This is because certain expenditures are ambiguously categorised in the microeconomic data, e.g. spending on housing may be counted as either consumption or investment. Consequently, it is difficult to achieve a precise quantitative evaluation of the relative consumption effects.

An importantly feature of the social dependency of consumption is its ability to explain how financial sector transformation has influenced household portfolio decisions. Research by Dos Santos (2009), Barba/Pivetti (2009), Fitoussi/Stiglitz (2009), Fitoussi/Saraceno (2010), Guttmann/Plihon (2010), and Karacimen (2013) lays out specific institutional causes behind the increasingly unsustainable household indebtedness in the USA stemming from financial sector transformation. Debt is argued to have served as a substitute for falling incomes in result of the worsening income distribution, which was associated with wage growth lagging behind productivity growth, retrenchment of the welfare state, and unequal tax burden, as well as financial liberalisation easing credit constraints for the lower income groups. This was sustained by the loose monetary policy of low interest rates, which promoted asset price inflation.

Furthermore, the assumption of the social dependence of consumption supports the evidence of wealth inequality between different gender, racial, and age groups. Montgomerie (2011) emphasises the key role of the "politics of abandonment" of social responsibilities by the

government in inducing slow income growth, changing liability structures, and greater debt servicing costs for low-income, young and retired, subprime households in the USA. Montgomerie/Büdenbender (2015) discuss the asset-based welfare policies in the UK focused on homeownership promotion as a driver of unequal wealth accumulation and financial volatility for racial minorities, lower social classes, and women. Young (2010) argues that financial innovation, deregulation, and the subprime crisis led women and minorities to be "last in, first out" in access to financial services through leveraged homeownership. This resulted in an asymmetric dispersion of systemic risk and financial fragility to these groups, and the concentration of gains among financial investors. Consequently, the evidence from the above literature highlights that the Post-Keynesian assumption of the social dependence of consumption can explain a range of socio-institutional factors influencing household portfolio decisions in times of financial sector transformation.

From the assumption of the social dependence of consumption follows the second tenet of the Post-Keynesian analyses of household portfolio behaviour, namely the separation and subordination of consumption needs. Since certain goods are observed to be more desirable than others, households order their consumption needs in a hierarchy, which leads them to reduce their consumption after a certain threshold level is reached (Robinson 1956:251,354; Pasinetti 1981:73). Thus, the traditional substitution effect resulting from price changes is rendered invalid. Instead, it is argued that income effects are more powerful, inducing households to spend even more in times of perceived income increases (Eichner 1986:159; Arestis 1992:124). This further implies that consumption needs can be satiated so that once satisfied, they expand to incorporate new goods. Constant growth in consumption needs induced by the rising social norms in consumption makes it impossible to capture household utility in a single measure, undermining utility maximisation as the main motive of household portfolio decisions (Lavoie 2014:98-99).

Importantly, due to these assumptions the Post-Keynesian analyses of rising household debt are characterised by a drastically different outlook on its nature and consequences. They are able to provide a theoretical justification for growing wealth inequality since the 1980s in the institutional context of stagnant wages, privatisation of social services, and securitisation. Together with the insights of the functional income distribution literature as well as Hyman Minsky's (1986) financial instability hypothesis emphasising the endogenous limits to borrowing capacities (cf. Cynamon/Fazzari 2016), the macroeconomic consequences of rising household indebtedness are explained theoretically, unlike in LTC/PIH. Importantly, household insolvency carries a range of indirect personal, psychological and social costs, which remains unrecognized in the LTC/PIH approach (DeVaney/Lytton 1995:138). Thereby, the Post-Keynesian analyses of consumption

highlight the unsustainability of household finances since the 1980s and are more insightful to analyse the dynamics of wealth inequality dynamics in this period.

In sum, the Post-Keynesian approach to wealth distribution emerges as the most suitable theoretical framework to develop a formal theory of inequality determination in times of financial sector transformation. Such theory is needed for two reasons. Firstly, the Post-Keynesian insights into household consumption behaviour have not yet been formalised. Secondly, as mentioned in section 2.1 the issue of wealth heterogeneity has not been fully explored by the Post-Keynesian functional distribution theory, which we argued provided the most comprehensive framework of inequality in times of financial sector transformation. Consequently, we notice a gap in the existing literature on inequality determination, and propose a new approach in the next chapter. This new theory is informed by the Post-Keynesian analyses of the social dependence of consumption and Piketty's interplay between the returns to wealth and income growth. We propose to unify these two approaches in the Post-Keynesian macro-modelling framework, which analyses the consequences of inequality for economic stability. Based on the stylised facts of household balance sheet structures developed in Chapter 1, we argue that the explicit consideration of household wealth heterogeneity would provide a more in-depth view into the causes of inequality under financial sector transformation than the current Post-Keynesian macro-models based on the dichotomous division of households into workers and capitalists.

2.4. Summary

In this chapter, we analysed the determinants of income and wealth inequality put forward by the existing economic literature. We distinguished between the Keynesian approaches to distribution, analysing economic processes from the perspective of fundamental uncertainty and effective demand, and the microeconomic theories of household portfolio decisions, focused on the optimising behaviour of representative agents in the economy. We argued that the macroeconomic theories of Galbraith (2012) and Stiglitz (2012) and the political economy approach considered the role of financial sector transformation and power shifts in determining income inequality, but they did not account for the role of wealth disparities documented in Chapter 1. We showed that Piketty (2014) explicitly introduced the dynamics of wealth as the determinant of inequality alongside income, but he did not analyse the disparities in these dynamics across households. We noted that these aspects had been incorporated into the Post-Keynesian economic theory, which considered household heterogeneity in analysing the functional distribution of national income. We argued that the Post-Keynesian approach had not yet examined the distributional implications of wealth heterogeneity among workers and capitalists arising due to financial sector transformation.

Consequently, we turned to the theories of household portfolio decisions in order to analyse the existing theoretical explanations of the determinants of wealth distribution.

We found that the analysed classical equilibrium approaches identified with the life-cycle theory of consumption of Modigliani/Brumberg (1954), and the permanent income hypothesis of Friedman (1957) did not fully explain the rise in wealth and income inequality observed in the USA since the 1980s. This is because they neglected the socio-institutional context of household wealth accumulation decisions associated with financial sector transformation. We argued that this weakness resulted from the assumption of perfect information and efficient markets inherent in these approaches, and the associated view of inequality as the expected outcome of the optimising behaviour of representative agents at different stages of their life-cycle. We noted that the presence of fundamental uncertainty leading to breakdowns in market efficiency had been incorporated into the Post-Keynesian analyses of consumption behaviour, found in Robinson (1956), Pasinetti (1981), Eichner (1986), Nell (1992), and Arestis (1992). These insights highlighted the social nature, hierarchy, and satiability of household consumption choices, rendering utility maximisation inconsistent with the socio-institutional structures of the modern financialised economies. Together with the macroeconomic functional income distribution theory, the Post-Keynesian approach explained the determinants and consequences of unsustainable debt accumulation and the associated increases in homeownership among low-income households, women, ethnic minorities, and the young before the Great Recession. These portfolio dynamics were argued to act as a compensation mechanism for the falling wage share of national income, the decreased bargaining power of workers, and the reduced state support.

Based on this literature review, we argued that the Post-Keynesian approach to distribution accounting for the social dependence of household portfolio choices constituted the most appropriate starting point for the development of a formal theory of inequality determination in times of financial sector transformation. The need for such theory was motivated by the existing gap in the Post-Keynesian literature on functional distribution, which had not yet explored the distributional consequences of the impact of financial sector transformation on the differences in household wealth composition, which complexified the social division into workers and capitalists. In the next chapter, we develop a new theory of inequality determination accounting for wealth heterogeneity and financial sector complexity. This theory is rooted in the Post-Keynesian macro-modelling framework, and unifies Piketty's argument of the relative rates of return to wealth and income with the Post-Keynesian assumption of the social dependence of consumption.

Chapter 3

A stock-flow consistent model of inequality determination

In the previous chapter we argued that there was a gap in the existing literature on inequality. On the one hand, the Keynesian approaches identified with Galbraith (2012), Stiglitz (2012), Piketty (2014), and the Post-Keynesian economic theory considered the impact of the socio-institutional structures on inequality. However, they had not yet incorporated the role of household wealth heterogeneity in generating inequality. On the other hand, the classical equilibrium theories of household portfolio decisions identified with the life-cycle theory of consumption by Modigliani/Brumberg (1954), and the permanent income hypothesis by Friedman (1957) explained differences in wealth accumulation across households. However, because of their assumption of efficient markets and optimising representative agents, and their neglect of the macroeconomic dynamics, these theories provided an inaccurate insight into the role of finance in generating unsustainable indebtedness and uneven wealth accumulation opportunities. We argued that the Post-Keynesian analyses of consumption emphasising the social dependence of household portfolio decisions were more suitable to understand rising inequality in the modern financialised economies, considering the dimensions of class, gender, race, and the intergenerational inequalities. Thus, we argued that due to its explicit focus on household heterogeneity and the consequences of income distribution for macroeconomic stability, there was a scope for the development of a new theory of inequality determination within the Post-Keynesian macro-modelling framework. Such theory would account for the role of financial sector transformation in generating disparities in wealth ownership, unifying Piketty's argument of the relative rates of return to wealth and income with the Post-Keynesian assumption of the social dependence of consumption.

In this chapter, we develop a Post-Keynesian theory of inequality determination based on the determinants and implications of wealth heterogeneity among households. Such theory incorporating wealth inequality into the Post-Keynesian functional distribution literature is needed to understand the dynamics of inequality in times of financial sector transformation. Given the pivotal role of rising inequality in generating macroeconomic instability, which was outlined in the Introduction, the inclusion of the wealth distribution channel in macroeconomic models enriches the analysis of the dynamics of the modern capitalist economies. The most original feature of our model is to incorporate the increased heterogeneity of household wealth by introducing a third social class into the Post-Keynesian macro-modelling approach based on the stylised facts of household balance sheet composition in Chapter 1. We argue that this can account for the fact that

the analytical categories of workers and capitalists have become more complex in result of the financial sector transformation. Moreover, by considering the Post-Keynesian assumption of the social dependence of consumption we can account for different wealth accumulation motives across the distribution in a structural macro framework. Consequently, distinguishing between the differences in wealth accumulation and leverage levels across the three household groups allows for a more precise identification of the points of financial fragility defining macroeconomic stability. This is particularly important considering the changing features of the financialised economies in the post-crisis era, such as the increasing accumulation of unsecured debt among low-wealth households and the restructuring of the housing market, which creates a deep divide in wealth accumulation opportunities and the resulting income flows between homeowners and renters. In this context, wealth ownership emerges as a powerful channel of distribution, which contributes to macroeconomic instability in new ways than before the Great Recession.

The macroeconomic model of inequality determination developed in this chapter aims to complement the existing literature by explicitly incorporating wealth inequality into the Post-Keynesian macro-modelling framework. We propose a three-class stock-flow consistent model with a complex financial sector calibrated to the US data to explain the observed trends in inequality in the USA, and to account for the disparate wage growth, unequal returns to wealth, and differences in leverage across households. The main contribution of the model is to provide a new conceptualisation of the household sector in the Post-Keynesian framework based on the balance sheet composition rather than the income sources received by each group. We propose to incorporate the heterogeneity of wealth composition across households by introducing a third class identified with the leveraged middle class of homeowners emergent due to the subprime lending boom before the Great Recession. Moreover, we incorporate the Post-Keynesian assumption of the social dependence of consumption, distinguishing between different motives for household indebtedness, i.e. necessitous borrowing of the low-wealth class, the relative consumption concerns of the middle class, and credit as an investment strategy for the high-wealth class. The distributional channels in the proposed model emerge through the transfer of wealth and income to the high-wealth class due to the securitisation of mortgages of the middle class, rental payments on housing by the low-wealth class, leverage levels of the two groups and consumption emulation of the middle class determining the interest rate paid on loans by these households.

The choice of the stock-flow consistent modelling method (thereby SFCM) is motivated by its integrated analysis of balance sheet composition across the real and the financial sector. This feature yields itself to the examination of the role of household wealth heterogeneity in generating inequality. Moreover, this method has been widely used in the Post-Keynesian macro-modelling literature on the distributive consequences of financialisation. Consequently, we are able to engage

in a dialogue with the existing models, introducing the elements of Piketty's (2014) insights regarding the interplay between income and wealth into the Post-Keynesian functional distribution framework. This is achieved by incorporating the differences in household balance sheet composition and securitisation, which are associated with different returns to wealth and leverage conditions.

The chapter is organised as follows. Firstly, we motivate the choice of the SFCM methodology in developing the theory of inequality determination in this thesis, and review the existing stock-flow consistent models accounting for financial sector transformation and relative consumption concerns. Secondly, we propose a new conceptualisation of the household sector in the Post-Keynesian macro-modelling framework, introducing a new definition of the middle class. We then present the structure of our model and analyse its simulation results calibrated to the US data, comparing the simulation outcome accounting for household wealth heterogeneity and securitisation with the alternative scenarios without these features. To test the robustness of our results to the parameter choices, we conduct a univariate and a multivariate sensitivity analysis. We find that household wealth heterogeneity leads to higher inequality levels than scenarios without the new elements proposed in our model. This result is robust to the parameter choices, particularly in the long run, although the magnitudes of the simulated inequality levels are sensitive to the assumed values of the wage share, the profit retention ratio of firms, household lending conditions, and the marginal propensities to consume.

3.1. Stock-flow consistent methodology

The reason for choosing the SFCM method to analyse the impact of financial sector transformation and household wealth heterogeneity on inequality is twofold. Firstly, the choice is motivated by its explicit focus on the integrated analysis of balance sheets of the real and the financial sector. Consequently, we are able to precisely identify the distributional channels arising from financial sector transformation and the differences in balance sheet composition across households. The methodology of SFCM yields itself to the consideration of the reinforcing dynamics between the stocks of wealth and the flows of income *à la* Piketty. Moreover, the SFCM approach has been widely used in the existing Post-Keynesian macro-models of financialisation and distribution. Thus, by adopting this methodology we can maintain dialogue with the existing literature on the distributive impact of financialisation.

Originating in Copeland (1949) and in the works of Tobin and Godley in the 1980s, the SFCM framework has recently been formalised by Godley/Lavoie (2007). It constitutes a macroeconomic tool integrating stocks and flows across the real and the financial sectors in the

economy in a consistent fashion. It is based on the quadruple-entry system, which necessitates that every inflow has a corresponding outflow in the system (Caverzasi/Godin 2013).

The majority of the SFCM studies are based on the dichotomous division into workers and capitalists/rentiers, earning income from labour and ownership of capital respectively. Several recent contributions in the SFCM literature on financialisation take into account some elements of household wealth into the analyses of growth and macroeconomic stability (Zezza 2008; Caverzasi/Godin 2013; Setterfield/Kim 2013; Nikolaidi 2015; Sawyer/Passarella Veronese 2017; Dafermos/Papatheodorou 2015). Most commonly, the aspects of wealth distribution are included by allowing for borrowing by workers. As indicated by the endogenous money theory, these loans and the corresponding debt repayments are transferred to the capitalist class in the form of financial assets. Wealth of rentiers is usually divided into firm equities and bank deposits. The allocation of wealth between these two assets depends on their relative rates of return, and is often modelled according to the Tobinesque portfolio principle (Caverzasi/Godin 2015:16). In addition, Zezza (2008) presents one of the first attempts to include a housing market in the SFCM, assuming that capitalists, identified with the top 5% of the income distribution, receive additional income from renting houses to part of the workers. Furthermore, Sawyer/Passarella Veronese (2017) and Nikolaidi (2015) incorporate securitisation into the SFCM framework, assuming that the shadow banking sector increases the capital income inflows of rentiers. Moreover, Dafermos/Papatheodorou (2015) link personal and functional income distribution in the SFCM approach, distinguishing between five groups of households depending on their employment status, skill level, and the type of income earned. In addition, Caverzasi/Godin (2013), Setterfield/Kim (2013), Kapeller/Schuetz (2015), and Detzer (2016) develop Post-Keynesian macro-models accounting for the emulation of rentier consumption by workers.

We argue that the current SFCM analyses have not yet explicitly captured the impact of financial sector transformation and the differences in household balance sheet structures on the endogenous inequality determination. With the exception of Dafermos/Papatheodorou (2015), most of the SFCM studies reviewed above do not explain distribution within the model. Moreover, few account for wage earnings among the top income group, or consider differences in household portfolio decisions in macroeconomic dynamics. This arises because of the dominance of the dichotomous division of households in these models, which does not sufficiently encompass the rising heterogeneity of wealth structures along the distribution. Furthermore, apart from Sawyer/Passarella Veronese (2017) borrowing is restricted to workers. However, as shown in Chapter 1, in the USA it is the rich who are indebted the most both in terms of value and participation. Consequently, the model proposed in this chapter attempts to fill the emergent gap in the literature by developing the analysis of endogenous determination of income and wealth

inequality, accounting for household wealth heterogeneity and financial sector complexity. This is achieved by introducing the third class of households corresponding to the middle class defined by its balance sheet structure dependent on leveraged housing. The household sector is thus redefined according to the differences in asset ownership and leverage levels rather than the type of income received.

3.2. New conceptualisation of the household sector

Based on the literature review in Chapter 2, and the analysis of changes in household balance sheet structures in Chapter 1, the stock-flow consistent model developed in this thesis aims to account for the increased heterogeneity of the categories of workers and capitalists encountered in the Post-Keynesian macro-modelling literature, arising due to changes in their wealth ownership structures. We propose to incorporate the growing wealth heterogeneity in the Post-Keynesian macro-models by providing a new conceptualisation of the household sector based on differences in the balance sheet composition. For this purpose, we introduce a third group into the conventional dichotomous distinction between workers and capitalists in the Post-Keynesian functional distribution theory. This new group is identified with the middle class, defined as the new class of leveraged homeowners formed in the subprime lending boom. The introduction of this class allows us to distinguish between different motives for debt accumulation across households based on the Post-Keynesian assumption of the social dependence of consumption discussed in Chapter 2.

We acknowledge that the definition of the middle class can be considered along a variety of dimensions. In monetary terms, the middle class is often defined relatively as the middle 60% of income earners, with incomes typically ranging from 75% to 125% of the median income[41]. Atkinson/Brandolini (2011) develop a wealth criterion to qualify the income definition of the middle class. They classify the rich as agents having net wealth at least 30 times larger than mean income. The middle class is defined as holding enough assets to be safe from the risk of falling into poverty for a certain period of time, e.g. 6 months, if income suddenly falls. Atkinson/Brandolini (2011) argue that asset-poor individuals may need to be excluded from the middle class even if their income exceeds the poverty threshold.

Furthermore, the middle class can be defined according to the social criteria such as class consciousness, social status, lifestyle, and type of employment, which influence the individual economic security and prospects (cf. Savage 2013).

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[41] Some studies extend the upper limit to as much as 300% of the median income because the 125% cut-off places a disproportionately large portion of the population in certain countries into the top category (cf. Pressman 2007).

In the Post-Keynesian macro-modelling literature, Palley (2015) constitutes one of the first attempts at formalising the middle class. He models a Goodwinian three-class economy, with the household sector divided into the upper, middle, and working class according to the type of employment. The upper class is identified with the richest 1% of the population, corresponding to the top managers. The middle class is defined as the next 19%, consisting of middle managers. Hence, it is much smaller than typically envisaged in the literature described above and does not contain the median household. The working class corresponds to the bottom 80% and includes non-supervisory production workers. Palley's model introduces a complex class struggle, where the middle managerial class has conflicts with both the upper and the working class. Managerial pay is seen as a deduction from surplus in line with Kalecki (1971), as the top managers receive a share of firms' profit. In contrast, pay of middle managers' is treated as non-managerial wage and forms part of the wage bill. Hence, it constitutes the cost of production based on which the mark-up prices are determined. Moreover, while non-managerial workers are paid hourly based on their exogenously determined bargaining power, employment rate, and working hours, the middle managers are assumed to receive a salary. Consequently, the middle and the top managers save part of their income, while workers consume all their wages. Hence, since middle managers own part of the capital stock they simultaneously benefit from a higher profit share (which aligns their interests with those of the top managers) and from a higher wage share (creating a common interest with the working class). Consequently, class conflict is complexified as the middle class is simultaneously in conflict with the top managers and workers over the share of profits and wages respectively. The political alliance of the middle class will ultimately depend on which source of income – wages or capital – is preferred (Palley 2015:240). Similar proposition regarding the simultaneous capitalist and non-capitalist nature of the middle class has been put forward by Wright (1997, 2009).

While Palley's model constitutes an important contribution to the literature, its conclusions concern the functional distribution of income rather than wealth. The middle class is seen to have contradicting interests and be in conflict with both the upper- and the lower-income groups. However, as argued in Chapter 1, the processes of financial sector transformation harmed wealth accumulation of the middle-income households, making their fate more similar to the working class in terms of their high leverage levels. Since the task of our analysis is to incorporate wealth into the examination of inequality in times of financial sector transformation, our original contribution to the Post-Keynesian macro-modelling literature is to incorporate the middle class into the analysis of the household sector based on a new conceptualisation. In our model, households are defined by their balance sheet characteristics related to the securitisation processes and differences in wealth accumulation motives rather than their wage/profit shares.

3.3. Model specification

The aim of the model presented in this thesis is to account for household wealth heterogeneity in explaining income and wealth inequality in a financialised economy. The model is simulated and calibrated using the US data. We analyse the evolution of various overall inequality measures for income and wealth. We focus on the personal distribution of wealth and income, treating the functional income distribution as given by assuming an exogenous wage share. Table 3.1 presents the balance sheet matrix of our model, while Table 3.2 shows the integrated transaction flow matrix. The model considers a closed economy with no government, and consists of five sectors: a three-class household sector, firms, and a three-tier financial sector comprising of commercial banks, special purpose vehicles (SPVs)/underwriters, and institutional investors. This definition of the financial sector aims to capture the increased complexity of modern financial institutions by introducing securitisation into the model dynamics. Apart from income transfers through the repayments of loans from commercial banks, inequality is influenced by securitisation, which transfers wealth of the middle-income group to the upper class through differences in asset ownership.

3.3.1. The household sector

In contrast to the existing Post-Keynesian macro-models, the household sector in our analysis is defined not by the type of employment but by the balance sheet characteristics. As argued previously, this allows for understanding the endogenous determination of wealth and income inequality in times of financial sector transformation. Moreover, it links the theory of Piketty (2014) with the Post-Keynesian functional distribution framework, highlighting the interplay between wealth ownership and income flows for overall inequality. We also account for the Post-Keynesian assumption of the social dependence of consumption by considering differences in debt accumulation motives across households.

Table 3.1 Balance sheet matrix

	Households			Firms	Commercial banks	SPVs/underwriters	Institutional investors	Sum
	Working class	Middle class	Rentier class					
Deposits	$+M_w$	$+M_m$	$+M_r$		$-M_w-M_m-M_r$			0
Loans	$-L_w$	$-L_m$	$-L_r$		$+L_w+L_{mNS}+L_r$	$+L_{mS}$		0
Capital				$+K$				$+K$
Houses		$+p_hH_m$	$+p_hH_r$	$+p_hHU$				$+p_hH$
Equity			$+E$	$-E$				0
MBS						–MBS	+MBS	0
Institutional investors shares			+SH				–SH	0
Net worth	V_w	V_m	V_r	V_f	V_b	V_s	V_I	V

Table 3.2 Transaction flow matrix

	Households			Firms		Commercial banks		SPVs/underwriters		Institutional investors		Sum
	Working class	Middle class	Rentier class	Current	Capital	Current	Capital	Current	Capital	Current	Capital	
Consumption	$-C_w$	$-C_m$	$-C_r$	$+C_w+C_m+C_r$								0
Investment				+I	–I							0
Wages	$+W_w$	$+W_m$	$+W_r$	–W								0
Firm profits			+DP	–TP	+RP							0
Bank profits			+FB			–FB						0
Financial profits			+FI							–FI		0
Coupon payments								–COUPAY		+COUPAY		0
Interest on deposits	$+r_m*M_w$	$+r_m*M_m$	$+r_m*M_r$			$-r_m*M$						0
Interest on loans	$-r_w*L_w$	$-r_{lm}*L_m$	$-r_l*L_r$			$+r_w*L_w+r_l*L_r$ $+r_{lm}*L_{mNS}$		$+r_{lm}*L_{mS}$				0
Rent on housing	–R		+R									0
Δ Deposits	$-\Delta M_w$	$-\Delta M_m$	$-\Delta M_r$				+ΔM					0
Δ Loans	$+\Delta L_w$	$+\Delta L_m$	$+\Delta L_r$				$-\Delta L_w-\Delta L_r$ $-\Delta L_{mNS}$		$-\Delta L_{mS}$			0
Δ Capital				+ΔK	–ΔK							0
Δ Houses		$-p_h*\Delta H_m$	$-p_h*\Delta H_r$		$+p_h*\Delta H_m$ $+p_h*\Delta H_r$							0
Δ Equities			$-p_e*\Delta E$		$+p_e*\Delta E$							0
Δ MBS									+ΔMBS		–ΔMBS	0
Δ Inst. inv. shares			–ΔSH								+ΔSH	0
Δ Net worth	ΔV_w	ΔV_m	ΔV_r	0	ΔV_f	0	ΔV_b	0	ΔV_s	0	ΔV_I	ΔV

The working class

Classification of the working class in our model is conceptually close to the category of workers encountered in the Post-Keynesian literature. In line with Kalecki (1954), this group is assumed to have the highest propensity to consume. Additionally, we assume that they are the most leveraged group. Based on the analysis of household balance sheet structures in Chapter 1, we identify this group with the bottom 20% of the income distribution in the USA, who experienced rapid increases in net wealth holdings before the Great Recession, followed by large losses since 2007. We assume that they do not carry enough wealth and income that would allow them to take out mortgages and hence that all working class households rent houses. Consequently, it is assumed that credit to the working class households consists of unsecured short-term consumer credit and payday loans. As shown in the balance sheet analysis in Chapter 1, this has been particularly relevant in the recent years as unsecured debt and payday borrowing have been on the rise after the 2007 crisis (cf. The Pew Charitable Trust 2012; PwC 2015).

Because of low wealth holdings, the working class is assumed to rely primarily on wage income. In our model, real disposable income of the working class consists of wages and interest earned on deposits, less interest paid on loans and house rental payments to rentiers (equation 3.1). Gross income is defined as wages and interest on deposits without considering loan repayments (equation 3.2). We assume that the working class takes on debt to finance consumption. Households consume part c_1 of their gross income as well as proportion c_4 of their wealth, and store the remaining savings after loan repayments as bank deposits (equations 3.3–3.4)[42]. We assume that the propensity to consume out of wealth c_4 is the same for all households.

Assuming simple adaptive expectations[43], borrowing by the working class is determined by their past consumption level, adjusted by parameter β_w, as well as the debt-service-to-income ratio (equation 3.5). β_w captures household borrowing norms as well as lending norms in the financial sector (Setterfield/Kim 2013:10). We assume that β_w for the working class is lower compared to the other households. In this way, we are able to indirectly account for the borrowing constraints of workers, reflecting commercial banks' attitude towards the creditworthiness of borrowers. We

[42] This corresponds to the assumption of the "pecking order" in Setterfield/Kim (2013) stating that households treat savings as a "luxury that is foregone first" in the presence of debt repayments.

[43] In contrast to the rational expectations hypothesis assuming that agents utilise all available public information, the theory of adaptive expectations states that expectations are based on the past values of an economic variable (Snowdon/Vane 2005:227). While a weakness of this backward-looking approach to the formation of expectations is the possibility of systematically erroneous predictions if the economic variable is unstable, we prefer the adaptive expectations hypothesis to the rational expectations due to the presence of fundamental uncertainty in the economy.

assume β_w to be high during a boom, as in the early 2000s when lending norms were lax due to the perceived minimisation of credit risk through securitisation. In times of recessions, β_w can be thought of as low as lenders are more concerned about creditworthiness, leading to stricter lending norms. Because workers are assumed to have higher leverage, they are constrained in their access to credit as their demand for loans is adjusted by the debt-service-to-income ratio, capturing the repayment capacity on past loans.

Net wealth of the working class is accumulated entirely in deposits less loans (equation 3.6). Rental payments on housing are defined in equation 3.7 as a proportion γ of the value of houses owned by rentiers and the price of housing. γ depends positively on the change in the rentier demand for housing (equation 3.8). At this stage of the analysis it is not endogenously explained why households in each group chose to rent or own their house, although the earlier discussion in Chapter 1 explained how financial innovation and the subprime lending expansion generated opportunities for low-income households to get onto the housing ladder and become the new middle class of leveraged homeowners. In the present model we do not analyse such between-class movements endogenously.

As discussed in Chapter 1, the differential degrees of leverage across the distribution became important contributors to inequality in the USA in the context of financial sector transformation. One of the most innovative features of our model is to examine the exact dynamics of household leverage and inequality. As financial distress is often measured simultaneously by a variety of indicators in the current literature (cf. DeVaney/Lytton 1995, Boushey/Weller 2008, Ampudia *et al.* 2014), we include three measures of leverage to account for financial fragility in the most complete way possible. Firstly, the debt-to-asset ratio is provided (equation 3.9), capturing the value of loans relative to the value of gross wealth. Secondly, the debt-to-income ratio (equation 3.10) constitutes a measure of the stock of loans to the flow of disposable income in each period. Finally, the debt-service-to-income ratio (equation 3.11) shows how much of gross income is directed towards debt repayments in each period.

$$YD_w = \frac{N_w}{N_w+N_m+N_r} W + r_{m,-1} M_{w,-1} - r_{w,-1} L_{w,-1} - R \tag{3.1}$$

$$YG_w = YD_w + r_{w,-1} L_{w,-1} \tag{3.2}$$

$$C_w = c_1 YG_{w,-1} + c_4 V_{w,-1} \tag{3.3}$$

$$\Delta M_w = YD_w - C_w \tag{3.4}$$

$$\Delta L_w = \beta_w C_{w,-1} - DSY_w L_{w,-1},\ \beta_w > 0 \tag{3.5}$$

$$V_w = M_w - L_w \tag{3.6}$$

$$R = \gamma p_h H_r \tag{3.7}$$

$$\gamma = \gamma_{-1} + (1 + (H_r - H_{r,-1})/H_{r,-1}) \tag{3.8}$$

$$levV_w = \frac{L_w}{M_w} \tag{3.9}$$

$$levY_w = \frac{L_w}{YD_w} \tag{3.10}$$

$$DSY_w = \frac{r_{w,-1}L_{w,-1}}{YG_w} \tag{3.11}$$

The middle class

As suggested previously, the definition of the middle class in our model differs sharply from Palley's (2015) analysis. We define the middle class according to their balance sheet composition based on the stylised facts established in the analysis of trends in household wealth composition in the USA in Chapter 1.

Importantly, the middle class is defined as a group whose balance sheets depend on housing. This definition encompasses population between the 20th and the 90th percentile and thus includes the median household. Their wealth was rising in the 1990s and the 2000s due to the increasing house prices, allowing them to refinance their mortgages by taking on more credit and engage in home equity withdrawal, a strategy which was only feasible in the house price bubble. When the growth of house prices reversed in July 2006, these households saw their wealth gains largely eroded. For these reason, the middle class is assumed to have high leverage ratios. As argued in Chapter 1, the expansion of credit wasn't accidental as household loans, primarily mortgages, constituted the basis for asset-backed securities. Consequently, the existence of the middle class is strongly linked to the financial sector transformation due to the incentives of financial institutions to generate as many household loans as possible to satisfy the growing demands of financial investors for securitised instruments.

Separation of this group from the working class is important to account for the impact of homeownership on inequality. As shown in Chapter 1, unlike households in the bottom 20% of the income distribution, the middle-income households, particularly those in the second and third quintile experienced large wealth losses in the past decades. This was due to the falling value of housing around the time of the Great Recession. Moreover, the middle class is different from the top income group because of the disparate returns to wealth documented in Chapter 1 emergent as the middle-income groups received lower capital income flows than the top group due to less diversified asset composition.

Because the middle class is assumed to account for 70% of households in our analysis, issues associated with heterogeneity of this group need to be acknowledged. Currently, the middle class in our model includes both subprime mortgage borrowers, whose incomes and wealth resemble those of the working class, and middle managers in the 80^{th}-90^{th} percentile of the income distribution, whose trends in income and wealth are closer to the rentier households.

We argue that heterogeneity issues cannot be avoided in analysing the household sector. The three-class division adopted here is superior to the two-class conceptualisation of the household sector in the Post-Keynesian macro-modelling literature because it allows for a more intricate examination of household balance sheets and leverage in times of financial sector transformation, which altered the traditionally envisaged economic relationships. There is a possibility of extending the division of households even further, which has been done by Dafermos/Papatheodorou (2015). Such detailed division is not necessary in the present model for two reasons. Firstly, it would introduce a considerable degree of complexity to an already elaborate model of heterogeneous households and financial institutions. Secondly, in the aggregate framework of SFCM, it would be difficult to meaningfully break down the social classes into upper/lower groups and introduce a drastically different picture of balance sheets than that already provided in the three-class model. This is because at the aggregate level the most important distinctions in wealth accumulation possibilities are already made.

In the model, real disposable income of the middle class consists of wage income and interest earned on bank deposits less interest payments on loans (equation 3.12). Gross income is defined as wage and interest income plus capital gains on housing[44] (equation 3.13). We assume that the middle class accumulates mortgage debt to finance part of their consumption. Thus, a fraction of wealth and gross income is consumed (equation 3.14). We assume that the residual disposable income after the repayment of loans is saved as deposits (equation 3.15).

Borrowing of the middle class depends on their target consumption adjusted by β (which is analogous to the parameter β_w in the workers loan demand function) and their debt burden measured as the debt-service-to-income ratio (equation 3.16). We assume that the parameter β reflecting household lending norms is the same across the middle class and rentiers. The target consumption of the middle class is set based on the past consumption level (due to the simple adaptive expectations), and relative to the consumption of rentiers adjusted by the emulation parameter η (equation 3.17). η is the exogenous Ravina emulation parameter (cf. Ravina 2007).

[44] This resembles the Haig-Simon income specification, where capital gains enter into the disposable income equation (Godley/Lavoie 2007:392).

As discussed in Chapter 2, consumption emulation has recently emerged as a potentially important driver of borrowing (cf. Cynamon/Fazzari 2008, Pressman/Scott 2009), leading to lower levels of consumption inequality than income inequality (cf. Krueger/Perri 2006). However, while in the existing SFCM studies emulation is applied to low-income workers, we restrict relative consumption to the middle class. We deem this approach more appropriate as emulation motives are more likely to be relevant among more affluent households belonging to the middle class, who can afford necessities such as owning their house. In contrast, the working class is more concerned with maintaining their living standards in light of the rising living costs (i.e. rent payments). Their demand for loans is thus more likely to be driven by necessitous borrowing concerns (cf. Pollin 1988) rather than their desire to follow the celebrity lifestyles of the rich. It would be possible to introduce emulation of the middle class consumption by the working class, which would be in line with the expenditure cascades theory where each group emulates consumption of the one just above it in the distribution (Frank *et al*. 2014). However, we believe that due to sluggishly growing incomes and increases in house prices, the rising credit demand of the low-income households is motivated primarily by sustaining a constant standard of living rather than the achievement of a particular social status.

Net wealth of the middle class is composed of the value of bank deposits and houses, less loans (equation 3.18). We therefore assume that the middle class households are owner-occupiers of their property (and hence that they do not rent out their houses). We assume that loans to the middle class consist exclusively of mortgages. Demand for houses by the middle class is defined positively by their disposable income and the change in the provision of mortgages from the previous period, and is defined negatively by their current consumption and the debt-to-income ratio, all adjusted by the price of housing (equation 3.19). As in the case of the working class, different measures of financial fragility for the middle class are presented, including the debt-to-asset ratio (equation 3.21), the debt-to-income ratio (equation 3.22) and the debt-service-to-income ratio (equation 3.23).

$$YD_m = \frac{N_m}{N_w+N_m+N_r} W + r_{m,-1} M_{m,-1} - r_{lm,-1} L_{m,-1} \tag{3.12}$$

$$YG_m = YD_m + r_{lm,-1} L_{m,-1} + CG_{Hm} \tag{3.13}$$

$$C_m = c_3 YG_{m,-1} + c_4 V_{m,-1} \tag{3.14}$$

$$\Delta M_m = YD_m - C_m \tag{3.15}$$

$$\Delta L_m = \beta C_m^T - DSY_m L_{m,-1}, \beta > 0 \tag{3.16}$$

$$C_m^T = C_{m,-1} + \eta C_{r,-1} \tag{3.17}$$

$$V_m = M_m + H_m - L_m \tag{3.18}$$

$$\Delta H_m = (YD_m - C_m + (L_m - L_{m,-1}) - levY_m)/p_h \tag{3.19}$$

$$CG_{Hm} = H_{m,-1}\Delta p_h \tag{3.20}$$

$$levV_m = \frac{L_m}{V_m + L_m} \tag{3.21}$$

$$levY_m = \frac{L_m}{YD_m} \tag{3.22}$$

$$DSY_m = \frac{r_{lm,-1}L_{m,-1}}{YG_m} \tag{3.23}$$

The rentier class

In our model, households in the top group are defined as the top 10% of the income distribution. In contrast to the other household groups, they saw the fastest increases in their income and wealth since the 1980s and the smallest wealth losses after the 2007 crisis, as evidenced by the analysis in Chapter 1. Moreover, their balance sheets are assumed to be more diversified and rely primarily on high-yielding financial investment assets and business equity rather than housing, which differentiates this group from the middle class. Because we do not analyse the dynamics of investment expectations and realisation among entrepreneurs, we narrow down the definition of the capitalist class to rentiers.

The existing Post-Keynesian studies often treat the rich as pure rentiers, who derive their income solely from capital ownership. This is also envisaged by Piketty – as wealth becomes inherited and the compounding returns to wealth gradually exceed the growth of income over time, the rich abandon work as they are able to live off the returns to their wealth. While this was true in the pre-Fordist era and seems to be a plausible scenario in the future, it doesn't describe the realities observed since the post-war period. Keister/Lee (2014) show that inheritance in the USA accounts for a small portion of the existing wealth of the rich. Moreover, as shown in the analysis of trends in inequality in Chapter 1, the top 10% captured an increasing share of wages between 1989-2013. This stems from the extremely high salaries paid to financial sector executives (cf. Kaplan/Rauh 2010; Philippon/Reshef 2012). To account for the growing wage inequality, we include wages in the rentier income in our model. In this view, the capitalist class can be thought of as "working rentiers". This complements the traditional Post-Keynesian view of the capitalist class. We assume that rentiers engage in work not because of necessity (as is in the case of the working and the middle class) but because the institutional conditions make employment an "investment strategy" for the rich, as they are able to use the economic power associated with their

high wealth to influence their earnings. Consequently, unlike the working and the middle class, they do not rely on their wages to maintain their living standards.

Furthermore, in contrast to most of the SFCM studies including debt, we allow for indebtedness of the rich. This is because the analysis of household balance sheet composition in Chapter 1 revealed that the top decile accumulated sizeable debt between 1989-2013, constituting the most indebted income group in terms of the ownership rates and the amount of debt. Consequently, in our model it is assumed that rentiers borrow from banks to consume and invest in excess of their wage and capital income. Rentier borrowing depends positively on their wealth, which serves as collateral. What is different about the indebtedness of the rich is their debt accumulation motives. We assume that rentiers take on debt as an investment strategy to accumulate more assets. Because of lower interest rates on loans and higher returns to the diversified asset portfolio, the debt-service-to-income ratio and the debt-to-asset ratio of the top decile are assumed be the lowest among all households. Conversely, based on the analysis in Chapter 1 we expect the debt-to-income ratio to be the highest for rentiers reflecting their large asset holdings, which allow for high debt accumulation relative to their income flows.

Rentier disposable income consists of wages (treated as part of the wage bill and including a wage premium over the other employees), interest on deposits, a proportion of profits of firms and commercial banks, as well as return earned on business equity and shares of institutional investors, and housing rental payments by the working class, less interest paid on loans (equation 3.24). Gross income is defined as the above plus the amount of debt repayments and capital gains on housing and business equity (equation 3.25 and 3.34-35). Rentiers consume a fraction of their gross income and wealth, although their propensity to consume out of income is assumed to be the lowest among all households (equation 3.26). Residual savings after debt repayments are stored in the form of deposits (equation 3.27).

Borrowing of rentiers (equation 3.28) depends on their past consumption and their debt-service-to-income ratio, and does not include the relative consumption concerns. It should be mentioned, however, that relative consumption motives are bound to be especially strong among the richest 10%, who engage in luxury goods consumption and aim to elevate their social status and pursue “celebrity lifestyles”. This is evidenced by the analysis of the top shares in Chapter 1, which highlighted that much of the increase in the top 10% share of income and assets was driven by the rising share of the top 1%. However, high aggregation of the SFCM and the elaborate character of the current model prevent us from modelling such precise consumption behaviour of the different income groups within the top decile.

It is assumed that the allocation of rentiers' wealth (equation 3.29) between houses, equities, institutional investors' shares and deposits, which are treated as a buffer stock (equations 3.30–3.32), follows the Tobinesque portfolio principle, i.e. it depends on the relative rates of return offered on these assets. We assume that rentiers own all firm equity. Return on housing considered by the rentiers is given by the ratio of rent payments by the working class and capital gains on housing to the value of housing in the previous period (equation 3.33).

Equations 3.36 to 3.38 provide the leverage measures of the rentier households, i.e. the debt-to-asset ratio, the debt-to-income ratio, and the debt-service-to-income ratio.

$$YD_r = \frac{N_r}{N_w+N_m+N_r} W + Wpr + r_{m,-1}M_{r,-1} + DP + FB + FI + R - r_{l,-1}L_{r,-1} \tag{3.24}$$

$$YG_r = YD_r + r_{l,-1}L_{r,-1} + CG_{Hr} + CG_E \tag{3.25}$$

$$C_r = c_5 YG_{r,-1} + c_4 V_{r,-1} \tag{3.26}$$

$$\Delta M_r = YD_r - C_r \tag{3.27}$$

$$\Delta L_r = \beta C_{r,-1} - DSY_r L_{r,-1},\ \beta > 0 \tag{3.28}$$

$$V_r = M_r + H_r + E + SH - L_r \tag{3.29}$$

$$p_e = (\lambda_{1,0} + \lambda_{1,1}r_{e,-1} + \lambda_{1,2}r_{m,-1} + \lambda_{1,3}\frac{YD_{r,-1}}{V_{r,-1}} + \lambda_{1,4}r_{Hr,-1} + \lambda_{1,5}r_{s,-1})V_{r,-1}/E_{-1} \tag{3.30}$$

$$H_r = (\lambda_{2,0} + \lambda_{2,1}r_{e,-1} + \lambda_{2,2}r_{m,-1} + \lambda_{2,3}YD_{r,-1} + \lambda_{2,4}r_{Hr,-1} + \lambda_{2,5}r_{s,-1})/p_{h,-1} \tag{3.31}$$

$$SH = \lambda_{3,0} + \lambda_{3,1}r_{e,-1} + \lambda_{3,2}r_{m,-1} + \lambda_{3,3}YD_{r,-1} + \lambda_{3,4}r_{Hr,-1} + \lambda_{3,5}r_{s,-1} \tag{3.32}$$

$$r_{Hr} = (R + CG_{Hr})/H_{r,-1} \tag{3.33}$$

$$CG_{Hr} = H_{r,-1}\Delta p_h \tag{3.34}$$

$$CG_E = e_{-1}\Delta p_e \tag{3.35}$$

$$levV_r = \frac{L_r}{V_r+L_r} \tag{3.36}$$

$$levY_r = \frac{L_r}{YD_r} \tag{3.37}$$

$$DSY_r = \frac{r_{l,-1}L_{r,-1}}{YG_r} \tag{3.38}$$

3.3.2. Firms

The firm sector in our model is deliberately simple. Firms are assumed to follow the standard Kaleckian behaviour, setting prices as a mark-up over costs. We assume that there is no inflation and that the price of output is unity, so that the nominal and real values coincide. Profits are

residual (equation 3.39) and the profit share is determined as a mark-up over unit labour costs. We assume that firms invest in housing and produce a single capital good on demand so that capital inventories are not taken into account. Firms retain part of their profits (equation 3.40) and distribute the rest to the rentiers (equation 3.41).

The output of the modelled economy is given by the consumption spending of households and investment in productive capital and housing (equation 3.42). The wage bill is set through the bargaining process and is defined according to an exogenously given wage share of output (equation 3.43). The wage rate of the working and the middle class depends on the share of each group (N_w and N_m respectively) in total population. Importantly, wages paid to rentiers are linked to a variable remuneration dependent on firm profits. The rentier wage rate (equation 3.44) is given by an exogenous premium $m_w > 1$ over the other workers' wage rate, as well as the profit sharing element ρh, and an exogenous parameter $\rho \in (0,1)$ reflecting the relative importance of profit remuneration in the rentier wage rate determination (Dafermos/Papatheodorou 2015:13).

Because the focus of the model is on introducing complexity into the household and the financial sector, firms' investment behaviour is highly simplified. Investment is assumed to expand at a constant rate and is defined by the growth of capital stock at an exogenous rate g_k (equations 3.45-3.46). A fraction x of investment spending is financed by issuing equity (equation 3.47). Return on equity is given in equation 3.48, while the value of equities outstanding is defined in equation 3.49. The capacity utilisation rate (equation 3.50) is given as the ratio of the actual to the potential output (equation 3.51).

Apart from productive capital, firms invest in housing, which depends on the difference between housing demanded by rentiers and the middle class and the available housing supply in the previous period (equation 3.52). In every period, a stock of houses remains unsold (equation 3.53), depending on the change in the supply and the demand for housing among the middle class (note that the Tobinesque portfolio equation implies that all houses demanded by rentiers are sold). Change in the price of housing is given by the difference between the change in the demand for housing by rentiers and the middle class and the change in the supply of housing by firms (equation 3.54).

$$TP = Y - W \tag{3.39}$$

$$RP = s_f TP \tag{3.40}$$

$$DP = TP - RP \tag{3.41}$$

$$Y = C_w + C_m + C_r + I + \Delta H \tag{3.42}$$

$$W = s_w Y \tag{3.43}$$

$$Wpr = (1-\rho)m_w \frac{N_w+N_m}{N_w+N_m+N_r} + \rho h\left((Y - \frac{N_w+N_m}{N_w+N_m+N_r}W - (1-\rho)m_w \frac{N_w+N_m}{N_w+N_m+N_r}N_r)/N_r\right) \quad (3.44)$$

$$I = g_k K_{-1} \quad (3.45)$$

$$\Delta K = I \quad (3.46)$$

$$e = e_{-1} + xI_{-1}/p_e \quad (3.47)$$

$$r_e = \frac{DP+CG_E}{p_{e,-1}e_{-1}} \quad (3.48)$$

$$E = p_e e_{-1} + xI_{-1} \quad (3.49)$$

$$u = \frac{Y}{Y^*} \quad (3.50)$$

$$Y^* = vK \quad (3.51)$$

$$\Delta H = h_1\left(\left(H_{m,-1} + H_{r,-1}\right) - H_{-1}\right) \quad (3.52)$$

$$\Delta HU = (H - H_{-1}) - (H_m - H_{m,-1}) \quad (3.53)$$

$$p_h = p_{h,-1} + h_2\left(\frac{(H_m+H_r)-(H_{m,-1}+H_{r,-1})}{(H_{m,-1}+H_{r,-1})} - \frac{H-H_{-1}}{H_{-1}}\right) \quad (3.54)$$

3.3.3. Commercial banks

Financial sector in our model comprises of three institutions – commercial banks, special purpose vehicles/underwriters, and institutional investors. The advantage of the SFCM method is its ability to illustrate the different functions of the various financial institutions in the economy (Sawyer/Passarella Veronese 2017). Based on the theory of endogenous money, we assume that commercial banks in our model have a distinct role of creating money through loans, which is circulated through the economy by the remaining financial institutions.

Since the aim of our model is to account for inequality determination in the age of financial sector transformation, commercial banks are envisaged as active profit-seeking entities rather than passive intermediaries between debtors and creditors. Profits of the commercial banks are generated by charging higher interest rates on loans than offered on deposits. A constant interest rate on deposits is assumed for all households, defined as an exogenous premium α_1 over a given central bank interest rate (equation 3.56). The interest rate on loans is set by charging an exogenous premium α_2 over the deposit rate (equation 3.57). Thus, the commercial bank profits are defined as the sum of the interest payments on non-securitised mortgages of the middle class

(equation 3.64), consumer loans of the working class, and loans to rentiers, less interest payments on deposits to households (equation 3.55)[45]. All profits are transferred to the rentiers, who are assumed to own commercial banks and the remaining financial institutions. This, together with the assumption that assets of rentiers outweigh their debt holdings, leads to the assumption that rentiers in our model remain creditors in net terms. This is because their debt payments are ultimately returned to them in the form of bank profits.

Commercial banks accept deposits from the household sector. However, each household group faces a different rate of interest depending on the perception of their creditworthiness by banks. The interest on loans to the working class is higher than the rate charged to the middle class and rentiers by a premium π (equation 3.58). This risk premium depends on the exogenous parameters π_0 and π_1, capturing the institutional conditions in the financial markets, as well as the debt-to-income ratio and the debt-service-to-income ratio of the working class (equation 3.59).

Loans to the middle class are subject to a mortgage rate (equation 3.60), defined as a spread over the commercial bank lending rate (equation 3.61). The mortgage spread depends positively on parameter π_0, the debt-service-to-income ratio, and the debt-to-income ratio of the middle class, adjusted by an exogenous parameter π_2, and negatively on the rate of return on mortgage-backed securities (MBS), adjusted by an exogenous parameter π_3.

Importantly, part of the mortgages to the middle class is securitised and sold to underwriters and their SPVs (equation 3.62), and the rest is kept on the commercial bank balance sheets (equation 3.63). The share of securitised loans (equation 3.64) depends on an exogenous parameter s_0 (capturing institutional conditions such as the degree of financial regulation) and the target yield on MBS (given by the past yield under the assumption of simple adaptive expectations), adjusted by an exogenous parameter s_1. The redundant equation of the model is given in equation 3.65[46].

$$FB = r_{w,-1}L_{w,-1} + r_{lm,-1}L_{mNS,-1} + r_{l,-1}L_{r,-1} - r_{m,-1}(M_{w,-1} + M_{m,-1} + M_{r,-1}) \quad (3.55)$$

$$r_m = r_{CB} + \alpha_1 \quad (3.56)$$

$$r_l = r_m + \alpha_2 \quad (3.57)$$

$$r_w = r_l + \pi \quad (3.58)$$

$$\pi = \pi_0 + \pi_1 levY_{w,-1}DSY_{w,-1} \quad (3.59)$$

[45] The simulated steady-state value of the interest rates on mortgages to the middle class is 6.8%, while the interest rate on loans to the working class is 8.8% (base interest rate on loans is 3%, Appendix II).
[46] The redundant equation is logically implied by the remaining model equations (Godley/Lavoie 2007:42).

$$r_{lm} = r_l + spreadm \tag{3.60}$$

$$spreadm = \pi_0 + \pi_2 levY_{m,-1} DSY_m - \pi_3 r_{MBS,-1} \tag{3.61}$$

$$L_{mS} = sL_m \tag{3.62}$$

$$L_{mNS} = (1 - s)L_m \tag{3.63}$$

$$s = s_0 + s_1 yield_{MBS,-1} \tag{3.64}$$

$$M_{red} = L_w + L_m + L_r \tag{3.65}$$

3.3.4. SPVs/underwriters

The main role of the sector of SPVs and underwriters is to transform the securitised mortgages bought from the commercial banks into MBS (equation 3.66). It is assumed that the SPVs/underwriters pay no administrative fees to the commercial banks for this transaction. Consequently, the role of SPVs/underwriters is to circulate money created by commercial banks.

We assume that all MBS are sold to institutional investors in the form of coupon payments without any fee (equation 3.67) at a coupon rate determined by an exogenous spread over the mortgage rate (equation 3.68). Consequently, the SPVs/underwriters sector accumulates no profits. Importantly, the issued MBS are assumed to be of the single "pass-through" type rather than consisting of various pooled MBS (cf. Nikolaidi 2015:4).

$$MBS = MBS_{-1} + \Delta L_{mS} \tag{3.66}$$

$$COUPAY = coupMBS_{-1} \tag{3.67}$$

$$coup = r_{lm} + spread_{MBS} \tag{3.68}$$

3.3.5. Institutional investors

The sector of institutional investors includes entities such as pension funds, mutual funds, hedge funds, insurance companies, and investment banks (cf. Davis 2003). Similarly to SPVs/underwriters, liabilities of institutional investors are not accepted as the means of payment in the economy, but reflect the circulation of money created by commercial banks. Institutional investors accumulate profits equal to the coupon payments from the SPVs/underwriters, which are entirely distributed to the rentiers (equation 3.69). Return on the institutional investors' shares is given as the ratio of their profits to the shares demanded by the rentiers in the previous period (equation 3.70). Institutional investors earn revenue from holding MBS and finance their operations by issuing shares, which are purchased by the rentiers. For simplicity, a constant price of shares equal to $1 is assumed. Demand for MBS follows the portfolio principle (equation 3.71),

where the return on MBS (equation 3.72) depends on the yield (equation 3.73) and the capital gains on MBS (equation 3.74).

$$FI = COUPAY \tag{3.69}$$

$$rs = \frac{FI}{SH_{-1}} \tag{3.70}$$

$$p_{MBS} = \frac{(\theta_{10}+\theta_{11}r_{MBS,-1})SH_{-1}}{MBS} \tag{3.71}$$

$$r_{MBS} = yield_{MBS} + \frac{CG_{MBS}}{p_{MBS,-1}MBS_{-1}} \tag{3.72}$$

$$yield_{MBS} = \frac{COUPAY}{p_{MBS,-1}MBS_{-1}} \tag{3.73}$$

$$CG_{MBS} = MBS_{-1}(p_{MBS} - p_{MBS,-1}) \tag{3.74}$$

3.3.6. Simulations

The model is calibrated to the US economy[47]. Table A2.1 in Appendix II shows the chosen exogenous parameter magnitudes, while Table A2.2 presents the initial values of stocks in the model. The main objective of the simulation exercise is to examine the impact of the proposed model setup on inequality patterns. Specifically, we analyse how the increased complexity of household balance sheet composition affects the quantitative measures of income and wealth inequality such as the Gini index (equation 3.75), the Atkinson index for income (with inequality aversion parameter ε=2 in equation 3.76), and the squared coefficient of variation (equation 3.77). This follows the benchmark exercise outlined in Dafermos/Papatheodorou (2015).

As mentioned at the beginning of Chapter 1, the Gini and the Atkinson indices range between 0 and 1, while the squared coefficient of variation ranges from 0 to infinity. In all indices, a higher value indicates higher inequality level. The choice of these three inequality measures is motivated by their different sensitivity to transfers at different moments of the distribution (the middle, the bottom, and the top of the distribution respectively). In addition, in order to compare the inequality dynamics of income and wealth, we calculate the Gini index and the squared coefficient of variation for wealth[48] (equations 3.80-3.81).

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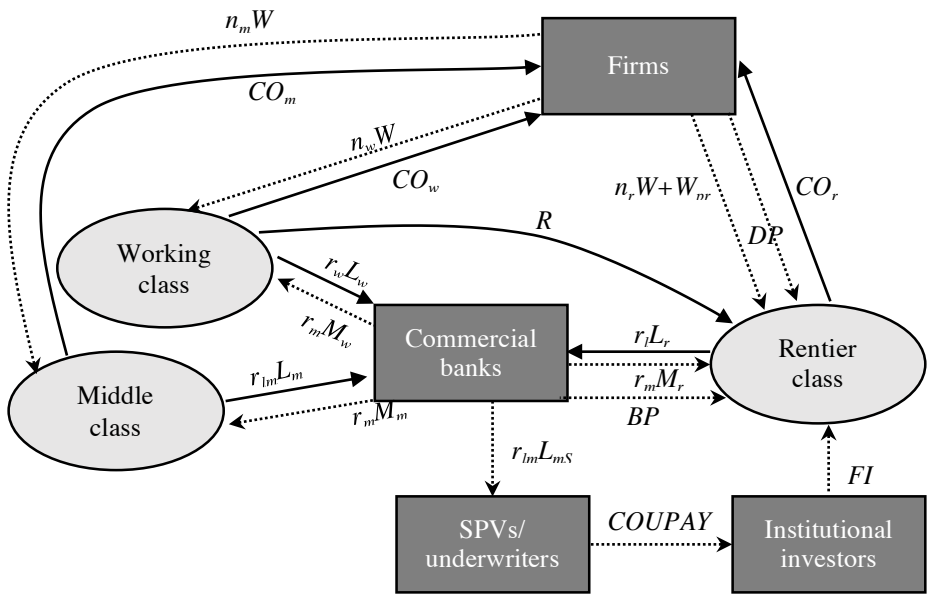
[47] Calibration is performed based on three criteria. Firstly, the latest available record common to the largest number of variables is identified with 2014. Secondly, if no data is available, parameter values are taken from previous studies or are assumed by the author based on economic intuition. Thirdly, for securitisation parameters, we take a pre-2007 average to simulate the securitisation boom scenario.

[48] As noted in Chapter 1, the Atkinson index cannot encompass the possible negative values of net wealth (cf. Cowell 2009:72).

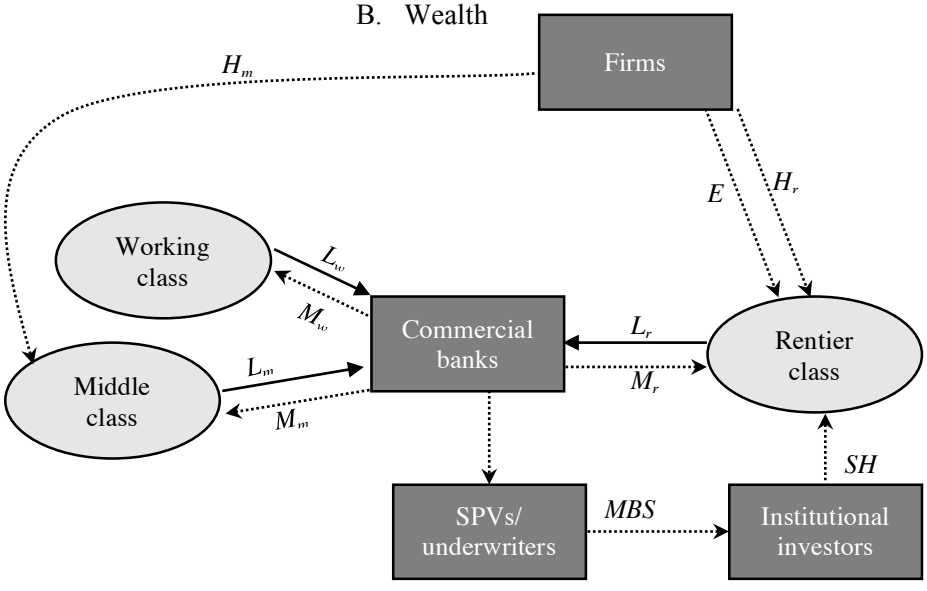
We expect that the proposed balance sheet heterogeneity among households should produce more acute long-run polarisation of income and wealth than simulated otherwise. Moreover, wealth inequality levels are expected to be higher than for income. This is because the inclusion of wealth heterogeneity in the model creates forces which pull the upper class even further away from the rest of the distribution, drowning the middle and working class in debt. In our model, these forces are identified with the securitisation of mortgages to the middle class (an indirect transfer of income and wealth from the middle to the rentier class, see Figure 3.1), the payments of housing rents by the working class, and the holdings and payments of debt (an indirect transfer of income from the working and the middle class to the rentiers). The latter is determined by the debt-service-to-income ratio determining the interest rate charged on loans to the middle and the working class. Furthermore, the inclusion of the relative consumption concerns allows us to distinguish between different motives for debt accumulation across households and examine their implications for macroeconomic stability.

Figure 3.1 Distributional channels in the SFC model

A. Income



B. Wealth



Firstly, we simulate the full model outlined above for 100 periods. For clarity, the simulation results are presented from period 20 onwards to allow for adjustment of the system to a steady state. The steady state is defined as a situation where all variables in the economy grow at the same rate given by the exogenous growth rate of capital g_k. We present results for the Gini coefficient and the squared coefficient of variation for income and wealth, as well as the Atkinson index for income. Additionally, we report the three measures of leverage for each household group and the debt-to-income ratio for the whole economy to gauge the impact of wealth distribution on macroeconomic fragility.

Secondly, we compare the above results of the full model with the reduced form specifications without the novel feature introduced here, namely the middle class, as well as the rentier wage, relative consumption concerns, and securitisation. This allows us to gauge the impact of household wealth heterogeneity on personal distribution of income and wealth, and financial stability.

$$GINI = \frac{1}{2N^2\mu}\sum_{i,j}|YH_i - YH_j|N_iN_j \qquad \text{where } i,j = w, m, r^{49} \qquad (3.75)$$

$$A_{\varepsilon=2} = 1 - \left[\frac{1}{N}\sum_i N_i\left(\frac{YH_i}{\mu}\right)^{-1}\right]^{-1} \qquad \text{where } i = w, m, r \qquad (3.76)$$

$$CV^2 = \frac{1}{N\mu^2}\sum_i N_i(YH_i - \mu)^2 \qquad \text{where } i = w, m, r \qquad (3.77)$$

$$\mu = \frac{\sum_i YD_i}{\sum_i N_i} \qquad \text{where } i = w, m, r \qquad (3.78)$$

$$YH_i = \frac{YD_i}{N_i} \qquad \text{where } i = w, m, r \qquad (3.79)$$

$$GINI_V = \frac{1}{2N^2\mu V}\sum_{i,j}|VH_i - VH_j|N_iN_j \qquad \text{where } i,j = w, m, r \qquad (3.80)$$

$$CV_V^2 = \frac{1}{N\mu V^2}\sum_i N_i(VH_i - \mu V)^2 \qquad \text{where } i = w, m, r \qquad (3.81)$$

$$\mu V = \frac{\sum_i M_i + H_m + H_r + SH + E}{\sum_i N_i} \qquad \text{where } i = w, m, r \qquad (3.82)$$

$$VH_i = \frac{V_i}{N_i} \qquad \text{where } i = w, m, r \qquad (3.83)$$

[49] Note that N is the total number of households: $N = N_w+N_m+N_r$.

3.4. Results

3.4.1. The baseline model

Simulations of the full model produce a consistent result of increasing inequality according to all measures, shown in Figure 3.2. We observe higher levels of wealth inequality than income inequality, which corresponds to the inequality patterns observed in the data in Chapter 1 (see Fig.1.1). The simulated value of the Gini index for income tends towards 0.6, which is close to the actual value recorded in the USA (see Chapter 1). Similarly, the simulated Gini index of wealth is close to the observed value, tending towards 0.74. The simulated value of the Atkinson index is lower in the model at 0.45, compared to the observed values of 0.7-0.8. Moreover, the simulated coefficient of variation squared for income tends towards 1.21, while the value of the measure for wealth is simulated to reach 1.7. These magnitudes are lower than those observed in the U.S. Survey of Consumer Finances[50]. Moreover, we observe lower and more empirically accurate magnitudes of the Gini index and the Atkinson index for income in our model, as well as slightly higher value of the coefficient of variation squared for income that the simulated values of income inequality in Dafermos/Papatheodorou (2015), which range between 0.9 and 1.1 in their model.

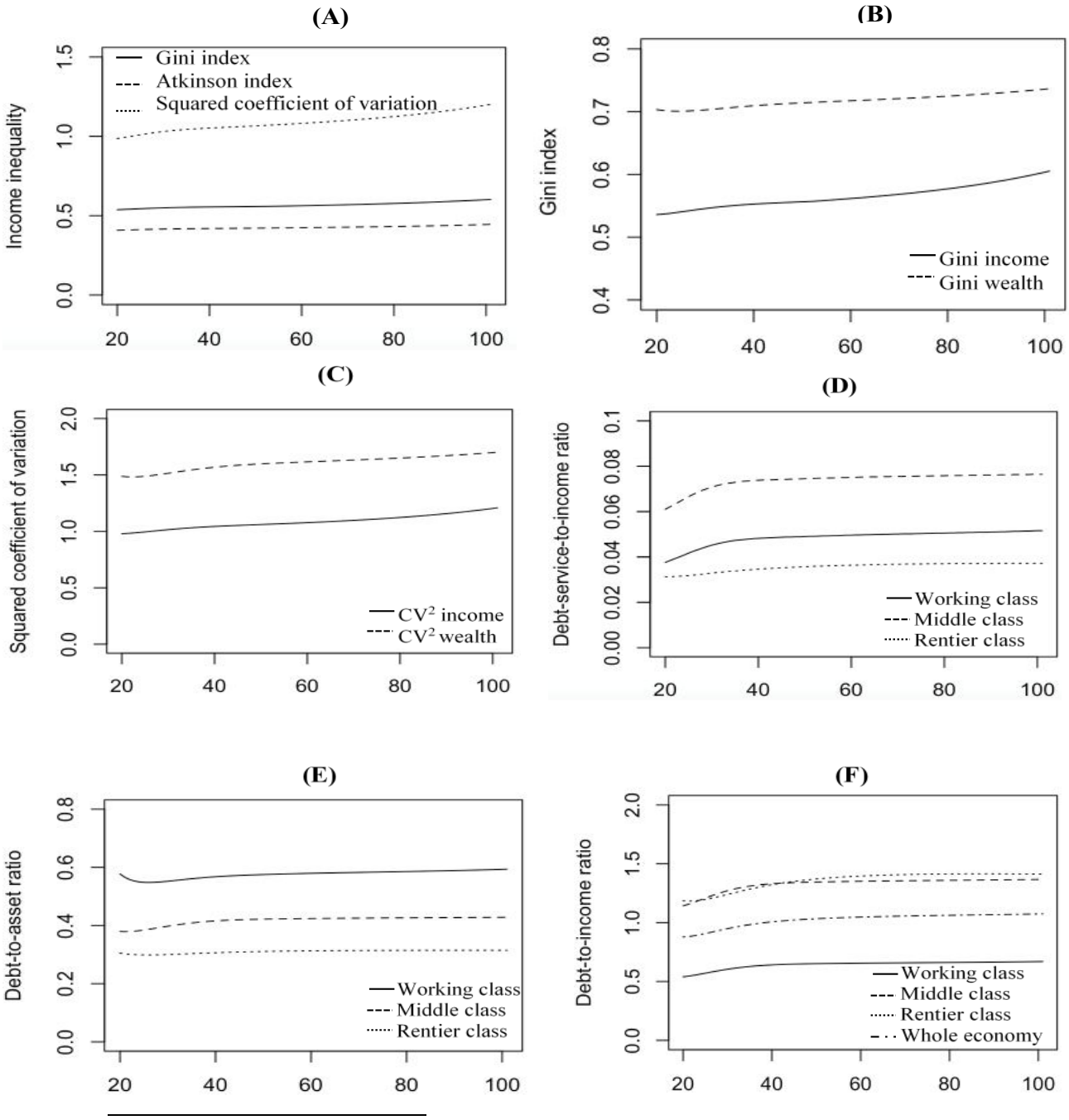
Furthermore, the simulated values of the leverage measures are consistent with the empirical observations in Chapter 1. The middle class emerges as the most leveraged in terms of the debt-service-to-income ratio, which is simulated to reach 7.7% for this group, 5.1% for the working class, and 3.8% for rentiers. This ordering is consistent with the data analysis in Chapter 1, although the simulated magnitudes are lower. This can be explained by the fact that we are only considering one type of debt payments at a time (either consumer debt or mortgages). Moreover, the debt-to-asset ratio is simulated to be the highest for the working class at 59.3%, compared to the simulated value of 42.8% for the middle class, and 31.5% for rentiers. These values are higher than observed in the data, where the middle-income households were found to have the highest debt-to-asset ratios (see Fig.1.16 in Chapter 1). The greater weight given to the workers' debt-to-asset ratio may be explained by the lack of housing on the asset side of their balance sheets in our model. Lastly, as expected from the data analysis in Chapter 1, rentiers are simulated to have the highest debt-to-income ratio of 141.2%. This arises from the greater holdings of assets serving as collateral for this group, which allow for higher debt accumulation relative to income flows. The ratio for the middle class is simulated to be close to the rentiers at 136.7%, which is explained by

[50] Note that we infer this information based on the analysis of the half of the coefficient of variation squared in Chapter 1. The reason for reporting the squared coefficient of variation in the SFC model is to maintain comparability with Dafermos/Papatheodorou (2015).

their ownership of houses as collateral. The debt-to-income ratio for the working class is simulated to reach 66.9%. We also report the debt-to-income ratio of the whole economy, which settles at 107.4%[51]. Overall, the simulated magnitudes of the debt-to-income ratio are slightly lower albeit close to the empirically observed values in Chapter 1.

Figure 3.2 Simulation results – full model

Note: Time periods on the horizontal axis.



[51] This is slightly higher than the observed value of approximately 100% for the household debt to GDP in the USA around the time of the Great Recession (source: Federal Reserve Economic Data, St. Louis).

3.4.2. Comparison with reduced specifications

To evaluate the contribution of the proposed conceptualisation of households based on balance sheet heterogeneity, we compare the full model results with simulations of the reduced form scenarios without the introduced new features. We consider four alternative specifications. Firstly, we analyse the inequality and leverage levels simulated in a specification with a pure capitalist class, which derives income solely from capital ownership and profits, and thus receives no wages. Secondly, we simulate a scenario without the relative consumption concerns determining the demand for loans among the middle class. Thirdly, we analyse a specification without the securitisation process, restricting the financial sector to include only commercial banks and considering only the circuit of money creation. Lastly, to analyse the impact of introducing the third class of households on inequality, we simulate a specification without the middle class, corresponding to the traditional dichotomous division between workers and capitalists[52].

Table 3.3 compares the simulation results across the full model and the reduced specifications, comparing the long-run steady state values of inequality and leverage. We find that in the pure capitalist specification, the simulated levels of inequality are lower in terms of all measures. The Gini index for income falls to 0.47, while the index for wealth declines to 0.69. The Atkinson index decreases slightly to 0.43. Moreover, the squared coefficient of variation for income and wealth is simulated to fall to 0.77 and 1.47 respectively. In terms of leverage, the simulated magnitudes across household groups are close to the full model results, being only marginally lower. In contrast, the debt-to-income ratio for the whole economy is lower than in the full specification at 97.1%. Hence, we conclude that the introduction of the rentier wage contributes to higher inequality due to greater disparities in wages across households, and leads to larger macroeconomic fragility.

Similarly, in the specification with no relative consumption concerns, we find the simulated inequality levels to be lower than in the full model, although the difference between the simulated magnitudes is smaller than in the pure capitalist specification. The long-run steady state value of the Gini index for income declines to 0.59, while the index of wealth remains at 0.74. The Atkinson index falls slightly to 0.44. Moreover, the squared coefficient of variation for income and wealth decrease to 1.16 and 1.67 respectively. Furthermore, the simulated leverage levels for the working class and the rentiers are similar to the full model results. In contrast, the leverage ratios are found to decline for the middle class. The debt-service-to-income ratio is simulated to reach

[52] We assume that in the specification without the middle class there is also no securitisation. The working class is assumed to represent the bottom 90% of the income distribution).

6.2%, while the debt-to-asset ratio and the debt-to-income ratio decline to 36.5% and 112.1% respectively. Similarly, the debt-to-income ratio for the whole economy is lower in this reduced specification compared to the full model at 100.6%. This signals that the social dependence of consumption decisions of the middle class increases their debt levels and leverage, which deepens inequality and raises macroeconomic instability.

Furthermore, the simulated long-run values of inequality and leverage in the specification without securitisation are found to be close to the full model results. Nevertheless, we observe marginally lower values of the Gini coefficient for income at 0.59, and the squared coefficient of variation for income and wealth, reaching 1.19 and 1.69 respectively. Similarly, the simulated values of the leverage measures are observed not to differ substantially from the full model results, although the steady-state value of the debt-to-income ratio of the whole economy is marginally lower at 106.3%. Nevertheless, the slight decrease in the simulated magnitudes of the inequality indicators suggest that the securitisation processes have an impact on the distribution of income and wealth, and macroeconomic fragility in the proposed framework.

Lastly, we observe substantial reductions in the simulated steady state values of inequality and overall leverage in the economy when the middle class is excluded from the model. The Gini index for income is lower at 0.31, while the coefficient for wealth reduces to 0.47. Similarly, the squared coefficient of variation for income declines to 1.08. In contrast the squared coefficient of variation is higher at 2.55 because of the increased polarisation of wealth at the top of the distribution. The decrease in the simulated value of the Atkinson index is lower compared to the other inequality measures at 0.43. Moreover, we observe that the debt-to-income ratio for the whole economy is simulated to be lower in the scenario without the middle class at 87.1%. Thus, we show that the traditional dichotomous division of households into workers and capitalists cannot fully explain the high levels of income and wealth inequality observed in the USA since the 1980s and leads to lower simulated fragility of the economy in terms of the debt-to-income ratio.

In sum, the comparison of the reduced specification results with the full model shows that the heterogeneity of household balance sheets along the distribution matters for inequality. Firstly, factors rarely considered in the existing Post-Keynesian macro-modelling literature, such as the rentier wage and securitisation, have an important impact on inequality measures, as is shown by the generally higher values of all inequality indicators in the full model compared to the reduced specifications with the pure capitalist class and without securitisation. Secondly, the new conceptualisation of households based on the introduction of a third class distinguished by wealth composition leads to higher and more realistic levels of inequality than the traditional dichotomous classification, and contributes to greater macroeconomic instability. Importantly, we find that the

social dependence of household consumption decisions, which is incorporated into the middle class in our model, increases the demand for credit among the middle class and raises their leverage, which contributes to higher inequality and macroeconomic instability. Furthermore, our results reveal that due to the disparities in debt accumulation motives across households arising because of the social dependence of their portfolio decisions, household leverage needs to be analysed holistically. This is because each measure of financial fragility captures a different aspect of indebtedness and thus does not represent the true capacity of households to handle financial distress when analysed by itself. Consequently, the results of our model show that the theory of inequality in the 21st century in the context of financial sector transformation needs to consider differences in the balance sheet structures across households, and their associated implications for financial distress and macroeconomic stability. This can be achieved by the adoption of the three-class taxonomy of households proposed in our model.

Table 3.3 Comparison of simulation results

	Specification				
	Full model	Pure capitalist	No relative consumption	No securitisation	No middle class
Gini index					
Income	0.61	0.47	0.59	0.59	0.31
Wealth	0.74	0.69	0.74	0.74	0.47
Atkinson index (income)	0.45	0.43	0.44	0.45	0.43
Squared coefficient of variation					
Income	1.21	0.77	1.16	1.19	1.08
Wealth	1.7	1.47	1.67	1.69	2.55
Debt-service-to-income ratio					
The working class	5.1%	5%	5.1%	5.1%	5%
The middle class	7.7%	7.4%	6.2%	7.8%	*(omitted)*
Rentiers	3.8%	3.9%	3.8%	3.8%	3.8%
Debt-to-asset ratio					
The working class	59.3%	58.5%	59.3%	59%	58.4%
The middle class	42.8%	41.9%	36.5%	42.6%	*(omitted)*
Rentiers	31.5%	31.1%	31.5%	31.6%	31.5%
Debt-to-income ratio					
The working class	66.9%	66.1%	66.8%	66.9%	65.9%
The middle class	136.7%	132.9%	112.1%	134.6%	*(omitted)*
Rentiers	141.2%	142.8%	141.4%	141.1%	141.4%
Whole economy	107.4%	97.1%	100.6%	106.3%	87.1%

Note: The pure capitalist specification excludes rentier wage. Specification with no relative consumption excludes rentier consumption from the target consumption of the middle class. Specification with no securitisation excludes the sector of SPVs/underwriters and institutional investors. Specification with no middle class also excludes securitisation.

3.5. Sensitivity analysis

In order to test the robustness of our finding that greater household balance heterogeneity increases inequality and macroeconomic instability, a range of sensitivity test is performed to examine the volatility of our results to the choice of specific parameter values. We identify 20 parameters as crucial to the model results, reflecting the underlying assumptions about economic behaviour. Two types of sensitivity analysis are conducted. Firstly, we perform a univariate test, where the full model scenario is re-run by changing only one parameter at a time and leaving the others constant. Secondly, a multivariate test is conducted, where the variation in the full model results is assessed by changing all parameter values simultaneously. The model outcome is seen as robust if the values of the key variables of interest (i.e. inequality and leverage measures) do not change significantly despite the variation in parameter calibration.

3.5.1. Univariate sensitivity test

Table A2.3 in Appendix II presents the 20 key parameters and their sensitivity analysis values. The choice of these values is motivated by changes in the economic conditions in the USA after the 2007 crisis. All parameter values are subsequently shocked in period 50.

One of the key distributional variables in our model is the central bank interest rate r_{cb}, as it constitutes the baseline for the interest rates on loans and deposits set by the commercial banks. In the sensitivity analysis, the central bank interest rate is shocked to increase from 0.25% to 0.5%. This corresponds to the actual change in the interest rate level adopted by the Fed at its December 2015 meeting. Thus, apart from assessing the robustness of the model result, this exercise also allows us to examine the impact of monetary policy on inequality levels in the modelled economy. In addition, we consider an increase in the deposit rate spread α_1 from 0.75% to 1%, and a rise in the spread of the lending rate α_2 from 2% to 4%. We expect that increases in the interest rate and the spread should raise leverage levels and income and wealth inequality.

Another parameter relevant for the interest rate level is π_0, reflecting the institutional conditions in the lending market. A higher level of π_0 indicates stricter lending standards among commercial banks, contributing to a larger transfer of income from the working and the middle class to the rentiers via the banking sector. In the sensitivity analysis, the value of π_0 is increased from 0.03 to 0.04.

Furthermore, the exogenously given share of wages is important for distribution as it determines the portion of national income going to the working and the middle class. The wage share parameter s_w is decreased from 57% to 50%, additionally allowing us to analyse the impact of the falling wage share on the overall inequality indicators. Moreover, we consider the impact of

an increase in the rentier wage premium m_w from 1.6 to 1.8 and a fall in the parameter ρ from 0.3 to 0.2, which indicates preference of rentiers for wage income.

We also examine the impact of the change in the degree of emulation of rentier consumption by the middle class. The Ravina emulation parameter η is increased from 0.29 to 0.4, reflecting increase in the middle class relative consumption. We expect that this should increase inequality and leverage of the middle class by raising the demand for loans.

Another parameter crucial to the model dynamics is s_0, which captures the institutional conditions in the financial markets in the equation defining the share of securitised mortgages (equation 3.64). The greater the proportion of securitised mortgages the higher the transfer of the middle class wealth to rentiers via securitisation. s_0 is decreased from 0.6 to 0.4, reflecting slowdown in the mortgage securitisation market after the 2007 crisis.

A further parameter influencing the distribution of income in our model is the firm profit retention rate s_f. A higher value of this parameter is likely to prevail in the recessionary period as firms are more credit constrained. In the sensitivity test, the value of s_f increases to 0.5, which corresponds to its observed post-crisis value in the USA.

Additionally, we assess the sensitivity of the full model results to the Tobinesque portfolio parameters. Parameter λ_{30}, reflecting the rentier preference for the institutional investors' shares, is decreased from 0.33 to 0.22. Importantly, due to the adding-up constraint requiring that λ_{10}, λ_{20}, and λ_{30} sum to unity (cf. Godley/Lavoie 2007), the fall in λ_{30} necessitates a simultaneous rise in one of the remaining two values. It is assumed that λ_{10} increases to 0.44. The rise in the value of λ_{10} indicates greater preference for firm equities among rentiers and hence smaller demand for securitised assets among institutional investors. The choice of these parameters is once again motivated by the fall in the demand for MBS after the 2007 crisis.

In addition to the above parameters directly affecting the distribution of income and wealth in our model we consider several parameters important for the overall model dynamics. Firstly, we test the model's sensitivity to parameter β_w capturing the lending norms for the working class, and the corresponding parameter β for the middle class and the rentiers. β is decreased from 0.1 to 0.05, and β_w is reduced from 0.05 to 0.025, reflecting more stringent lending conditions after the 2007 crisis. Secondly, the propensity to consume out of wealth c_4 is reduced from 0.1 to 0.05, maintaining the assumption that each household group consumes the same proportion of its wealth. Moreover, we simulate an increase in the marginal propensity to consume out of income of the working class c_1, rising from 0.9 to 0.95, and an increase in this propensity for the middle class

c_3, from 0.75 to 0.8. In addition, we consider a fall in the marginal propensity to consume out of income for rentiers c_5 from 0.6 to 0.5, indicating an increase in their saving[53]. Thirdly, parameters h_1 and h_2 are decreased from 0.5 to 0.1, indicating a slowdown in the supply of housing by firms, and a brake on the house price growth respectively. Finally, parameter θ_{10} in the institutional investors' portfolio equation is decreased from 0.3 to 0.1, suggesting falling demand of institutional investors for MBS.

Figure A2.1 in Appendix II shows that overall the univariate sensitivity analysis shows that the full model results are robust to changes in most of the key parameters. When the values of m_w and ρ are shocked in period 50, the model outcome exhibits no variation from the baseline full model specification. Similarly, following the shock to the values of s_0, θ_{10}, h_1, h_2, and λ_{30} the model results do not change their long-term steady state values, experiencing only slight variations in the short-run.

Changes in the values of several parameters have an impact on the long-run levels of inequality. The fall in the wage share s_w, and the increase in the lending rate spread α_2 lead to higher steady-state levels of inequality, with increases in the squared coefficient of variation and the Gini index for wealth and income, as well as the Atkinson index. This is because the changes in these parameters have a disproportionate negative effect on incomes of the working and the middle class. Moreover, the increase in the profit retention rate s_f results in lower long-run steady-state values of wealth and income inequality. This occurs as the lower levels of distributed profits reduce rentier income and wealth. In addition, changes in the values of parameter π_0 in the risk premium function, parameter β reflecting lending norms, and the marginal propensities to consume out of wealth c_4 and income c_1, c_3, and c_5 lead to higher steady-state levels of wealth inequality in the long-run, both in terms of the Gini index and the squared coefficient of variation. This is because these parameters influence the demand for loans, and disproportionately reduce net worth of the working and the middle class.

Furthermore, the simulated values of the leverage measures are sensitive to the values of several parameters. Changes in the central bank's interest rate r_{cb}, the deposit rate spread α_1, and in α_2 result in overall increases in the steady-state value of the debt-service-to-income ratio across all households. In addition, the increase in α_2 reduces the debt-to-income ratio in the long run for all groups and in the whole system, as well as the debt-to-asset ratio for rentiers. This arises because of the increased interest rate influencing debt repayments, which additionally lowers debt accumulation among rentiers (since their debt motives are assumed to be neither necessitous nor

[53] The increase in the saving rates of the rich is observed by Saez/Zucman (2016).

emulation-driven). Furthermore, the fall in c_4 leads to a decline in the steady-state value of the debt-to-asset ratio across all households due to the falling demand for loans.

Moreover, the decrease in the lending norms parameter β_w results in a decline in all leverage measures for the working class, while the fall in β reduces the leverage ratios for the middle class and the rentiers. This is due to the decreased demand for loans. In addition, the rise in π_0 leads to an increase in the debt-service-to-income ratio for the working and the middle class due to the rise in the mortgage rate of the middle class. Furthermore, the increase in the marginal propensity to consume out of income for the working and the middle class raises the steady-state value of their debt-to-asset ratio, while the fall in the marginal propensity to consume out of income for rentiers reduces their debt-to-asset ratio in the long run. This is because of changes in the demand for loans across these groups. Lastly, the increase in the degree of consumption emulation by the middle class η leads to a long term increase in the leverage measures of the middle class.

Overall, our results correspond to the findings of the existing SFCM studies including securitisation and consumption emulation. The decrease in the wage share in Nikolaidi (2015) is simulated to raise the debt-to-asset and the debt-payments-to-income ratio among working households, which is observed in our model in the short run. Similarly, a cut in the wage rate in Sawyer/Passarella Veronese (2017) leads to an increase in leverage (measured as the loans to wealth ratio) and income inequality (measured as the ratio of rentier to worker income). In our model, the decrease in the wage share also results in a rise in income inequality. In contrast, the increase in the degree of securitisation s_0 in Nikolaidi (2015) leads to higher leverage among working households (measured as the debt-to-asset ratio and the debt-service-to-income ratio), while it does not alter the leverage measures in our model. Moreover, a rise in the demand for derivatives in Sawyer/Passarella Veronese (2017) increases income inequality and workers leverage, while in our model the rise in the preference of institutional investors for MBS θ_{10} does not influence inequality or household leverage. Furthermore, an increase in consumption emulation in Zezza (2008) and Caverzasi/Godin (2013) leads to a rise in the aggregate debt-to-income ratio. While in our model we do not observe changes to the model results following the shock to the Ravina emulation parameter η, the comparison of results of the full model with the reduced specification without emulation shows that the presence of relative consumption concerns leads to higher macroeconomic volatility measured by the debt-to-income ratio. Lastly, a decline in the central bank's discount rate and the associate fall in the commercial bank lending rate lead to a lower debt-to-income ratio in Zezza (2008), while in our model we observe an increase in the debt-to-asset ratio but not the debt-to-income ratio following the rise in the deposit and the lending rate spreads α_1 and α_2 and the central bank's interest rate r_{cb}.

In sum, the simulation results of the full model tend to be robust to changes in most of the parameter values. The sensitivity of the inequality and leverage measures is the highest to parameters influencing the demand and the repayment of loans across households, the marginal consumption propensities out of income and wealth, as well as the wage share and the profit retention rate. This suggests that both wealth and income channels are important in determining the levels of inequality and leverage in our model.

3.5.2. Multivariate sensitivity test

Having examined the sensitivity of the model results to changes in the individual parameter values, we proceed to analyse its sensitivity to changes in all chosen parameters simultaneously. Since at the present stage of the analysis the choice of sensitivity values for different parameters is not random, one multivariate scenario corresponding to the post-crisis conditions in the USA is considered, maintaining consistency across parameter changes.

Figure A2.2 in Appendix II presents the multivariate sensitivity test results for the SFC model developed in this chapter. By introducing shocks to parameter values in period 50, the model is able to reproduce the overall trends in the economic dynamics experienced in the USA after the 2007 crisis. Firstly, the changes in parameter values are associated with a recession in the model. The steady state growth rate of output initially falls from 2.5% to -10% and gradually returns to its pre-shock level after around 20 periods.

Secondly, two out of three income inequality measures indicate falling income inequality in the periods following the shock. The Gini index and the squared coefficient of variation for income settle at lower steady state levels after approximately 10 periods. In contrast, the Atkinson index for income increases after the shock. This suggest that changes in income inequality after the crisis in our model are different across the various household groups. The sensitivity of the squared coefficient of variation and the Gini index to transfers at the top and at the middle of the distribution respectively indicates that the post-recessionary fall in income inequality in the model is driven by its decrease among the top income group, and less so by the middle. Conversely, the sensitivity of the Atkinson index to changes at the bottom of the distribution suggests that the simulated income inequality increases occur during the recession as the lowest income groups experience a larger fall in their incomes than the rest.

Furthermore, the multivariate sensitivity test of the model reproduces the fact observed in Fig.1.1 in Chapter 1 that, unlike income, wealth inequality measured by the Gini index and the squared coefficient of variation increased after the crisis, reaching a higher steady-state value in the long run.

Moreover, we simulate that all leverage measures experience an initial increase when the shock is introduced apart from the debt-to-asset ratio for rentiers, which declines. The rentier and the middle class deleverage after the recession in terms of the debt-to-asset and the debt-to-income ratio. The working class is also observed to reduce their debt-to-income and the debt-service-to-income ratio albeit to a smaller extent than the remaining households. Moreover, the long run value of the debt-to-asset ratio of the working class returns to its pre-recessionary value. This indicates that the working class households do not deleverage substantially after the crisis, which corresponds to the actual observation for the bottom quintile of the income distribution after the Great Recession in Chapter 1.

Overall, the sensitivity analysis shows that the model results presented in the previous section are robust to changes in most of the key parameters, particularly in the long run. The sensitivity of the model outcome to changes in the wage share, the profit retention ratio, parameters influencing household lending norms and interest rates, as well as the marginal propensities to consume out of income and wealth suggest inequality in our model is determined by the interaction of the dynamics of income and wealth. Importantly, we show that the greater heterogeneity of household balance sheets induces macroeconomic instability and is associated with an acute recession. In sum, the proposed model set out, emphasising the balance sheet heterogeneity of the household sector by introducing a third class to the Post-Keynesian macro-modelling framework, does well in explaining the observed trends in income and wealth inequality in the USA before and after the 2007 crisis. Conversely, approaches which do not consider the differences in household wealth composition may underestimate the analysed levels of inequality and macroeconomic fragility.

3.6. Summary

The model presented here constitutes one of the first attempts to develop a theoretical model of inequality in the age of financial sector transformation accounting for household wealth heterogeneity. The SFCM framework is adopted to incorporate the interactions between the financial and real sector and their impact on the distribution of income and wealth in a financialised economy. The main original features of the proposed model compared to the existing Post-Keynesian macro-modelling literature is the interpretation of inequality in terms of the differences in balance sheet structures among households and the introduction of a three-class household sector. The three-class taxonomy of households including the middle class of leveraged homeowners produces more accurate levels of inequality and higher macroeconomic fragility that the traditional two-class division. Moreover, we include securitisation, and the relative

consumption concerns in the model to account for the endogenous determination of household portfolio decisions, which reflects differences in the debt accumulation motives across households.

We show that the proposed model provides a more suitable approach to analysing inequality in times of financial sector transformation. The reason why the three-class classification of households produces higher inequality and financial fragility is because the dichotomous division of households into workers and capitalists predominant in the Post-Keynesian macro-models does not fully explore their increasing heterogeneity. As shown in Chapter 1, since the 1980s, low- and middle-income households have become actively involved in the financial markets through the proliferation of subprime credit and asset-backed securities. Simultaneously, the rich have captured an increasing share of income and wealth due to the high returns to their wealth enabled by financial innovation and deregulation, as well as the high salaries earned by the financial sector executives. Thus, the further innovation of our model is to reinterpret the groups of workers and rentiers based on their balance sheet structures rather than income sources and to introduce the rentier wage as an "investment strategy" for the richest household group in the context of financial sector transformation.

The main distributional channels in our model emerge through the provision of credit to the working and the middle class, the housing sector, and the social dependence of the consumption decisions of the middle class. Firstly, this is because debt payments by these groups are ultimately received by the rentiers in the form of bank profits. Secondly, the process of securitisation transforms the mortgages held by the middle class into wealth of the rentiers through derivative financial instruments sold to institutional investors, who issue shares purchased by the rentiers. Moreover, the housing sector in our model influences inequality directly through rent payments by the working class received by the rentiers, and indirectly through the interest payments on mortgages. Furthermore, the introduction of the relative consumption concerns for the middle class and the subsequent distinction between different motives for debt accumulation across households contributes to macroeconomic instability.

An important caveat of the proposed stock-flow consistent model is its high level of aggregation. The integrated analysis of the sectoral balance sheets allows for the development of an endogenous theory of inequality based on the differences in household wealth composition. However, the aggregated nature of the model and its complexity limit its scope for analysing the impact of wealth heterogeneity on the social dimensions of inequality across gender, race, and generations highlighted in the data analysis in Chapter 1 and by the Post-Keynesian assumption of the social dependence of consumption discussed in Chapter 2.

Overall, the model shows that inequality between households in the model arises because the receipts of capital income flowing from the returns to wealth ownership depend on the absolute size of wealth. This occurs because of the differences in balance sheet composition across households. Rentiers, who own a diversified portfolio of assets serving as collateral and face lower leverage due to the accumulation of secured debt and smaller interest rates, capture an increasing portion of aggregate income and wealth in our model. The introduction of the middle class exacerbates inequality and deepens financial fragility by generating disparities in income and leverage between homeowners and renters, identified with the middle and the working class respectively. To strengthen this conclusion, future extension of the model could incorporate securitisation of consumer debt, heterogeneity in the propensities to consume out of wealth across households, and endogenously determined movements of households between the defined classes.

In sum, the key testable implication of the stock-flow consistent model developed in this chapter is that the heterogeneity of household balance sheet composition induces higher inequality levels because returns to wealth depend on its absolute size. This is an important finding because the inclusion of the wealth distribution channel in the model contributes to macroeconomic instability. The model scenario calibrated to the post-crisis conditions in the USA generates an acute recession and leads to deeper increases in wealth inequality compared to income. Consequently, this shows that the explicit consideration of wealth distribution is essential in understanding the rising levels of inequality and financial fragility in the USA. In the next chapter, we undertake an empirical examination of the key model finding using the household survey data from the U.S. Survey of Consumer Finances between 1989 and 2013. To account for the limitation of the proposed model in analysing the intersectional dimensions of wealth distribution, the empirical analysis in the next chapter explicitly considers the impact of household wealth heterogeneity on inequality across gender, race, and generations.

Chapter 4

Empirical analysis of the impact of household wealth heterogeneity on inequality

In the previous chapter, we developed a formal model of inequality determination in times of financial sector transformation. Its main contribution and original feature was to account for the role of wealth distribution within the household sector in generating inequality and financial fragility. The disparities in household wealth structures were analysed by proposing a new conceptualisation of households in the Post-Keynesian macro-modelling framework. We argued that this was necessary to consider the impact of the increasing heterogeneity of the conventionally analysed groups of workers and capitalists on distribution and macroeconomic stability. Consequently, we defined households not in terms of the type of income received (wages vs. profits), but according to their balance sheet composition. This conceptualisation was based on the stylised facts established by the household balance sheet analysis in Chapter 1. To account for the increasingly capitalist features of the lower income households, we introduced a third group into the household sector, identified with the middle class of leveraged homeowners emergent in the subprime lending bubble in the 2000s. To develop an endogenous mechanism of household wealth accumulation, we incorporated securitisation, as well as the Post-Keynesian analysis of consumption behaviour highlighted in Chapter 2, introducing the relative consumption concerns, and distinguishing between different debt accumulation motives among households. By combining the Post-Keynesian macro-modelling approach with the Post-Keynesian assumption of the social dependence of consumption, we accounted for the interaction between endogenous wealth accumulation and macroeconomic instability. In result, the model reproduced some of the trends in income and wealth inequality observed in the analysis of the US data in Chapter 1, generating higher levels of inequality and leverage compared to scenarios without the third class of households, rentier wage, consumption emulation, and securitisation. However, the high aggregation of the SFCM did not allow us to explicitly consider the role of wealth heterogeneity in determining the gender, racial, and intergenerational inequality.

The main testable implication of the stock-flow consistent model developed in the previous chapter is that the complexity of household wealth holdings generates inequality because capital income flows and debt payments depend on the absolute size of wealth. The aim of this chapter is to empirically test this conclusion and assess the statistical significance and the contribution of the disparities in household balance sheet composition to income and wealth inequality. This is undertaken in two stages, using the household survey data from the U.S. Survey of Consumer

Finances between 1989 and 2013. Firstly, we use linear regression analysis to establish statistical significance of the relationship between household wealth structures and inequality. Secondly, we apply the inequality decomposition analysis to evaluate the contribution of different assets and liabilities to income and wealth disparities across households. To address the caveat of the aggregate stock-flow consistent model, we explicitly analyse the impact of household wealth composition on inequality across gender, race, and generations. Moreover, we test the validity of the balance sheet classification underpinning the three-class taxonomy of households proposed in the stock-flow consistent model by analysing the contribution of balance sheet variables to the relative and overall measures of inequality across the distribution.

In line with the proposed set-out of the stock-flow consistent model developed in Chapter 3, we find that greater reliance of household balance sheets on housing, low-yielding financial assets, unsecured debt, and higher leverage has a statistically significant impact on inequality because low returns and high debt burden push household income towards the bottom of the distribution. Conversely, greater ownership of business equity, high-yielding financial assets, and debt secured by real estate raises households' position in the income distribution due to higher capital income flows and lower debt repayments, although these effects are not shared equally across the distribution, gender, race, and generations. Moreover, we find that income inequality between 1989-2013 was driven by disparities in capital income, although the contribution of wage inequality increased overtime, while wealth inequality was determined by differences in the holdings of primary residence, business equity, and private pension wealth. Balance sheet composition is also found to explain a large portion of the inequality across its social dimension of gender, race, and generations. These results correspond to Piketty's idea of the interplay between wealth structures and income flows driving inequality, which was incorporated in our stock-flow consistent model, and validate the proposed conceptualisation of the household sector.

4.1. Data

Before proceeding to the empirical analysis of the implication of the stock-flow model from Chapter 3, it is necessary to discuss the methodological features of the chosen dataset. This is because despite providing the most in-depth information on household finances over time, the measurement of income and wealth in the household survey data such as the U.S. Survey of Consumer Finances faces several difficulties. Some of these were already indicated at the beginning of Chapter 1, such as non-response among the richest households. These methodological issues may potentially lead to inaccuracies in the measurement of income and wealth, and to underestimation of the true levels of inequality in the society.

The U.S. Survey of Consumer Finances (thereby SCF) was initiated by the Federal Reserve in the early 1960s and has been conducted triennially since 1983. The main difference between this and other household surveys such as the Panel Study of Income Dynamics (PSID) in the USA is that the SCF pays greater attention to the information on household finances such as the ownership of real and financial assets, and different types of liabilities. Furthermore, it represents a repeated cross-section as it does not track the same individuals over time like PSID (Bastagli/Hills 2013:25). In fact, the survey sample size has almost doubled in the period covered, increasing from over 3,000 respondents in 1989 to approximately 6,000 in 2013 (Table 4.1).

Table 4.1 Characteristics of the U.S. Survey of Consumer Finances

Wave	**Area-probability sample**		**List sample**		**Total number of respondents**
	Response rate	Number of respondents	Response rate	Number of respondents	
1989	69%	2,277	34%	866	3,143
1992	70%	2,456	34%	1,450	3,906
1995	70%	2,780	34%	1,519	4,299
1998	70%	2,813	35%	1,496	4,309
2001	70%	2,917	30%	1,532	4,449
2004	70%	3,007	30%	1,515	4,522
2007	70%	2,915	30%	1,507	4,422
2010	70%	5,012	30%	1,480	6,492
2013	70%	4,568	30%	1,458	6,026*

*For confidentiality reasons, 11 observations corresponding to very high net worth individuals were removed from the public dataset in 2013, reducing the total number of observations to 6,015. **Sources**: Bricker *et al*. (2014); Bricker *et al*. (2012); Bucks *et al*. (2009); Bucks *et al*. (2006); Aizcorbe *et al*. (2003); Kennickell *et al*. (2000); Kennickell *et al.* (1997); Kennickell/Starr-McCluer (1994); Kennickell/Shack-Marquez (1992).

The primary economic unit (PEU) of the survey is a household, defined as an economically dominant single individual or a couple (married or unmarried) over 18 years old, together with all individuals in the household who are financially dependent on that individual or couple. All responses are given by the head of a household. In the case of the PEU with a couple, the head is taken to be either male in a mixed-sex couple or the older individual in a same-sex couple. Due to this organisation of the survey, no information can be inferred about the intra-household distribution of the analysed variables.

One of the greatest advantages of the SCF differentiating it from similar household surveys is oversampling of high-income households. Nonresponse in survey data is problematic because it leads to errors in measurement, so that inequality may be underestimated (Korinek *et al*. 2006). Moreover, misrepresentation in household survey data can bias statistical inference as nonresponse by interviewees is likely to be non-random when such sensitive topics as wealth and income are investigated (Fessler/Shürtz 2013:48). Selective nonresponse among the richest is particularly problematic in the case of wealth as its distribution is highly skewed towards the top tail (see

Fig.1.4 in Chapter 1). To overcome this problem the SCF is based on a dual-frame sample design to correct for the non-response bias (*Codebook for 2013 Survey of Consumer Finances*). The first frame consists of a multi-stage area-probability design, which is standard for the surveys of this type. It ensures an equal probability of selection of households in the sample. The second frame is based on a list sample derived from the Internal Revenue Service (IRS) tax data to disproportionately account for the wealthy families. The area-probability sample and the list sample contribute approximately 75% and 25% respectively to the overall sample size. The response rates vary greatly between the two samples, with the list sample response rate being systematically lower than the area-probability sample (see Table 4.1 above).

For confidentiality reasons, individuals with enough wealth to be listed among the Forbes 400 are excluded from the list sample. Furthermore, to protect the identity of respondents, the public dataset has been systematically modified. Firstly, since 1998 no information on the geographical location of respondents is given. Moreover, continuous variables have been rounded, while small or unusual values of discrete variables have been collapsed. For certain cases, a set of variables has been transformed into missing to prevent identifiability of respondents. To approximate the distribution of the missing data and to minimise the overall distortion of this operation, the dataset statistically imputes the relevant variables five times by repeatedly drawing from an estimate of the conditional probability distribution of the data. Consequently, the total number of observations in each wave is five times the number of respondents.[54]

Importantly, all these data transformations are kept confidential so that there is no possibility of establishing which variables have been imputed or blurred. However, the creators of the SCF assure that the impact of these manipulations on empirical analyses based on the transformed dataset should be minimal. Nevertheless, because of the resulting complexity of the survey design, the standard procedures of variance and standard error estimation are not applicable in the case of the SCF. To compute the correct standard errors accounting for sampling, the data has been divided into 999 replicates capturing some important features of the sample variation. Thus, the sampling variance can be estimated using replicate weights derived from the bootstrapping technique.

Because the SCF is not of an equal-probability design, nonresponse adjusted probability weights account for nonresponse and the uneven probability of selection in the original design. A set of revised weights, computed from the original selection probabilities and estimates of the

[54] Note that for confidentiality reasons 11 observations were dropped from the 2013 wave, bringing the total number of respondents down to 6,015.

aggregate control totals from the Current Population Survey, is only available since the 1989 wave. This treatment of the survey weights provides the reason for analysing the waves of the SCF from 1989 onwards.

In general, estimates based on the SCF should be comparable to other surveys. However, because of the oversampling of rich households, the SCF may produce estimates of means and medians of financial variables that are slightly different from other datasets. This is because the distribution of many these variables tends to be highly skewed towards the top, which can provide inaccurate estimates when a smaller number of wealthy respondents is included.

4.2. Methodology

To test the hypothesis that wealth composition determines income and wealth inequality, the empirical analysis in this chapter is divided into two parts – linear regression estimation and inequality decomposition analysis. We combine parametric and non-parametric estimation approaches to evaluate the impact of household wealth composition on inequality. The advantage of applying the parametric techniques is their ability to account for correlation among the determinants of inequality, and can thus include the socio-demographic dimensions of inequality associated with gender, race, and generations. On the other hand, the non-parametric approaches avoid making assumptions about the error term required by the regression analysis, and are thus more robust to the presence of endogeneity and non-spherical errors in the data.

Firstly, we employ the linear regression analysis to test the implication of the theoretical model from Chapter 3 that household balance sheet heterogeneity is associated with higher income and wealth inequality. We estimate a pooled OLS model, where relative inequality, defined as the ratio of household income to the median income in each wave, is regressed on variables measuring the composition of asset and portfolio holdings. To isolate the effect of wealth structures on inequality, we control for the socio-economic characteristics of the household head, including age, education, gender, race, self-employment, labour force participation, and family size. Despite the lack of a clear stochastic relationship between balance sheet composition and inequality, regression analysis is helpful in directly evaluating the statistical significance of the implication of the stock-flow consistent model in Chapter 3 regarding the impact of the interactions of wealth and income in generating inequality. By analysing the association between balance sheet composition and the position of a household in the distribution of income relative to the median in a regression model, we can assess the statistical significance of the model's implication next to other explanations of inequality related to differences in household characteristics. Furthermore, we are able to extend the model implications to examine the gender, racial, and intergenerational dimension of the relationship between household wealth heterogeneity and inequality, which was

observed in Chapter 1 and explained theoretically in Chapter 2. To evaluate any systematic differences in the effect of wealth composition on the social dimension of inequality, we employ a chi-squared test[55].

The choice of the pooled OLS model is motivated by the complex design of the SCF outlined in the previous section, which limits the applicability of more advanced econometric techniques. The pooled OLS regression is preferred to the panel data estimation techniques commonly used in the survey data analysis because the SCF is not a panel but a repeated cross-section. Consequently, the fixed and random effects estimators are not applicable in this case. An additional advantage of the pooled OLS estimation over these methods is that it accounts for time-invariant variables such as dummies for gender and race, which are excluded from the fixed effects estimation (Wooldridge 2002:170). Moreover, the pooled OLS model is preferred to the alternative estimation of the cross-sectional averaging of least squares as the latter does not account for the time series dimension of the data. This leads to a biased estimator as the unobserved time effects are correlated with regressors. Consequently, by estimating a pooled OLS model we can account for the time effects present in the SCF. Since the size of the cross-section in the SCF is larger than the time series, separate intercepts are included for every period (Wooldridge 2002:170), corresponding to the dummy variables for each wave of the survey.

Consistency[56] of the pooled OLS estimator requires that residuals in the regression model are spherical, i.e. homoscedastic (so that the conditional variance of residuals is constant over time) and not serially correlated (so that the conditional covariance across residuals in different time periods is zero; Wooldridge 2002:171). Moreover, for the pooled OLS estimator to be unbiased[57] we need to assume that the dependent variable is exogenous, i.e. it is independent of the error term. We argue that due to the complex data design of the SCF, these assumptions may be violated. To test the robustness of the pooled OLS results we compare them with the quantile regression estimates, as well as estimating the non-parametric Theil-Sen median slope. Both of these methods are shown to be more robust to extreme values, which may inflate the mean-based pooled OLS estimates. Moreover, the non-parametric approach allows to empirically evaluate the

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[55] This is tested using the STATA command *suest*, which estimates the simultaneous variance of coefficients in two regressions with different sample size, and evaluates whether the two estimates are statistically different from each other based on a chi-squared test (See https://www.stata.com/manuals13/rsuest.pdf).

[56] Consistency is an asymptotic property stating that as the sample size tends to infinity the estimator approaches its true population value (Greene 2011:103).

[57] Unbiasedness is defined as a finite-sample property where the expected value of the estimator is equal to its population value (Greene 2011:95).

impact of wealth heterogeneity on inequality without making assumptions about the distribution of the error term, which are inherent in the regression approach and are likely to be violated in the SCF. Nevertheless, the pooled OLS estimates allow us to compare the statistical significance of differences in estimates across the socio-demographic categories using the chi-squared test, which is not applicable in the quantile regression and the Theil-Sen median slope estimation.

In the second part of the empirical analysis, the inequality decomposition techniques are applied to measure the contribution of the different types of assets and debt to the overall measures of income and wealth inequality. The rationale for distinguishing between the relative median income ratio and the overall inequality indicators in this chapter is to provide a robust insight into inequality determination given the methodological limits of the empirical tools. Specifically, the low number of time series in the dataset prevents the regression of an overall inequality index on the proposed balance sheet variables due to insufficient degrees of freedom. This is because the overall measure is invariant across observations in each given wave. In contrast, the methodological features of the inequality decomposition analysis focused on variance allow for the examination of the determinants of the overall inequality indicator.

The inequality decomposition analysis employs the non-parametric variance decomposition of Shorrock's (1982) and the parametric decomposition of Fields (2003). The choice of these two methods is motivated by the ability to quantify the contribution of the income and wealth components to inequality in a manner robust to the endogeneity problems (Shorrocks decomposition), and correlation among the factor sources (Fields decomposition). Moreover, we use the Oaxaca-Blinder decomposition to examine the contribution of wealth structure to the gap in income and wealth across gender, race, generations, and in more detail across the income distribution. Consequently, we are able to explore the social dimension of the relationship between wealth heterogeneity and inequality, which could not be explicitly incorporated in the stock-flow consistent model developed in the previous chapter. In addition, the Oaxaca-Blinder decomposition of the income and wealth gap between the bottom 90% and the top 10%, as well as the bottom 20% and the top 80% of the income distribution allows us to evaluate the three-class conceptualisation of the household sector based on the differences in wealth composition proposed in the stock-flow consistent model.

Based on the model of inequality determination put forward in Chapter 3, we assume that the causality runs from household wealth composition to inequality. This is because disparities in wealth ownership translate into wealth and income inequality by generating differences in the rates of return and leverage associated with specific asset and debt holdings. However, it is empirically reasonable to assume the presence of mutual causality in the interplay between income and wealth

dynamics in generating inequality. This is because higher income flows can also influence which assets and debt can be accumulated by a household. Given the complex design of the SCF, the standard econometric solutions to endogeneity, such as the two-stage least squares or the generalised method of moments estimators, cannot be readily applied to the regression analysis undertaken here. Consequently, we argue that the decomposition analysis allows for a more robust assessment of the implication of the stock-flow consistent model in Chapter 3 by evaluating the contribution of wealth heterogeneity to overall inequality measures.

4.3. Linear regression analysis

The linear regression analysis aims to assess the statistical significance of the conclusion of the stock-flow consistent model developed in Chapter 3 that household balance sheet heterogeneity is associated with higher income and wealth inequality due to the differences in the returns to wealth and leverage dependent on the absolute size of wealth holdings. As described in the previous section, the pooled OLS estimation method is chosen due to the complexity of the SCF design, which prevents a straightforward implementation of the more sophisticated econometric methods.

4.3.1. Pooled OLS specification

Equation 4.1 presents the baseline regression model. The dependent variable $z_{i,t}$ is the ratio of income of household i relative to the median income of the whole sample in wave t. $X_{i,t}$ is the matrix of regressors for each observation over time, and β is the matrix of estimated coefficients. T_t is a vector of year dummies. The error term $\varepsilon_{i,t}$ is assumed to be normally distributed.

$$z_{i,t} = X_{i,t}\beta + T_t\gamma + \varepsilon_{i,t} \qquad t = 1989, 1992, 1995, \ldots, 2013 \tag{4.1}$$

To assess the statistical significance of the impact of wealth composition on relative inequality, we estimate a baseline regression model (equation 4.1) including detailed balance sheet composition variables and household socio-economic controls as explanatory variables in matrix $X_{i,t}$ and a vector of year dummies T_t with 1989 being the reference year. However, as argued earlier there are strong reasons to suspect mutual causality between relative income inequality and wealth composition. This is because high-wealth individuals receive greater capital income through the returns to wealth. In turn, high income generates opportunities for the accumulation of more profitable assets through saving and investment. In our sample, the correlation between the median income ratio and net wealth is relatively high at 0.51. Given the structure of the survey, it is not possible to employ the standard procedures dealing with endogeneity, such as the instrumental variable estimation techniques. To address the potential endogeneity bias between the median income ratio and the absolute size of wealth components, the balance sheet composition variables are presented in terms of their contribution to the total holdings of assets or debt.

To assess the sensitivity of the estimates, we report coefficients of the quantile regression alongside the results of the pooled OLS estimation. Quantile regression analysis allows for estimation of the proposed economic relationship at different points of the conditional distribution of the dependent variable (Baum 2013). We consider the conditional median function of the median income ratio corresponding to the 50th percentile. Thus, in contrast to the OLS method which minimises the sum of squared errors, the quantile regression minimises the sum of the absolute values of the error term, and is thus also called the least-absolute-deviation (LAD) regression (*ibid.*). Hence, the median quantile regression is more robust to outliers than the OLS. Moreover, it is semiparametric and avoids assumptions about the parametric distribution of the error term. Thus, the quantile regression is superior to the OLS if errors are highly non-normal, as is likely to be the case in the present dataset.

The balance sheet composition variables include the relative shares of financial and non-financial assets in total assets, the shares of secured and unsecured debt in total debt holdings, and leverage measures. Thus, this baseline specification only includes households with positive holdings of assets and debt. Table A3.1 in Appendix III presents the descriptive statistics for our variables of interest, while Table A3.2 shows the correlation matrix of regressors.

All types of assets and liabilities considered in the empirical analysis in this chapter correspond to the definitions presented in Chapter 1, subsection 1.1.3. Among the detailed balance sheet composition variables, the contribution of financial assets is broken down into the total asset share of transaction accounts, financial investment assets, and retirement and insurance assets. The share of non-financial assets is decomposed into the contribution of primary residence, business equity, and vehicles and other non-financial assets to total asset holdings. As all balance sheet share variables sum to 1, we exclude the share of other real estate in total assets due to perfect collinearity issues[58].

As shown in the balance sheet analysis in Chapter 1, households towards the top of the distribution tend to hold more financial investment assets, business equity, and retirement and insurance assets relative to their overall portfolio. Thus, we expect that greater contribution of these assets to total asset holdings increases the median income ratio. In contrast, greater share of

[58] Further reason for excluding this variable from the regression analysis is low proportion of households owning this type of wealth (see Appendix I, section 1.3.1) together with the lack of a strong *a priori* theoretical rationale for its analysis (compared to e.g. business equity, which despite low ownership rate is theoretically important to analyse because of the definition of capitalists in the Post-Keynesian literature described in Chapter 2). Nevertheless, to gauge the impact of other property holdings on relative inequality in the regression analysis, we include the share of mortgages secured by other real estate in total debt.

primary residence, transaction accounts, and vehicles and other non-financial assets in total holdings is expected to have a decreasing effect on the median ratio. This is because the balance sheet shares of these assets were observed to be the highest among households in the middle and the bottom of the income distribution.

The relationship between debt and relative inequality is ambiguous. The association can be negative, as debt repayments reduce household disposable income. On the other hand, debt may have a positive impact on the median income ratio, as credit provides an additional source of financing which can be used for consumption and investment. This effect is defined by the composition of debt holdings. We expect the relationship to be positive for the greater share of debt secured by housing in total holdings, as it allows for home equity withdrawal. In contrast, greater reliance on unsecured debt in total liabilities is expected to decrease the median income ratio, as this type of debt is predominant among the low-income households. In the regression analysis, we distinguish between mortgages secured by primary residence and by other property, to gauge the impact of the ownership of other real estate on relative inequality (which was excluded from the asset composition variables). Moreover, the relative holdings of unsecured debt are broken down into instalment loans and credit card balances (other lines of credit and other debt are omitted due to multicollinearity issues).

The consideration of the impact of household balance sheet composition on relative inequality calls for the inclusion of leverage measures. In the baseline balance sheet composition specification, we include the monthly debt-service-to-income ratio (DSY), the debt-to-asset ratio, and the debt-to-income ratio. In addition, a dummy variable is included indicating whether household monthly debt payments exceed 40% of her monthly income. The rationale for including the dummy variable is to control for the position in the income distribution among highly indebted households. Specifically, we examine the intercept difference among those with the monthly debt-service-to-income ratio above 40% and less leveraged households. This approach differs from the inclusion of a squared term of the variable. This is because the squared term investigates the difference in the gradient of the relationship as debt-service-to-income ratio increases, affecting the slope of the regression line, while we are interested in analysing differences in the levels of the median income ratio across the degrees of indebtedness[59]. Higher debt-service-to-income ratio and

[59] In fact, inclusion of a squared term for the debt-service-to-income ratio instead of the dummy is insignificant in all specifications, which highlights different functions of the two methods. Thus, no non-linearity in the relationship between leverage and the median income ratio is found, and the focus is placed on the difference in the level of relative income (i.e. position in the income distribution) between extremely indebted households and the rest.

debt-to-asset ratio are expected to be negatively associated with relative inequality as households with high values of these ratios tend to be towards the bottom of the distribution (see Figure 1.16 in Chapter 1). Conversely, we expect the debt-to-income ratio to be positively associated with relative inequality as households at the top of the distribution are observed to have higher values of this ratio than the rest.

Among the socio-economic controls, we include variables associated with income inequality in the literature reviewed in Chapter 2. Firstly, we include age of the household head and the value of age squared in order to account for the presence of the life-cycle effects. According to this theory, we would expect an inverted U-shaped relationship between age and the median income ratio. As households engage in consumption smoothing over their life-cycle, they experience the highest levels of relative income during their productive years, declining after retirement. Secondly, we consider the impact of human capital accumulation through education on relative inequality, measured as the index of the highest educational achievement of the household head, ranging from 1 – no grades completed, to 17 – graduate school. Moreover, we include dummy variables for gender and race, equal to 1 for female-headed households and households headed by Blacks or Hispanics respectively. Based on the analysis of the trends in income and wealth in Chapter 1, we expect that households headed by females and Blacks or Hispanics have lower incomes relative to the median. Furthermore, we include a dummy variable for marital status, equal to 1 if the household head is single, and 0 otherwise. We expect single households to have a lower position in the income distribution relative to the median compared to households who are married or live in a partnership, who benefit from joint income streams (cf. Cohen/Haberfeld 1991). Moreover, we account for labour force participation and type of employment of the household head. We include a dummy variable equal to 1 if the household head is out of labour force, expecting these households to be further down the distribution of income relative to the median compared to working households. In addition, we include a dummy variable for the type of employment equal to 1 if the household head is self-employed. The impact of self-employment on relative inequality is ambiguous. On the one hand, small entrepreneurs have been documented to experience lower income increases than wage-earning households (cf. Hamilton 2000). On the other hand, if self-employed households exercise control over corporations, seize large operational profits, and accumulate sizeable wealth through business equity, they are expected to be positioned at the top of the income distribution relative to the median (Wolff/Zacharias 2013:1383). Finally, to control for the household size, we include the number of children in the household. To capture the potentially non-linear relationship between household size and relative income, we include the squared value of the number of children. We expect a hump-shaped relationship between family

size and relative income as after a certain point a greater number of dependents places a higher burden on household finances.

To evaluate the relevance of wealth composition as an independent determinant of inequality, we compare the baseline regression with a reduced specification including only household characteristics. Moreover, to verify the robustness of the detailed balance sheet estimates in terms of their sign and significance, we analyse a reduced general balance sheet specification including broader categories of wealth composition among regressors, namely the relative share of financial assets, secured and unsecured debt, and leverage[60].

4.3.2. Pooled OLS results

Table 4.2 presents results of the pooled OLS estimation across the three specifications (reduced regression with socio-economic variables; regression with general balance sheet components; and the baseline model with detailed balance sheet variables). Moreover, it compares the results of the pooled OLS (POLS) and the median quantile regression estimation (QR) of the baseline detailed balance sheet specification[61]. As mentioned in the previous subsection, the rationale for comparing these three specifications is to provide an overview of the impact of broadly defined balance sheet composition, as well as a more detailed insight into the role of specific assets and liabilities in driving relative inequality. In addition, they provide a robustness check for the estimated signs and significance of the balance sheet components and socio-economic controls. This is also the task of the quantile regression estimation.

In the baseline specification with detailed balance sheet composition variables, greater reliance on non-financial assets in total holdings is negatively associated with the median income ratio, except for the relative holdings of business equity. This negative effect is the strongest for households with large relative holdings of primary residence. A one-percentage point increase in the share of primary residence in total assets is associated with a 0.7 percentage point decline in the median income ratio, significant at 1% level. The impact of the relative holdings of vehicles and other non-financial assets is not statistically significant. In contrast, a one-percentage point rise in the share of business equity in total assets is associated with a 2.6 percentage point increase in the median income ratio, significant at 1% level.

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[60] Note that due to collinearity issues we exclude the relative holdings of non-financial assets from this reduced general balance sheet composition specification.

[61] While we report the measure of the goodness of fit for the quantile regression, it is not directly comparable with the adjusted R^2 of the pooled OLS estimation due to methodological differences. This is because the indicators of the goodness of fit are not readily applicable in the quantile regression (cf. https://www.stata.com/manuals13/rqreg.pdf).

Greater contribution of financial assets to total holdings is estimated to have a positive impact on relative inequality. The effect is observed to be the highest for financial investment assets. A one-percentage point rise in the relative holdings of financial investment assets is associated with a 2.9 percentage point increase in the median income ratio. In contrast, a corresponding increase in the shares of transaction accounts and retirement and insurance assets in total holdings is associated with a lower increase in the median income ratio of 0.42 and 0.37 percentage points respectively. All estimates are significant at 1% level.

Moreover, the expected positive effect of secured debt holdings on relative inequality turns out to be driven by other real estate in the detailed balance sheet specification. A one-percentage point increase in the relative holdings of debt secured by other property is estimated to raise the median income ratio by 2.2 percentage points, significant at 1% level. A corresponding increase in the share of mortgages secured by primary residence in total debt is associated with a 0.3 percentage point rise in the median income ratio, significant at 5% level. In contrast, greater relative share of unsecured debt holdings is negatively associated with the relative position in the income distribution. A one-percentage point increase in the relative holdings of credit card balances is associated with a 0.97 percentage point decrease in the median income ratio, while a parallel increase in the share of instalment debt in total debt is related to a 0.8 percentage point decline in the median ratio.

As expected, the leverage measures are negatively associated with relative inequality. A one-percentage point increase in the debt-payments-to-income ratio is associated with a 3.5 percentage point decline in the median income ratio, significant at 5% level. Extremely indebted households with the debt-payments-to-income ratio greater than 40% are estimated to have a 96.5 percentage point lower median income ratio compared to less indebted households, which is significant at 1% level. Both the debt-to-asset and the debt-to-income ratio are not statistically different from zero.

Among the socio-economic controls, all variables have a statistically significant relationship with the median income ratio at 1% level. The highest positive impact is associated with educational attainment and self-employment status of the household head. An extra grade of educational achievement is estimated to increase the median income ratio by 17.7 percentage points, holding other variables constant. Self-employed households are estimated to have a 63.9 percentage points higher median income ratio than other households. Conversely, the highest negative association with the median income ratio follows from marital status and labour force participation. The median income ratio is estimated to be 69.7 and 38.1 percentage points lower for households whose head is single and out of labour force respectively. Moreover, we find

support for the life-cycle effects, with an inverted-U shaped relationship between age and relative income. Based on the positive estimate of age and the negative coefficient of age squared, we find that the median income ratio reaches maximum at 65 years old[62]. Similarly, there is evidence of a statistically significant hump-shaped relationship between the number of children and the median income ratio. The maximum income ratio is recorded for families with four children (see previous footnote). Furthermore, race and gender have a statistically significant impact on relative inequality. Households whose head is female are estimated to have a 20.5 percentage point lower median income ratio than male-headed households, while households headed by Blacks or Hispanics are estimated to have a 5.8 percentage point lower income relative to the median compared to White households.

Exclusion of the detailed balance sheet composition variables in the regression model alters some of the previously obtained estimates. In the reduced specification including only socio-economic controls, all socio-economic variables are statistically different at 5% level than in the baseline specification. The magnitude of the life-cycle effects increases, with the optimum age rising to 69. The coefficient of educational attainment rises from 17.7 to 23.4. The estimates of marital status and labour force participation increase in absolute terms to -80.2 and -48.9 respectively. The negative impact of gender increases to -29.9, while the coefficient of race rises to -27.3. Moreover, the estimate of the self-employed dummy increases to 136.0.

In the general balance sheet specification, the estimates of the socio-economic variables remain close to the detailed balance sheet specification results, except for the coefficients of educational attainment, self-employed, females, and Blacks/Hispanics, which rise to 20.1, 138.2, -30.2, and -14.2 respectively. Among the general balance sheet composition variables, a one-percentage point increase in the share of financial assets in total assets is related to a 1.2 percentage point increase in the median income ratio, holding other variables constant. The estimate is significant at 1% level. Secured debt holdings are positively associated with relative inequality, with a one-percentage point increase in the share of secured debt in total debt being related to a 0.3 percentage point rise in the median income ratio, significant at 5% level. In contrast, the impact of a one-percentage point increase in the relative holdings of unsecured debt is negative, reducing the median income ratio by 0.8 percentage points, significant at 1% level. As expected, the leverage measures have a negative association with relative inequality. A one-

[62] This is based on own calculations of a formula obtained from the partial derivative of the median income ratio with respect to age from the regression equation. If x* is the optimal value of age, then $x^* = -\hat{\beta}/2\gamma$ where $\hat{\beta}$ is the estimate of age and γ is the estimate of age squared. The decimal points are rounded upwards if equal to or exceeding 0.5.

percentage point increase in the debt-payments-to-income ratio is associated with a 2.7 percentage point decline in the median income ratio, significant at 5% level. The ratio is estimated to be 96.1 percentage points lower for households with debt payments exceeding 40% of income, significant at 1% level. The debt-to-asset and the debt-to-income ratio remain not statistically significant. Overall, these results are consistent in sign and significance with the estimates of the detailed balance sheet specification.

Comparison of the baseline specification results with the quantile regression estimation shows that the OLS estimates are robust in terms of significance and sign, with the exception of transaction accounts and instalment debt. However, we observe differences in the magnitudes of the estimated coefficients. The impact of socio-economic variables on the median income ratio tends to be lower in the median regression compared to the pooled OLS estimation. The difference is particularly large for the self-employment dummy, which decreases from 63.9 in the OLS estimation to 0.8 in the quantile regression.

Among the balance sheet composition variables, we find that the negative effect of the greater relative holdings of primary residence decreases in absolute terms in the median regression, with the estimate of -0.4 compared to -0.7 in the OLS estimation. Moreover, the impact of the greater relative holdings of vehicles and other non-financial assets on the median income ratio in the quantile regression is statistically significant at 1% level and larger in absolute terms compared to the OLS regression. A one-percentage point rise in the share of vehicles and other non-financial assets in total holdings is associated with a 0.4 percentage point decline in the median income ratio, while the estimate is not statistically different from zero in the pooled OLS estimation. Furthermore, a one-percentage point rise in the share of business equity and financial investment assets in total holdings is estimated to have a smaller increasing effect of 0.3 and 0.2 percentage points respectively on the median income ratio in the quantile regression, compared to the estimates of 2.6 and 2.9 respectively in the OLS specification. This suggests that the original results for these variables are sensitive to the extreme values of business equity and financial investment assets holdings.

Furthermore, we find substantial differences in the estimates of transaction accounts across the two regressions. While in the OLS estimation a one-percentage point rise in the share of this asset in total holdings is associated with an increase of 0.4 percentage points in the median income ratio, the coefficient turns negative at -0.3 in the median regression. Both estimates are significant at 1% level. Moreover, the magnitude of the positive effect of the greater relative holdings of retirement and insurance assets on the median income ratio is found to be lower in the median regression, with the estimate of 0.2 compared to the coefficient of 0.4 in the OLS estimation.

Among the debt composition variables, greater reliance on mortgages secured by primary residence is associated with higher increases in the median income ratio in the quantile regression. A one-percentage point rise in the share of this type of debt in total liabilities is estimated to increase the median income ratio by 0.6 percentage points (significant at 1% level), compared to a rise of 0.3 percentage points in the pooled OLS estimation, significant at 5% level. In contrast, the estimate of the greater relative holdings of mortgages secured by other property is lower in the median regression, with the coefficient of 1.1 compared to 2.2 in the OLS regression. Moreover, there are substantial disparities in the estimates of the relative instalment debt holdings across the two regressions. While a one-percentage point rise in the share of this debt in total liabilities is associated with a 0.8 percentage point decline in the median income ratio in the OLS estimation, a parallel increase is estimated to raise the median ratio by 0.01 percentage points in the quantile regression. Both estimates are significant at 1% level. Similarly, the effect of the greater relative holdings of credit card debt on the median income ratio is lower in absolute terms in the median regression, and is associated with a 0.04 percentage point decrease compared to a 0.9 percentage point decline in the OLS estimation. Both estimates are significant at 1% level. This indicates that at the median level debt composition is a greater and a more significant predictor of relative inequality than in the mean-based OLS regression.

Moreover, we observe asymmetries in the estimates of leverage across the two regressions. A one-percentage point rise in the debt-payments-to-income ratio is associated with a decline of 11.4 percentage points in the median income ratio in the quantile regression, significant at 1% level. Conversely, the decrease is lower at 3.5 percentage points in the OLS estimation, significant at 5% level. Additionally, households whose debt-service-to-income ratio exceeds 40% are found to have a 47.1 percentage point lower median income ratio compared to the less indebted households in the quantile regression. This gap is smaller than in the pooled OLS estimation, where the difference in the median income ratio between extremely indebted households and the rest is 96.5 percentage points. This suggests that the median household is more indebted in terms of the debt-service-to-income ratio than the mean. Moreover, the debt-to-asset and the debt-to-income ratio are statistically significant at the 10% and 1% level respectively in the median regression, although the magnitudes are very close to zero.

Figure 4.1 shows the differences in the estimates of the balance sheet composition variables in the detailed specification across quintiles. It is evident that the mean-based estimates of the OLS regression disguise much of the heterogeneity of the impact of household balance sheet composition on relative inequality. Comparing the estimates of the median and the OLS regression with the quantile regression coefficients estimated at the 20^{th} and 90^{th} percentile we observe that there are disparities in the impact of the balance sheet composition variables across the

distribution. The largest differences in the coefficient magnitudes are observed for business equity, financial investment assets, retirement and insurance assets, as well as debt secured by other property, and the debt-service-to-income ratio.

Overall, results of the median regression indicate that estimates of the relative holdings of business equity, financial investment assets, transaction accounts, and instalment debt are particularly sensitive to extreme values. The results suggest that asset composition is a greater determinant of relative income for households towards the top of the distribution, which skews the mean-based estimates upwards. Simultaneously, debt composition emerges as a greater predictor of relative income for a typical median household, which is evident in the higher magnitudes of the estimates of unsecured debt and mortgages secured by primary residence in the quantile regression. The differences in the estimates of leverage measures indicate that the median household is more indebted and suffers greater declines in relative income due to increases in the debt-payments-to-income ratio than the average mean household.

Table 4.2 Pooled OLS and quantile regression results 1989-2013

Median income ratio	Socio-economic variables (POLS)	General balance sheet specification (POLS)	Detailed balance sheet specification (POLS)	Detailed balance sheet specification (QR)
Age	9.31***	7.54***	7.75***	3.99***
	(0.273)	(0.350)	(0.407)	(0.001)
Age squared	-0.07***	-0.06***	-0.06***	-0.04***
	(0.003)	(0.004)	(0.004)	(0.000)
Educational attainment	23.37***	20.12***	17.70***	8.74***
	(0.377)	(0.447)	(0.435)	(0.001)
Female	-29.96***	-30.21***	-20.47***	-14.60***
	(3.356)	(4.561)	(4.689)	(0.005)
Black/Hispanic	-27.28***	-14.23***	-5.79***	-5.77***
	(1.481)	(1.749)	(1.648)	(0.003)
Single	-80.24***	-67.65***	-69.71***	-47.70***
	(3.927)	(5.140)	(5.174)	(0.006)
Number of children	16.33***	14.64***	18.23***	7.64***
	(1.989)	(2.028)	(2.047)	(0.003)
Number of children squared	-1.93***	-1.56***	-2.38***	-1.48***
	(0.446)	(0.474)	(0.473)	(0.001)
Self-employed	136.00***	138.20***	63.91***	0.76***
	(6.777)	(7.124)	(7.178)	(0.011)
Out of labour force	-48.96***	-31.68***	-38.09***	-27.80***
	(2.968)	(3.560)	(3.551)	(0.005)
Financial assets		1.23***		
		(0.051)		
Secured debt		0.29*		
		(0.150)		

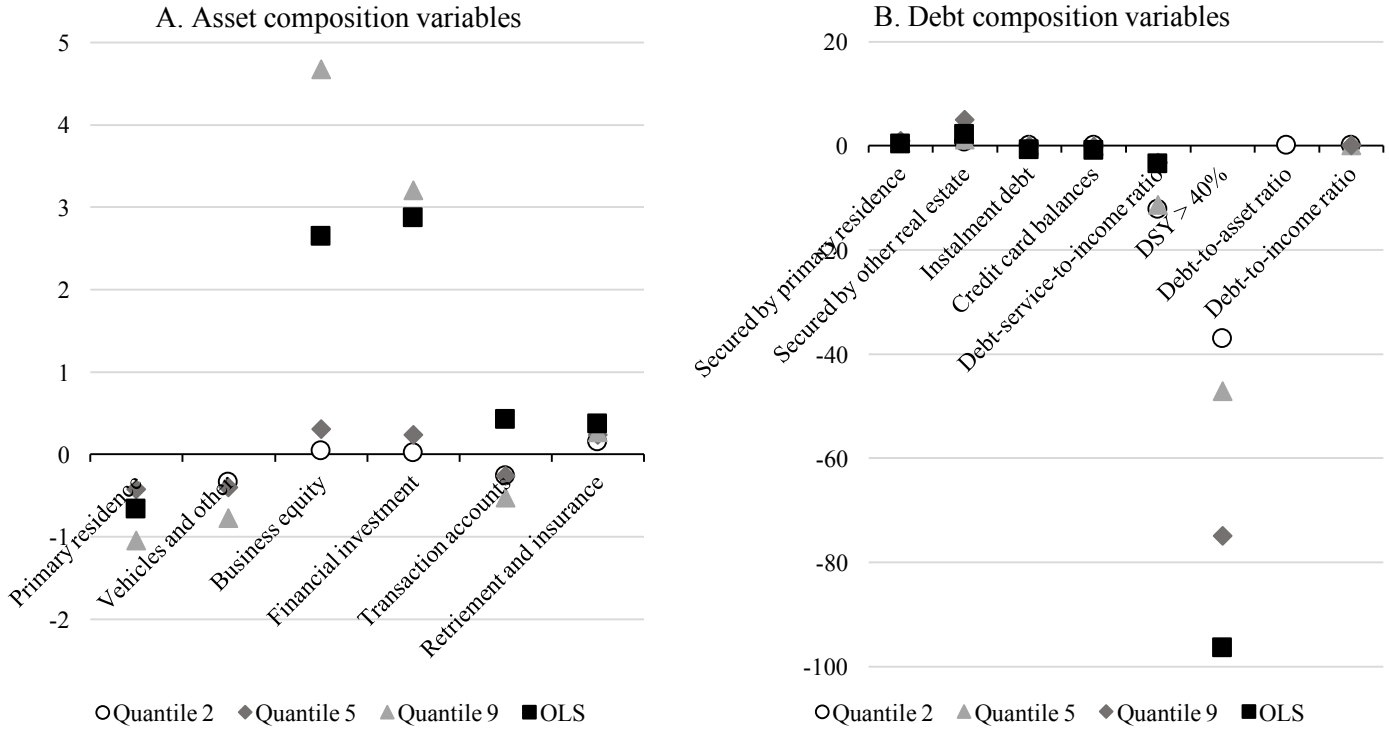
Unsecured debt		-0.75*** (0.150)		
Debt-service-to-income ratio (DSY)		-2.72** (1.259)	-3.50** (1.495)	-11.40*** (0.015)
DSY>40%		-96.01*** (2.797)	-96.49*** (3.030)	-47.10*** (0.011)
Debt-to-asset ratio		-0.003 (0.002)	-0.00 (0.001)	-0.00*** (0.000)
Debt-to-income ratio		-0.01 (0.428)	-0.01 (0.444)	0.00* (0.001)
Primary residence			-0.67*** (0.113)	-0.42*** (0.012)
Vehicles and other non-financial			-0.08 (0.109)	-0.40*** (0.013)
Business equity			2.64*** (0.202)	0.31*** (0.054)
Financial investment assets			2.87*** (0.184)	0.23*** (0.017)
Transaction accounts			0.42*** (0.130)	-0.26*** (0.012)
Retirement and insurance assets			0.37*** (0.113)	0.24*** (0.014)
Debt secured by primary residence			0.33** (0.158)	0.59*** (0.011)
Debt secured by other real estate			2.16*** (0.238)	1.11*** (0.014)
Instalment debt			-0.83*** (0.150)	0.01*** (0.010)
Credit card balances			-0.97*** (0.151)	-0.04*** (0.012)
1992	-18.43*** (5.164)	-19.34*** (6.507)	-18.44*** (6.630)	-2.74*** (0.006)
1995	-24.70*** (5.150)	-28.87*** (6.408)	-22.91*** (6.522)	-10.70*** (0.005)
1998	-17.82*** (5.311)	-24.95*** (6.822)	-20.75*** (7.031)	-11.50*** (0.010)
2001	-8.022 (6.573)	-16.71** (7.876)	-10.38 (8.039)	-12.00*** (0.006)
2004	-20.29*** (5.303)	-28.44*** (6.531)	-19.06*** (6.578)	-14.50*** (0.008)
2007	-5.277 (5.536)	-13.50** (6.628)	-5.60 (6.749)	-14.00*** (0.007)
2010	-17.01*** (5.390)	-21.13*** (6.705)	-10.56 (6.671)	-11.80*** (0.007)
2013	-1.130 (5.453)	-9.18 (6.899)	2.31 (6.868)	-10.30*** (0.005)
Constant	-365.7*** (9.583)	-273.60*** (17.550)	-223.50*** (22.160)	-52.00*** (0.021)

Observations	41,528	30,219	30,219	30,219
Adjusted R-squared*	0.036	0.053	0.065	0.219
Root Mean Squared Error	621.8	545.1	541.6	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Base year 1989. Financial assets, primary residence, vehicles and other, business equity, liquid assets, retirement accounts, and financial investment assets are presented in terms of the percentage share of the value of these variables in total assets. Unsecured debt, secured debt, debt secured by primary residence and by other real estate, instalment debt, and credit card balances are expressed in terms of the percentage share of the value of these holdings in total debt. Balance sheet variable shares and the income median ratio are given in percentage terms.*Due to methodological assumptions of the quantile regression, we report the pseudo-R^2 for the quantile regression and the adjusted R^2 for the pooled OLS regression.

Figure 4.1 Coefficients by quantile, USA 1989-2013



Analysis of the goodness of fit of the estimated regression models suggests that out of the three pooled OLS specifications, the detailed balance sheet regression explains the most of the variation in the median income ratio. The highest adjusted R^2 is obtained for the specification with detailed balance sheet variables. However, this statistic should be interpreted cautiously due to its low magnitudes of less than 10%. Low R^2 is expected given the large sample size, but it may signal omitted variable problems. For this reason, we also compare the Root Mean Squared Error (RMSE), which takes a square root of the ratio of the residual sum of squares in the regression to its degrees of freedom. The lower value of RMSE of 541.6 in the detailed balance sheet specification confirms that its accuracy is higher compared to the reduced specifications.

In addition to the potential omitted variable bias, a further limitation of our model may arise due to the endogeneity issues associated with the interplay between income and wealth, despite

accounting for the relative shares of the balance sheet variables. For this reason, this econometric exercise should be treated as an illustration of the statistical significance of the proposed relationship between household balance sheet composition and relative inequality, which has been observed in the descriptive analysis of the data in Chapter 1.

Overall, the estimation results support our research hypothesis and the implication of the stock-flow consistent model developed in Chapter 3 that wealth heterogeneity increases inequality through differences in balance sheet composition. Households with higher levels of high-yielding financial investment assets, business equity, and debt secured by other real estate have relatively higher income levels compared to the median in the period studied. In contrast, incomes of households whose asset holdings rely on primary residence are estimated to be further away from the median towards the bottom of the distribution. Moreover, although the estimated relationship between the relative holdings of debt secured by primary residence and the median income ratio is positive, the effect is lower than for debt secured by other real estate. Moreover, incomes of households relying on unsecured debt holdings are estimated to be lower relative to the median. Furthermore, leverage matters. Highly indebted households with large monthly debt payments relative to monthly income, particularly those with debt-payment-to-income ratio exceeding 40%, are estimated to be further down the distribution of income relative to the median. While our study finds support for the significance of the socio-economic characteristics of households for relative inequality, their impact is reduced when wealth composition is considered.

These findings suggest that household wealth heterogeneity significantly affects relative income distribution, and thus needs to be considered as an independent determinant of inequality. In the next section we analyse the social dimension of inequality, examining how the estimated effects of household wealth composition on relative income differ across gender, race, and generations. Moreover, we break down the analysis across periods to account for the impact of the subprime lending boom. Consequently, we consider the intersectional dimensions of inequality associated with financial sector transformation, which could not be included in the stock-flow consistent model due to its aggregate nature.

4.3.3. Results by socio-demographic subgroup

In order to account for the intersectional dimension of the impact of household wealth composition on inequality, the detailed balance sheet specification of the pooled OLS regression is re-estimated including interaction dummy variables for the balance sheet composition variables. The slope dummies equal 1 for female-headed households, households headed by Blacks/Hispanics, and households aged less than 35, with households headed by males, Whites/other ethnicities, and over 35 taken as reference categories. The aim of analysing the slope dummy variables is to investigate

any systematic differences in the impact of wealth composition on relative inequality across gender, race, and generations, which could not be considered in the stock-flow consistent model developed in Chapter 3. We expect that due to the high opportunity cost of purchasing assets relative to financing everyday consumption, and because of discrimination issues in the credit markets associated with the predatory lending practices, these groups were exposed to more costly forms of borrowing and the impact of asset and debt composition on relative inequality is likely to be different for households headed by women, Blacks/Hispanics, and the young. For clarity to presentation, below we present tables with the estimated composite slopes and intercepts of the balance sheet composition variables and the median income ratio for female, Black/Hispanic, and young-headed households[63].

Gender

Table 4.3 presents composite slope estimates of the balance sheet composition variables and the composite intercept for female-headed households. As our interest lies in assessing any potential differences in the impact of household wealth on relative income, we do not describe the differences in the socio-economic characteristics across the analysed subgroups in detail.

The estimated directions of the relationship between the median income ratio and asset composition variables are consistent across gender and with the baseline specification results. However, asset variables have generally no significant impact on the position in the income distribution for female-headed households. The estimated composite coefficients of the total asset shares of primary residence, vehicles and other non-financial assets, transaction accounts, and retirement and insurance assets are not statistically different from zero. Only the estimate of the relative holdings of financial investment assets is statistically significant at 1%. However, it's magnitude of 0.4 is substantially lower than the estimate of 3.9 for male-headed households. This suggests that the positive impact of higher relative holdings of financial investment assets and business equity is not shared equally across gender, with male households enjoying significantly higher increases in their incomes relative to the median compared to females.

Furthermore, there are significant differences in the impact of debt composition on relative income across gender. While the interaction dummy of gender and relative holdings of debt

[63] Calculation of the composite slope and intercept is illustrated by the following example regression equation, where D is the dummy variable, Y is the dependent variable, X is a regressor, and ε is the error term: $Y = \beta_0 + \beta_1 X + \beta_2 D + \beta_3 DX + \varepsilon$. For $D=1$: $y = (\beta_0 + \beta_2) + (\beta_1 + \beta_3)X + \varepsilon$, where $(\beta_0 + \beta_2)$ is the composite intercept and $(\beta_1 + \beta_3)$ is the composite slope for subgroup for which the dummy is 1. For $D=0$ intercept and slope correspond to the original estimates β_0 and β_1.

secured by primary residence is not statistically significant, based on the calculation of the composite standard error the overall coefficient is positively and significantly associated with the median income ratio for female-headed households. *Ceteris paribus*, a one-percentage point increase in the share of mortgages secured by primary residence in total debt is associated with a 0.2 percentage point rise in the median ratio for female households significant at 1% level, while the coefficient is not statistically different from zero for males. Moreover, male households holding debt secured by other property enjoy higher increases in their median income ratio of 2.2 percentage points for each one-percentage point rise in these relative holdings. In contrast, the effect for female-headed households is significantly lower at 0.8 percentage points.

Striking differences across gender emerge for the relative holdings of unsecured debt. While a one-percentage point increase in the share of instalment loans in total debt is associated with a 1.1 percentage point decline in the median ratio among males significant at 1% level, the estimated effect is not statistically significant for female households. Moreover, a one-percentage point increase in the share of credit card balances in total debt is related to a 1.4 percentage point decrease in the median income ratio for male households, while the coefficient is not statistically different from zero for females. Moreover, the negative effect of leverage is magnified for female households, with a one-percentage point increase in the debt-payments-to-income ratio decreasing the relative income of women by 7.6 percentage points (although the interaction dummy is not statistically significant), compared to a 3.5 percentage point decline for men. In addition, incomes of females whose debt-payments-to-income ratio exceeds 40% are estimated to be significantly closer to the median than incomes of the extremely indebted males. This indicates that female-headed households in the bottom half of the distribution tend to be more indebted compared to men. Furthermore, the insignificant estimates of the relative unsecured debt holdings suggest that this form of debt is not as detrimental for the relative income position among women compared to men. Lastly, we observe a significant difference in the intercept across gender, with female-headed households occupying a lower position in the income distribution in mean terms than male households.

Comparison of the pooled OLS results with the quantile regression estimates shows robustness of the majority of these effects in terms of their sign, although the median regression estimation yields all regressors to be significant at 1% level. As in the full sample, the quantile regression coefficients tend to be lower in magnitude than the pooled OLS estimates. This is particularly notable in the case of the relative holdings of business equity, financial investment assets, and debt secured by other property, which signify that the median household sees smaller increases in their relative position in the income distribution from holding these types of wealth. As in the pooled OLS estimation, these coefficients are lower for the subsample of women

compared to men. Remarkably, the median female household is estimated to lower her position in the income distribution by 0.04 percentage points for each one-percentage point rise in the relative holdings of business equity. Moreover, the estimates of the relative holdings of unsecured debt are positively associated with the median income ratio for female-headed households and statistically significant at 1% level. This suggests that greater accumulation of unsecured debt has a larger effect for the relative position in the income distribution for the median female-headed household compared to males. Moreover, the quantile regression estimates of the debt-to-asset and debt-to-income ratios are statistically significant and negative for both groups, but their magnitude remains close to zero.

Overall, we find that female-headed households do not enjoy the same increases in their relative income following the rise in the relative holdings of business equity, financial investment assets, and other real estate (gauged by the contribution of debt secured by other property to total holdings). Moreover, we observe that female households suffer greater relative income declines from higher leverage compared to males, and that their relative position in the income distribution is related to a larger extent to unsecured debt accumulation.

Table 4.3 Pooled OLS and quantile regression results with interaction dummies – gender and balance sheet composition variables, USA 1989-2013

Median income ratio	Composite slope (POLS)		Composite slope (QR)	
	Male	**Female**	**Male**	**Female**
Primary residence	-0.96***	**-0.05**	-0.57***	**-0.13*** **
	(0.136)	(0.091)	(0.015)	(0.009)
Vehicles	-0.28**	*-0.03*	-0.56***	-0.14***
	(0.131)	(0.093)	(0.013)	(0.010)
Business equity	2.74***	**0.07**	0.30***	**-0.04*** **
	(0.220)	(0.243)	(0.076)	(0.036)
Financial investment assets	3.94***	**0.42*** **	0.50***	**0.02*** **
	(0.252)	(0.116)	(0.035)	(0.013)
Transaction accounts	0.53***	**0.06**	-0.34***	**-0.09*** **
	(0.184)	(0.093)	(0.023)	(0.023)
Retirement and insurance assets	0.32**	*0.11*	0.34***	0.11***
	(0.136)	(0.096)	(0.016)	(0.023)
Debt secured by primary residence	0.26	*0.24***	0.63***	0.39***
	(0.209)	(0.064)	(0.017)	(0.014)
Debt secured by other real estate	2.22***	**0.83*** **	1.24***	**0.67*** **
	(0.299)	(0.167)	(0.029)	(0.224)
Instalment debt	-1.14***	**-0.02**	-0.05***	**0.04*** **
	(0.200)	(0.055)	(0.015)	(0.010)
Credit card balances	-1.37***	**-0.04**	-0.16***	**0.07*** **
	(0.205)	(0.059)	(0.014)	(0.011)
Debt-service-to-income ratio (DSY)	-3.45**	*-7.59***	-0.13***	**-0.04*** **

	(1.519)	(2.812)	(0.038)	(0.031)
DSY>40%	-119.38***	**-32.16*** **	-59.10***	**-22.90*** **
	(3.685)	(3.191)	(0.017)	(0.012)
Debt-to-asset ratio	-0.01	*0.00*	-0.00***	**-0.00*** **
	(0.013)	(0.001)	(0.000)	(0.000)
Debt-to-income ratio	-0.01	*-0.50*	0.00***	-0.01***
	(0.607)	(1.193)	(0.000)	(0.000)
Constant	-171.65***	**-269.45*** **	-27.70***	**-73.30*** **
	(27.063)	(17.911)	(0.000)	(0.018)
Observations	30,219		30,219	
Adjusted R-squared*	0.07		0.23	
Root Mean Squared Error	540.2			

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Full regression results (including socio-economic controls and time effects) are not reported because these estimates remain statistically the same in the regression including the interaction dummy variables. Full results available on request. Base year 1989. Estimates in bold indicate the Wald test yielding the interaction dummy statistically significant at 5% level. Standard errors calculated as $\sqrt{var(X) + var(XD) + 2cov(X, XD)}$ where XD is the interaction dummy. Italics indicate that the interaction dummy is not statistically significant. Asterisks reflect significance of the composite slope based on the calculated standard errors. *Due to methodological assumptions of the quantile regression, we report the pseudo-R^2 for the quantile regression and the adjusted R^2 for the pooled OLS regression. Weighted Least Squares (WLS) iteration in quantile regression selected at 1 for convergence.

Race

Table 4.4 presents estimation results of the detailed balance sheet specification with interaction dummies across racial groups, comparing the subsamples of households headed by Whites/other ethnic groups and Blacks/Hispanics. This categorisation is motivated by the similar patterns of wealth accumulation across these groups, as evidenced by the descriptive data analysis in Chapter 1. The impact of asset composition on the median income ratio is significantly lower for Blacks/Hispanics, while debt accumulation is estimated to play a greater role than for Whites/other ethnic groups.

Firstly, the positive effects of the greater shares of business equity and high-yielding financial investment assets in total holdings are not shared equally between these ethnic groups. While a one-percentage point increase in the contribution of business equity to total assets is estimated to increase the median income ratio by 2.9 percentage points among White/Other households significant at 1% level, this effect is not statistically different from zero for Blacks/Hispanics. Similarly, a one-percentage point rise in the relative holdings of financial investment assets is associated with a 3.1 percentage point increase in the median income ratio for Whites/other ethnic groups significant at 1% level. However, the corresponding estimate is not statistically different from zero for Blacks/Hispanics.

Similarly, estimates of the relative holdings of transaction accounts and retirement and insurance assets are not statistically different from zero for Black/Hispanic households, while they are positive and statistically significant at 1% for Whites and other ethnicities. Moreover, relative holdings of vehicles and other non-financial assets are estimated to be negatively related to the median income ratio for Black/Hispanic households. A one-percentage point rise in the share of vehicles in total assets is associated with a 0.4 percentage point decrease in the median income ratio for this group, significant at 1% level. In contrast, the estimate is not statistically significant for White/Other households.

In contrast to assets, the estimates of debt composition variables tend to have a greater effect on the median income ratio for Blacks/Hispanics compared to Whites/other ethnic groups. A one-percentage point increase in the share of debt secured by primary residence is associated with a 0.3 percentage point rise in the median ratio among Blacks/Hispanics, significant at 1% level. Conversely, the estimate is not statistically significant for White/Other households. Gauging the impact of other property ownership, greater relative holdings of debt secured by other real estate are associated with higher increases in the median income ratio for Whites/other ethnic groups compared to Blacks/Hispanics. A one-percentage point increase in the share of this type of debt in total liabilities is estimated to raise the median income ratio of White/Other households by 2.2 percentage points, compared to a 0.7 increase for Blacks/Hispanics. This suggests that ownership of property other than main residence has a greater effect on the relative incomes of Whites/other ethnic groups than for Blacks/Hispanics.

Furthermore, there are significant differences in the impact of relative holdings of unsecured debt on the median income ratio across race. While the impact of greater relative holdings of instalment debt is estimated to be negative across race, the magnitude is significantly lower in absolute terms for Blacks/Hispanics. A one-percentage point increase in the share of instalment debt in total liabilities is associated with a 1.1 percentage point decline in the median income ratio for Whites/other ethnic groups, significant at 1% level. In contrast, a corresponding rise is related to a decrease of 0.1 percentage points significant at 10% level for Blacks/Hispanics. Moreover, a one-percentage point rise in the share of credit card balances in total debt is estimated to decrease the median income ratio of White/Other households by 1.3 percentage points (significant at 1% level), while the coefficient is not significantly different from zero among Blacks/Hispanics.

A similar pattern is detected for the impact of the debt-service-to-income ratio on relative income across race. A one-percentage point rise in the ratio is estimated to decrease the median income ratio of Whites/other ethnic groups by 4.4 percentage points, significant at 1% level. In contrast, the coefficient is not statistically different from zero for Blacks/Hispanics. However,

Black and Hispanic households whose debt-payments-to-income-ratio exceeds 40% are estimated to have a 49.4 percentage point lower median income ratio relative to the less indebted households. The median income ratio is estimated to be 108.3 percentage point lower for Whites/other ethnic groups. This indicates that Blacks and Hispanics in the bottom half of the distribution are more indebted compared to White and Other households. Lastly, on average Black/Hispanic households are lower in the income distribution relative to the median than Whites and other ethnicities, which is evidenced by statistically significant intercept dummy.

Comparing the above results with the quantile regression, we observe that most of the estimates are consistent in terms of significance and sign. As in the regression across gender, the quantile regression coefficients tend to be of lower magnitude than in the pooled OLS estimation. Among exceptions, the estimate of the relative holdings of business equity is not statistically significant for the subsample of Whites. Moreover, the coefficients of the relative holdings of financial investment and retirement and insurance assets are negative and statistically significant in the quantile regression for the subsample of Blacks/Hispanics, while the pooled OLS estimates are not statistically different from zero. This signifies that greater ownership of these assets does not improve the relative position in the income distribution for Blacks/Hispanics. Furthermore, the quantile regression estimates of the relative holdings of instalment debt and credit card balances are positive and statistically significant for Blacks/Hispanics. This indicates that the position in the income distribution of the median Black or Hispanic household relied to a greater extent on unsecured debt accumulation. In contrast, unlike in the pooled OLS regression, the quantile regression estimates of the debt-service-to-income, debt-to-asset, and the debt-to-income ratio are statistically significant and negative for Blacks/Hispanics (and the latter two also for Whites/Other ethnicities), although their magnitude is close to zero.

Overall, these results suggest that while asset composition plays a greater role in influencing the relative incomes of Whites/other ethnic groups, debt and leverage are larger determinants of the relative position of Blacks/Hispanics along the income distribution. This indicates that minority households have become more dependent on debt in the process of financial sector transformation as their access to asset ownership was limited between 1989-2013. The resulting higher levels of leverage among minority households have significantly contributed to the deepening of racial inequality measured in the mean terms, as observed in the balance sheet analysis in Chapter 1.

Table 4.4 Pooled OLS and quantile regression results with interaction dummies – race and balance sheet composition variables, USA 1989-2013

Median income ratio	Composite slope (POLS)		Composite slope (QR)	
	White/Other	**Black/Hispanic**	**White/Other**	**Black/Hispanic**
Primary residence	-0.82***	**-0.38****	-0.44***	**-0.33*****
	(0.131)	(0.160)	(0.011)	(0.008)
Vehicles	-0.16	*-0.37***	-0.43***	**-0.39*****
	(0.127)	(0.146)	(0.009)	(0.007)
Business equity	2.87***	**0.08**	0.34	*-0.02*
	(0.255)	(0.255)	(0)	(0)
Financial investment assets	3.13***	**0.30**	0.28***	**-0.12*****
	(0.214)	(0.194)	(0.028)	(0.023)
Transaction accounts	0.51***	**-0.15**	-0.24	*-0.34*
	(0.164)	(0.171)	(0)	(0)
Retirement and insurance assets	0.40***	**-0.16**	0.36***	**-0.08*****
	(0.133)	(0.155)	(0.015)	(0.011)
Debt secured by primary residence	0.23	*0.30****	0.58***	**0.42*****
	(0.203)	(0.090)	(0.011)	(0.016)
Debt secured by other real estate	2.23***	**0.72*****	1.20***	**0.63*****
	(0.287)	(0.227)	(0.039)	(0.011)
Instalment debt	-1.08***	**-0.11***	-0.04***	*0.05****
	(0.194)	(0.064)	(0.007)	(0.007)
Credit card balances	-1.27***	**-0.10**	-0.10***	**0.07*****
	(0.198)	(0.070)	(0.009)	(0.008)
Debt-service-to-income ratio (DSY)	-4.43**	*-0.72*	-0.10***	**-0.04*****
	(1.823)	(3.513)	(0.001)	(0.023)
DSY>40%	-108.30***	**-49.38*****	-49.20***	**-33.80*****
	(3.434)	(8.291)	(0.003)	(0.027)
Debt-to-asset ratio	-0.01	*0.00*	0.01***	**-0.00*****
	(0.007)	(0.001)	(0.000)	(0.000)
Debt-to-income ratio	-0.55	*0.00*	-0.01***	*-0.01****
	(0.477)	(2.956)	(0.000)	(0.000)
Constant	-201.78***	**-255.91*****	-49.40***	**-58.64*****
	(25.664)	(20.522)	(0.000)	(0.009)
Observations	30,219		30,219	
Adjusted R-squared*	0.07		0.22	
Root Mean Squared Error	540.9			

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Full regression results (including socio-economic controls and time effects) are not reported because these estimates remain statistically the same in the regression including the interaction dummy variables. Full results available on request. Base year 1989. Estimates in bold indicate the Wald test yielding the interaction dummy statistically significant at 5% level. Standard errors calculated as $\sqrt{var(X) + var(XD) + 2cov(X, XD)}$ where XD is the interaction dummy. Italics indicate that the interaction dummy is not statistically significant. Asterisks reflect significance of the composite slope based on the calculated standard errors. *Due to methodological assumptions of the quantile regression, we report the pseudo-R^2 for the quantile regression and the adjusted R^2 for the pooled OLS regression. WLS iteration in quantile regression selected at 40 for convergence.

Generations

Table 4.5 presents results of the detailed balance sheet specification with interaction dummies across age groups, comparing households aged below 35 and those 35 years old and above. This categorisation is motivated by the results of the descriptive analysis in Chapter 1, which revealed that the youngest group of households fared consistently worse over time compared to the older households in terms of changes in their income and wealth.

As in the case of gender and race, the positive effects of the greater relative holdings of business equity and financial investment assets on relative income are not shared equally across generations. A one-percentage point increase in the share of business equity in total assets is estimated to increase the median income ratio by 3.3 percentage points for households aged 35 and above, significant at 1% level. In contrast, the estimate for the youngest group is not statistically different from zero. Similarly, a one-percentage point increase in the share of financial investment assets in total holdings is estimated to raise the median income ratio of households aged 35 and above by 3.6 percentage points. Conversely, the estimate is significantly lower at 0.5 for households aged below 35. Both estimates are significant at 1% level.

Furthermore, we find an asymmetric impact of the relative holdings of transaction accounts on the median income ratio across generations. A one-percentage point rise in the share of transaction accounts in total assets is estimated to increase the relative income of households aged 35 and above by 0.4 percentage points, significant at 5% level. In contrast, the estimate is not statistically different from zero among households below 35 years old. In addition, we estimate that there is no statistically significant difference between the coefficients of the relative holdings of primary residence, retirement and insurance assets, and vehicles and other non-financial assets between age groups, although the latter estimate is not statistically significant among households aged below 35.

Moreover, there are significant differences in the impact of debt composition on relative income across generations. Debt holdings are estimated to have a greater positive effect on the median income ratio for households younger than 35 compared to asset composition. A one-percentage point increase in the share of debt secured by primary residence is estimated to raise the median income ratio of the youngest group by 0.8 percentage points, while the estimated effect of 0.1 is significantly lower for households older than 35. Both estimates are significant at 1% level. We find no significant differences in the impact of mortgages secured by other property on the median income ratio between generations, although the magnitude of the estimate for young households is lower than for households aged 35 and above. Importantly, while the estimated effect of greater relative holdings of unsecured debt on the median income is negative for

households aged 35 and above, the impact is found to be not statistically significant for the youngest group.

Furthermore, higher leverage levels have a more detrimental impact on the relative income among households below 35 years old compared to those aged 35 and above. A one-percentage point increase in the debt-service-to-income ratio is associated with a 16.8 percentage point decline in the median income ratio for the youngest group, significant at 1% level. In contrast, a parallel rise in the leverage ratio is estimated to decrease the median ratio of households aged 35 and above by 3.6 percentage points, significant at 5% level. Moreover, households below 35 years old whose monthly debt-payments-to-income ratio exceeds 40% percent are estimated to have 47.3 percentage points lower median ratio compared to less indebted households, while relative income is found to be 107.8 percentage points lower among extremely indebted households aged 35 and above. Both estimates are significant at 1% level. Additionally, we find that a one-percentage point rise in the debt-to-asset ratio is associated with a decline of 0.01 in the median income ratio significant at 1% level among households aged 35 and over. The estimates of the debt-to-asset and the debt-to-income ratios are not statistically different from zero for households below 35. Lastly, comparison of the intercept dummy indicates that young households have a lower position in the income distribution relative to the median than households aged 35 and over.

Comparison of the pooled OLS and the quantile regression results shows that the majority of the estimates are robust in terms of their sign and significance, although the quantile regression coefficients tend to have lower magnitudes compared to the pooled OLS estimates. The median regression estimate of the relative holdings of vehicles and other non-financial assets is not significantly different from zero for Whites/other ethnicities. Moreover, unlike in the pooled OLS regression the estimate of the relative holdings of business equity is found to be positive and statistically significant for young households in the quantile regression, although its magnitude of 0.1 is substantially below the coefficient of 0.4 for households aged 35 and over. In contrast, the estimate of the relative holdings of financial investment assets is negative and significant for this group, compared to a positive pooled OLS coefficient. This indicates that relative incomes of young households do not benefit to the same extent from ownership of these assets compared to households aged 35 and above. Furthermore, quantile regression estimates of the relative holdings of transaction accounts are negative for both age groups, while the pooled OLS coefficients are positive. In addition, the quantile regression coefficient of the relative holdings of instalment debt for households below 35 is statistically significant and positive compared to the negative pooled OLS result. Furthermore, the quantile regression estimates of the debt-to-asset and the debt-to-income ratio are statistically significant for both age groups, but the magnitudes are close to zero.

Overall, the above results indicate that debt accumulation is related to higher increases in relative income among households aged below 35 than asset composition, especially in terms of debt secured by main residence. In contrast, greater reliance on unsecured debt holdings is associated with lower relative income among households aged 35 and above. However, these older households enjoy significantly greater increases in the median income ratio than the youngest group, which is associated with their greater holdings of financial investment assets and business equity. Moreover, households below 35 years old are found to suffer greater relative income losses from higher debt-payments-to-income ratio relative to those aged 35 and above. Similarly to gender and race, the lower estimate for extremely indebted households among the youngest group indicates that they tend to be more indebted on average.

Table 4.5 Pooled OLS and quantile regression results with interaction dummies – age group and balance sheet composition variables, USA 1989-2013

Median income ratio	Composite slope (POLS)		Composite slope (QR)	
	Aged 35+	**Aged <35**	**Aged 35+**	**Aged <35**
Primary residence	-0.77***	*-0.41***	-0.43***	**-0.27*****
	(0.129)	(0.178)	(0.006)	(0.018)
Vehicles	-0.47***	*-0.04*	-0.53	*-0.17*
	(0.129)	(0.135)	(0)	(0)
Business equity	3.33***	**-0.06**	0.42***	**0.08*****
	(0.244)	(0.197)	(0.103)	(0.103)
Financial investment assets	3.63***	**0.52*****	0.39***	**-0.01*****
	(0.242)	(0.150)	(0.013)	(0.014)
Transaction accounts	0.35**	*0.12*	-0.31***	**-0.10*****
	(0.179)	(0.129)	(0.011)	(0.008)
Retirement and insurance assets	0.28**	*0.23**	0.21***	*0.27****
	(0.131)	(0.139)	(0.006)	(0.006)
Debt secured by primary residence	0.10***	**0.81*****	0.53***	**0.73*****
	(0.203)	(0.092)	(0.004)	(0.020)
Debt secured by other real estate	2.00***	*1.40****	1.10***	**0.69*****
	(0.285)	(0.280)	(0.074)	(0.012)
Instalment debt	-1.01***	**-0.04**	-0.00***	*0.07****
	(0.197)	(0.042)	(0.003)	(0.003)
Credit card balances	-1.21***	**0.00**	-0.10	*0.12*
	(0.196)	(0.046)	(0)	(0)
Debt-service-to-income ratio (DSY)	-3.60**	**-16.82*****	-0.12***	*-0.09****
	(1.526)	(4.617)	(0.003)	(0.003)
DSY>40%	-107.81***	**-47.27*****	-47.70	*-35.68*
	(8.292)	(3.117)	(0)	(0)
Debt-to-asset ratio	-0.01***	**-0.00**	-0.00***	**-0.00*****
	(0.002)	(0.001)	(0.000)	(0.000)
Debt-to-income ratio	-0.01	**-0.14**	0.00***	**-0.00*****
	(2.276)	(0.294)	(0.000)	(0.000)

Constant	-200.2***	**-278.20***	-34.50***	**-73.63***
	(30.364)	(20.206)	(0.000)	(0.004)
Observations	30,219		30,219	
Adjusted R-squared*	0.07		0.22	
Root Mean Squared Error	540.7			

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Full regression results (including socio-economic controls and time effects) are not reported because these estimates remain statistically the same in the regression including the interaction dummy variables. Full results available on request. Base year 1989. Estimates in bold indicate the Wald test yielding the interaction dummy statistically significant at 5% level. Standard errors calculated as $\sqrt{var(X) + var(XD) + 2cov(X, XD)}$ where XD is the interaction dummy. Italics indicate that the interaction dummy is not statistically significant. Asterisks reflect significance of the composite slope based on the calculated standard errors. *Due to methodological assumptions of the quantile regression, we report the pseudo-R^2 for the quantile regression and the adjusted R^2 for POLS. WLS iteration in quantile regression selected at 30 for convergence.

Summary

In sum, we find that the relative incomes of women, Blacks, Hispanics, and households aged below 35 are determined to a larger extent by debt composition rather than assets. The magnitude of the positive effects of the greater share of business equity and financial investment assets in total holdings is significantly smaller for these groups. Moreover, unsecured debt is found to have a less detrimental association with their median income ratios than for the other groups, although at varying levels of significance. We also find evidence for an asymmetric impact of leverage on relative income, with greater declines in the median income ratio for female and young households. Moreover, lower estimates of extremely indebted households in the subsamples of women, Blacks, Hispanics, and the young suggest that these groups tend to be more indebted on average than their counterparts. Our results indicate that female, Black, Hispanic, and young households have become more dependent on debt and did not share the same improvements in their relative position in the income distribution arising from the ownership of assets as households headed by Whites, males, and those over 35. This gauges the impact of the absolute size of wealth holdings among these groups on generating higher returns to wealth compared to their counterparts. Consequently, households headed by females, Blacks, Hispanics, and aged below 35 faced higher leverage levels on average, which pushed them further down the income distribution. The statistical significance of the estimated effects suggests that disparities in asset ownership and the resulting levels of indebtedness and leverage have significantly contributed to the deepening of the gender, racial, and intergenerational inequality, as argued in Chapter 1.

4.3.4. Results by period

In addition to examining the relationship between wealth components and relative income inequality across socio-demographic characteristics, we break down the pooled OLS analysis by

period. Table 4.6 presents results of the detailed balance sheet specification of the pooled OLS regression estimated separately between 1989-1998, 2001-2007, and 2010-2013. The first period corresponds to the pre-subprime lending years, when growth in the private household debt was rising steadily (see Figure 1.10 in Chapter 1). The second period is associated with the acceleration of the subprime lending in the USA and the corresponding housing bubble (see Figure 1.12 in Chapter 1). The third period captures the post-crisis conditions, namely the fall in the aggregate household debt relative to the GDP. We expect that the impact of the relative holdings of the different types of assets and liabilities has changed over time, investigating statistically significant differences across estimates at 5% level between 1989-1998 and 2001-2007, as well as between 2001-2007 and 2010-2013. As in the case of the socio-demographic characteristics, we only describe results for the wealth composition variables and leverage, although the remaining estimates are displayed in Table 4.6. Estimates in bold indicate statistical difference across coefficients at 5% level according to the χ^2 test.

Among the asset composition variables, there is no statistically significant difference across subperiods in the estimates of the relative holdings of primary residence, vehicles and other non-financial assets, transaction accounts, and retirement and insurance assets. In contrast, the positive impact of a greater share of business equity and financial investment assets in total holdings has increased significantly in the subprime period. A one-percentage point rise in the relative holdings of business equity was associated with a 3.2 percentage point increase in the median income ratio in 2001-2007, which is significantly higher at 5% level that the estimate of 1.8 between 1989-1998. Similarly, the impact of a one-percentage point increase in the share of financial investment assets in total holdings on the median income ratio increased from 1.9 to 3.7 percentage points between the pre-subprime period and the subprime lending boom era. This reflects how the expansion and securitisation of subprime lending translated into higher returns and capital income increases for the holders of business equity and high-yielding financial assets.

Furthermore, the positive effect of a greater share of debt secured by other real estate in total liabilities rose significantly from 1.4 percentage points in the pre-subprime period to 2.9 in the subprime boom era. While we observe a parallel rise in the estimate of the relative holdings of mortgages secured by primary residence between these two periods from 0.08 (not statistically different from zero) to 0.5 (significant at 1% level), the difference is estimated not to be statistically significant at 5% level. This reflects the looser lending conditions in the subprime period, particularly in terms of mortgage lending. Moreover, we find that the effect of unsecured debt holdings on the median ratio did not change significantly over time.

In contrast, the post-crisis period marks a statistically significant decline in the negative impact of leverage on relative income. A one-percentage point increase in the debt-payments-to-income ratio was associated with a 2-percentage point decrease in the median income ratio in 2010-2013. This is lower in absolute terms than the estimate of -17 in the subprime era and signifies an increased role of leverage in determining the relative income ratio. This is paralleled by a rise in the relative income gap between extremely indebted households and those with the debt-service-to-income ratio below 40%, from 84.8 percentage points in the subprime boom era to 110.5 in the post-crisis period.

In addition to examining changes in the estimates of the balance sheet composition, we find that the estimated lower level of the median income ratio for Black and Hispanic households is explained by a large negative effect after the Great Recession. In the regression for 2010 and 2013, Blacks and Hispanics are estimated to have a 17.5 percentage point lower median income ratio compared to Whites and other ethnic groups, which is significant at 1% level. This is significantly different at 5% from the estimate of -1 and -1.7 between 1989-1989 and 2001-2007 respectively. Moreover, we observe that the goodness of fit of the proposed regression model according to the adjusted R^2 and RMSE is the most accurate for the subprime lending years compared to the other subperiods.

Comparing the above results with the quantile regression estimates, we observe that most of the coefficients are robust in terms of sign and significance. The pooled OLS estimates tend to be higher in magnitude than the quantile regression results. Unlike in the pooled OLS, the quantile regression coefficient of the relative holdings of primary residence is not statistically different from zero between 2001-2007, while the estimate of vehicles is statistically significant over 2010-2013. Moreover, the quantile regression coefficients of the relative holdings of financial investment and retirement and insurance assets are not statistically significant between 1989-1998. In addition, the coefficient of the relative holdings of transaction accounts is negative in all periods in the quantile regression, compared to the positive pooled OLS estimates. Furthermore, the coefficients of the relative holdings of instalment and credit card debt, and the debt-service-to-income ratio are not statistically different from zero between 1989-1998 and 2001-2007. In contrast, unlike in the pooled OLS, the estimates of the debt-to-income ratio and the debt-to-asset ratio are statistically significant at 1% level in the quantile regression in all periods. While the value of the coefficient of the debt-to-income ratio is close to zero, the estimate of the debt-to-asset ratio increases overtime from 0 in 1989-1998 to -1.9 in 2010-2013. Lastly, among household characteristics we observe differences in the pooled OLS and the quantile regression estimates for age, educational attainment, marital status, and the number of children.

Overall, analysis of the results of the pooled OLS regression across subperiods shows that while most of the estimates remain consistent in terms of their sign and significance across subperiods, the impact of balance sheet composition on relative inequality has changed over time. This is particularly vivid in terms of the increased effect of the relative holdings of business equity, financial investment assets, and debt secured by other real estate on the median income ratio in the subprime era. This is consistent with the finding of the stock-flow consistent model developed in Chapter 3 that securitisation is associated with higher levels of income and wealth inequality.

Table 4.6 Pooled OLS and quantile regression results by period

Median income ratio	*1989-2013 (POLS)*	1989-1998 (POLS)	2001-2007 (POLS)	2010-2013 (POLS)	*1989-2013 (QR)*	1989-1998 (QR)	2001-2007 (QR)	2010-2013 (QR)
Age	*7.75***	6.79***	8.18***	8.57***	*3.99***	4.35***	3.64	3.89***
	(0.407)	(0.763)	(0.771)	(0.686)	*(0.001)*	(0.000)	(0)	(0.001)
Age squared	*-0.06***	-0.05***	-0.07***	-0.07***	*-0.04***	-0.038***	-0.03***	-0.03***
	(0.004)	(0.009)	(0.007)	(0.007)	*(0.000)*	(0.000)	(0.000)	(0.000)
Educational attainment	*17.70***	**15.51***	**19.05***	20.75***	*8.74***	8.16	9.01	9.48***
	(0.435)	(0.715)	(0.762)	(0.806)	*(0.001)*	(0)	(0)	(0.003)
Female	*-20.47***	-21.81***	-20.68**	-18.98***	*-14.60***	-17.10***	-13.50***	-10.70***
	(4.689)	(7.557)	(10.080)	(4.581)	*(0.005)*	(0.003)	(0.080)	(0.014)
Black/Hispanic	*-5.79***	-1.02	-1.76	**-17.79***	*-5.77***	-7.24***	-3.61***	-7.83***
	(1.648)	(2.669)	(2.989)	(3.429)	*(0.003)*	(0.005)	(0.117)	(0.009)
Single	*-69.71***	-61.24***	-72.83***	-74.32***	*-47.70***	-45.00	-48.80	-51.00***
	(5.174)	(8.262)	(10.770)	(5.869)	*(0.006)*	(0)	(0)	(0.014)
Number of children	*18.23***	**8.72***	**23.97***	27.02***	*7.64***	5.23***	11.10	6.85***
	(2.047)	(3.008)	(3.671)	(4.649)	*(0.003)*	(0.006)	(0)	(0.011)
Number of children squared	*-2.38***	**-0.87**	**-3.72***	-3.23***	*-1.48***	-1.06***	-02.23	-1.04***
	(0.473)	(0.673)	(0.860)	(0.966)	*(0.001)*	(0.001)	(0)	(0.003)
Self-employed	*63.91***	68.90***	52.51***	68.64***	*0.76***	3.20***	4.46***	-4.05***
	(7.178)	(11.210)	(10.740)	(15.750)	*(0.011)*	(0.020)	(0.432)	(0.032)
Out of labour force	*-38.09***	-36.71***	-33.65***	-43.10***	*-27.80***	-25.80	-28.00***	-28.50***
	(3.551)	(5.264)	(7.444)	(5.741)	*(0.005)*	(0)	(0.112)	(0.008)
Primary residence	*-0.67***	-0.66***	-0.64***	-0.61**	*-0.42***	-0.40***	-0.39	-0.45***
	(0.113)	(0.150)	(0.230)	(0.263)	*(0.012)*	(0.009)	(0)	(0.023)
Vehicles	*-0.08*	-0.23	0.06	0.14	*-0.40***	-0.36	-0.36	-0.45***
	(0.109)	(0.144)	(0.228)	(0.270)	*(0.013)*	(0)	(0)	(0.028)
Business equity	*2.64***	**1.80***	**3.23***	3.63***	*0.31***	0.15***	0.42***	0.54***
	(0.202)	(0.297)	(0.350)	(0.471)	*(0.054)*	(0.050)	(1.01)	(0.146)
Financial investment assets	*2.87***	**1.85***	**3.64***	3.77***	*0.23***	0.16	0.35***	0.39***
	(0.184)	(0.248)	(0.409)	(0.393)	*(0.017)*	(0)	(0.345)	(0.039)
Transaction accounts	*0.42***	0.02	0.60**	0.95***	*-0.26***	-0.25***	-0.17***	-0.31***
	(0.130)	(0.144)	(0.269)	(0.329)	*(0.012)*	(0.010)	(0.358)	(0.028)
Retirement and insurance assets	*0.37***	0.26*	0.33	0.61**	*0.24***	0.16	0.30***	0.35***
	(0.113)	(0.154)	(0.241)	(0.254)	*(0.014)*	(0)	(0.288)	(0.033)
Debt secured by primary residence	*0.33***	0.08	0.49**	0.63***	*0.59***	0.64***	0.57	0.67***
	(0.158)	(0.270)	(0.192)	(0.234)	*(0.011)*	(0.008)	(0)	(0.040)
Debt secured by other real estate	*2.16***	**1.36***	**2.91***	2.59***	*1.11***	1.12***	1.29***	1.04***
	(0.238)	(0.353)	(0.469)	(0.407)	*(0.014)*	(0.086)	(0.567)	(0.045)

Instalment debt	*-0.83***	-0.93***	-0.74***	-0.77***	*0.01***	0.05	-0.03	0.05***
	(0.150)	(0.264)	(0.161)	(0.202)	*(0.010)*	(0)	(0)	(0.039)
Credit card balances	*-0.97***	-1.07***	-0.92***	-0.90***	*-0.04***	-0.01	-0.08	0.04***
	(0.151)	(0.268)	(0.161)	(0.208)	*(0.012)*	(0)	(0)	(0.040)
Debt-service-to-income ratio (DSY)	*-3.50***	-10.91**	-16.07***	**-1.93****	*-11.40****	-15.70	-13.50	-4.07***
	(1.495)	(4.798)	(3.254)	(0.985)	*(0.015)*	(0)	(0)	(0.012)
DSY>40%	*-96.49****	-85.63***	-82.47***	**-105.90****	*-47.10****	-45.50	-43.30***	-43.20***
	(3.030)	(5.133)	(7.949)	(6.937)	*(0.011)*	(0)	(0.141)	(0.015)
Debt-to-asset ratio	*-0.00*	**-0.04**	**-0.00**	-0.00	*-0.00****	0.00***	-1.01***	-1.86***
	(0.001)	(0.033)	(0.003)	(0.002)	*(0.000)*	(0.000)	(0.037)	(0.004)
Debt-to-income ratio	*-0.01*	-0.00	-0.69	-1.05	*0.00**	-0.0172***	0.00***	-0.00***
	(0.444)	(0.928)	(2.395)	(1.381)	*(0.001)*	(0.000)	(0.000)	(0.000)
1989 (base year)	(base)	(base)			*(base)*	(base)		
1992	*-18.44****	-18.02***			*-2.74****	-1.75***		
	(6.630)	(6.617)			*(0.006)*	(0.006)		
1995	*-22.91****	-23.90***			*-10.70****	-9.71		
	(6.522)	(6.521)			*(0.005)*	(0)		
1998	*-20.75****	-18.87***			*-11.50****	-9.75***		
	(7.031)	(7.135)			*(0.010)*	(0.005)		
2001	*-10.38*		(base)		*-12.00****		(base)	
	(8.039)				*(0.006)*			
2004	*-19.06****		-7.56		*-14.50****		-2.01***	
	(6.578)		(5.654)		*(0.008)*		(0.113)	
2007	*-5.60*		5.64		*-14.00****		-1.30***	
	(6.749)		(6.272)		*(0.007)*		(0.125)	
2010	*-10.56*			(base)	*-11.80****			(base)
	(6.671)				*(0.007)*			
2013	*2.31*			13.42***	*-10.30****			1.03***
	(6.868)			(4.883)	*(0.005)*			(0.007)
Constant	*-223.50****	-134.20***	-285.00***	-338.30***	*-52.00****	-56.6	-59.4	-73.5***
	(22.160)	(32.680)	(35.920)	(39.310)	*(0.021)*	(0)	(0)	(0.071)
Observations	*30,219*	11,322	9,856	9,041	*30,219*	11,322	9,856	9,041
Adjusted R-squared*	*0.065*	0.045	0.091	0.075	*0.219*	0.226	0.221	0.214
Root Mean Squared Error	*541.6*	570.4	484.0	569.7				

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.190

Note: Pairs of estimates in bold indicate that the difference between coefficients of 1989-98 and 2001-07 as well as 2001-07 and 2010-13 regressions is statistically significant at 5% level.
*Due to methodological assumptions of the quantile regression, we report the pseudo-R^2 for the quantile regression and the adjusted R^2 for the pooled OLS regression.

4.3.5. Non-parametric sensitivity analysis

The pooled OLS estimation finds that greater relative holdings of business equity, financial investment assets, and secured debt are associated with higher position of a household in the distribution of income relative to the median. In contrast, greater reliance on primary residence, transaction accounts, and unsecured debt pushes household income away from the median towards the bottom of the distribution. The statistical significance of these estimates indicates that the implication of the stock-flow model developed in Chapter 3, namely that household wealth heterogeneity increases inequality, is empirically validated. Moreover, we find that the magnitude of the positive effects of the relative ownership of business equity and financial investment assets was boosted in the subprime lending era between 2001-2007, and has not been shared equally across gender, race, and generations. Instead, debt composition and leverage are found to be associated with higher increases in the relative position along the income distribution of these groups. This is consistent with the discussion of the Post-Keynesian analyses of consumption in Chapter 2, which linked the increasing indebtedness of women, ethnic minorities, and the young to wealth disparities arising due to the processes of securitisation and subprime lending. Similar finding is observed for the typical median household in the quantile regression, whose estimates tend to be of lower magnitudes compared to the pooled OLS regression, particularly for the relative holdings of primary residence and transaction accounts.

In this section we evaluate the sensitivity of these findings to the assumptions of the regression method. We argue that while the U.S. Survey of Consumer Finances carries the benefit of a detailed analysis of household wealth, the complexity of the data structure results in a likely violation of many of the standard regression assumptions regarding endogeneity and non-spherical errors. Software limitations restrict the possibility of using traditional methods addressing these issues. Moreover, the OLS methodology relying on mean averages in calculating the estimates may inflate some coefficients due to its sensitivity to the extreme values of wealth. Thus, to provide a robustness check to the pooled OLS and the quantile regression results, we compare these estimates with results of the non-parametric Theil-Slope median ratio.

The Theil-Sen median slope is defined as the median of all slopes calculated between each pairs of datapoints of any two variables[64] (Theil 1950; Sen 1968). Its interpretation is similar to the regression coefficient as the unit change in the outcome variable given a unit increment in the predictor variable. The difference between the non-parametric and the regression-based slope is

[64] The analysis is conducted using STATA package *censlope* developed by Newson (2006).

that the non-parametric gradient is based on the calculation of a rank parameter rather than the conditional distribution estimation. It thus avoids problems associated with the violation of the assumptions regarding the error term, which are likely to be encountered in a complex dataset such as the U.S. Survey of Consumer Finances (Granato 2006). Moreover, the Theil-Sen median slope is by definition more robust to outliers than the OLS estimates.

To gauge the preciseness of the median slope estimates, we report confidence intervals[65] which are robust to differences in the conditional population distribution of the median income ratio (e.g. its unequal variance), given the different values of our explanatory variables (Newson 2012).

Given the outcome variable Y, the predictor variable X, and a proportion $q \in (0,1)$ The Theil-Sen median slope is defined as β in equation 4.2:

$$\theta(Y - \beta X, X) = 1 - 2q \tag{4.2}$$

Where θ is a rank correlation coefficient Somers' D (Somers 1962) and q=0.5[66,67]. Given the definition of Somers' D $D(Y|X)$, the Theil-Sen median slope satisfies the following property (equation 4.3):

$$\begin{aligned} 1 - 2(0.5) &= D(Y - \beta X | X) \\ 0 &= \Pr(Y_1 - \beta X_1 < Y_2 - \beta X_2) - \Pr(Y_1 - \beta X_1 > Y_2 - \beta X_2) \\ \Pr\left[(Y_2 - Y_1)/(X_2 - X_1) < \beta\right] &= \Pr\left[(Y_2 - Y_1)/(X_2 - X_1) > \beta\right] \end{aligned} \tag{4.3}$$

This means that a pairwise slope $(Y_2–Y_1)/(X_2–X_1)$, where $Y_1<Y_2$ and $X_1<X_2$, is equally likely to be above or below β. We assume that the Theil-Sen median slope follows the t-distribution.

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[65] Due to the construction of the *censlope* module, confidence intervals for the Theil-Sen median slope are calculated using the jackknife standard errors. The main difference between the two methods is that the jackknife procedure is less computationally intensive compared to the bootstrapping technique as it uses less replicates (cf. Schiel 2011).

[66] The alternative parameter which is more commonly used in the rank defining literature is the Spearman correlation coefficient (Spearman 1904). However, it is not suitable to be analysed in the survey data setting, and its confidence intervals are less reliable and interpretable (Kendall/Gibbons 1990). The main difference between the Spearman coefficient and Somers D is that the former is calculated as the product-moment correlation between the cumulative distribution functions of two variables rather than the probabilities of concordance/discordance (see next footnote; Newson 2001).

[67] Given two random variables U and V, Somers' D $D(U|V)$ is a conditional probability of concordance or discordance between two ordered pairs of U and V (U_1, U_2) and (V_1,V_2), where $U_1<U_2$ and $V_1<V_2$ (Newson 2001:2). U and V are concordant if the larger of the two values of U is associated with a greater value of V, and they are discordant if the larger U-value is related to a smaller of the two values of V. Similarly to other correlation coefficients $D(U|V) \in (-1,1)$.

The additional advantage of this non-parametric approach is the ability to evaluate the relationship between relative inequality and the relative holdings of assets and liabilities which had to be excluded from the regression model due to the multicollinearity issues associated with the construction of the balance sheet composition variables. This include the share of other property in total assets, as well as the shares of other unsecured lines of credit and other debt in total liabilities.

Table 4.7 presents estimates of the Theil-Sen median slope for the balance sheet composition variables and the socio-economic controls in the whole sample. We describe the results for balance sheet composition variables, comparing the non-parametric slope with the OLS and the quantile regression estimates. The robustness analysis reveals consistency in the direction of the relationship estimated in the pooled OLS regression across majority of the balance sheet composition variables. Exceptions include estimates for the relative holdings of primary residence, debt-service-to-income ratio, debt-to-asset ratio, and debt-to-income ratio, which are positive. Similarly, the median slope of the relative transaction asset holdings is positive (unlike in the quantile regression). Among socio-economic controls, all of the median slope estimates apart from age and the number of children squared are consistent in sign with the earlier estimation methods. We find a negative non-parametric association between age and the median income ratio, while the median slope of the number of children squared is positive.

In terms of variables which are excluded from the regression analysis, the median slope estimate of the relative holdings of other property shows that a one-percentage point rise in the share of this asset in total holdings is associated with a 2.9 percentage point increase in the median income ratio. The magnitude of this effect is higher compared to the greater relative holdings of primary residence and vehicles, and is closer to the impact of business equity and financial investment assets. In addition, debt variables excluded from the regression analysis are found to be positively related to the median income ratio in terms of the median slope. A one-percentage point rise in the share of other unsecured lines of credit it total debt is associated with a 1.2 percentage point increase in the median income ratio, while a parallel increase in the relative holdings of other debt is estimated to raise the median ratio by 0.2 percentage points.

Table 4.7 Theil-Sen median slope

Median income ratio	**Theil-Sen median slope**	***95% confidence interval***		Pooled OLS	Quantile regression
		Lower	*Upper*		
Socio-economic controls					
Age	-0.11	*-0.12*	*-0.01*	7.75	3.99
Age squared	-0.00	*-0.00*	*-0.00*	-0.06	-0.04
Educational attainment	14.15	*14.06*	*14.23*	17.70	8.74
Female	-65.05	*-65.56*	*-64.47*	-20.47	-14.60
Black/Hispanic	-40.71	*-40.98*	*-40.51*	-5.79	-5.77
Single	-76.38	*-76.95*	*-75.87*	-69.71	-47.70
Number of children	13.19	*13.13*	*13.27*	18.23	7.64
Number of children squared	5.15	*5.11*	*5.17*	-2.38	-1.48
Self-employed	50.04	*49.81*	*50.47*	63.91	0.76
Out of labour force	-54.40	*-54.53*	*-54.30*	-38.09	-27.80
Share of total assets					
Primary residence	0.23	*0.23*	*0.24*	-0.67	-0.42
Other property	2.95	*2.93*	*2.97*	*(omitted)*	
Vehicles and other non-financial assets	-0.48	*-0.49*	*-0.47*	-0.08	-0.40
Business equity	3.05	*3.02*	*3.08*	2.64	0.31
Financial investment assets	2.66	*2.61*	*2.71*	2.87	0.23
Transaction accounts	0.20	*0.19*	*0.21*	0.42	-0.26
Retirement and insurance assets	2.88	*2.84*	*2.91*	0.37	0.24
Share of total debt					
Debt secured by primary residence	0.74	*0.73*	*0.74*	0.33	0.59
Debt secured by other property	2.38	*2.35*	*2.40*	2.16	1.11
Instalment debt	-0.43	*-0.44*	*-0.43*	-0.83	0.01
Credit card balances	-0.39	*-0.40*	*-0.39*	-0.97	-0.04
Other unsecured lines of credit	1.23	*1.19*	*1.27*	*(omitted)*	
Other debt	0.24	*0.21*	*0.27*	*(omitted)*	
Leverage measures					
Debt-service-to-income ratio (DSY)	109.99	*109.50*	*110.49*	-3.50	-11.40
DSY > 40%	-31.38	*-31.83*	*-31.01*	-96.49	-47.10
Debt-to-asset ratio	27.59	*27.19*	*27.99*	-0.00	0.00
Debt-to-income ratio	22.91	*22.80*	*23.01*	-0.01	-0.00

Note: Confidence intervals are constructed using the jackknife standard errors.

In addition to the whole sample, we analyse robustness of the linear regression analysis by subgroup. Table A3.3 in Appendix III compares the Theil-Sen median slopes across gender, race, generations, and subperiods. We find that most of the estimates are robust in terms of their sign and significance, and the relative size between subgroups. Similarly to the whole sample median slopes, we find that the coefficients of the debt-service-to-income ratio, the debt-to-asset ratio, the debt-to-income ratio, and the relative holdings of primary residence are positive in the non-parametric estimation, compared to the negative regression coefficients. Moreover, the Theil-Sen

median slope of the relative holdings of retirement and insurance assets is positive for the subsample of Blacks/Hispanics and in each subperiod (compared to the generally negative regression coefficients). Similarly, the median slope of the relative holdings of transaction accounts is positive across gender and generations compared to the negative regression estimates. We also find that the median slope of the relative holdings of vehicles is positive for the subsample of women, while the regression estimates are negative. Furthermore, unlike the regression coefficients, the estimated median slopes of the relative holdings of financial investment assets and transaction accounts are found to be greater among Blacks/Hispanics than for Whites/Other ethnicities. We also observe the non-parametric estimates of the relative holdings of instalment debt, as well as credit card balances for gender and subperiods to be negative compared to the positive regression coefficients. Moreover, among the socio-economic controls, we find the median slope of age to be negative across race, for households younger than 35, and over 1989-1998 and 2001-2007, compared to the positive regression coefficients.

Among variables not included in the regression analysis, we find that a one-percentage point increase in the relative holdings of other property has a larger impact on the relative position in the income distribution of 3 percentage points for males, Whites/Other ethnicities, and households aged 35 and above. This effect is estimated to be lower at 1.1 percentage points for female households, 2 percentage points for Blacks/Hispanics, and 1.5 percentage points for households younger than 35. Moreover, we observe overall positive effects of the greater relative holdings of the other types of debt on the median income ratio. These are estimated to be higher at approximately 1-2 percentage points for the other unsecured lines of credit, and 0.3-0.5 for other debt in the subsamples of males, Whites/Other ethnicities, households aged 35 and above, and over 1989-1998, while the median slopes for the remaining subgroups are estimated to be below 1.

In sum, the sensitivity analysis using the non-parametric estimation of the Theil-Sen median slope supports our main finding regarding the asymmetric impact of the balance sheet composition on relative income inequality. We observe larger differences in the estimated values between the OLS and the quantile regression results, while the median slope coefficients of the non-parametric approach are more consistent with the OLS estimates. The greatest disparities between these two methods are found for the share of primary residence in total assets and the debt-service-to-income ratio, both of which have opposite signs to the regression estimates. In addition, the non-parametric median slope estimation allows us to account for the impact of the relative holdings of other property, other unsecured lines of credit, and other debt, which are excluded from the regression analysis due to multicollinearity issues. We find that these balance sheet items are positively associated with the median income ratio.

4.3.6. Summary

The linear regression analysis established a statistically significant relationship between household wealth heterogeneity and relative income inequality using the nine waves of the U.S. Survey of Consumer Finances between 1989 and 2013. We confirmed the finding of the stock-flow consistent model which stated that balance sheet heterogeneity influenced inequality by generating unequal flows of capital income related to the returns to wealth dependent on the absolute size of wealth holdings. Moreover, we tested this conclusion across the social dimensions of inequality, finding that debt composition and leverage contribute more than asset holdings to the relative position of households headed by women, Blacks/Hispanics, and the young in the income distribution. The originality of our analysis was to apply the existing estimation methods in a new way to establish a significant empirical link between balance sheet composition and relative income inequality, highlighting its intersectional dimension. Nevertheless, the issues of endogeneity, omitted variable bias, and non-spherical residuals may pose problems to the consistency and unbiasedness of our estimates.

We showed that greater reliance on primary residence, unsecured debt, and higher leverage in household balance sheets was significantly associated with lower position in the income distribution relative to the median. In contrast, greater contribution of financial investment assets, business equity, and secured debt to total asset and debt holdings respectively was significantly associated with higher relative position in the income distribution. However, these effects were significantly smaller for households headed by women, Blacks/Hispanics, and the young. We found that the magnitude of the positive effects of the relative holdings of business equity and financial investment assets increased in the subprime lending boom era between 2001-2007 compared to the period 1989-1998. Thus, we supported the proposition of the stock-flow consistent model from Chapter 3 that the impact of household wealth composition on inequality was magnified by the processes of securitisation and subprime lending in that period.

Most of these results were found to be robust in terms of significance and sign when compared to the estimates of the non-parametric Theil-Sen median slope and the quantile regression. Results of the Theil-Sen median slope estimation showed that the magnitudes of the majority of the pooled OLS estimates were not substantially influenced by extreme values or problems with the regression assumptions about the error term. Some notable exceptions included the relative holdings of primary residence, mortgages secured by primary residence, and the debt-service-to-income ratio, whose effects on relative inequality were higher when estimated by the median slopes.

Moreover, the lower values of the asset composition variables estimated in the quantile regression suggested that the magnitudes of the positive effects of greater relative asset holdings were stronger for households towards the top of the income distribution. Conversely, relative income in the quantile regression was found to be significantly increased by the greater relative holdings of instalment loans, which lowered the household position in the income distribution in the pooled OLS estimation. Moreover, the negative effect of higher leverage on relative income was magnified in the quantile regression, being particularly detrimental for the bottom quintile.

Overall, the estimated asymmetric magnitudes of the balance sheet composition variables indicated that the increases in relative income due to the greater relative holdings of assets (particularly business equity and financial investment assets) were higher among households headed by men, Whites, and those over 35 years old. Based on the analysis in Chapter 1, we observed that these groups owned higher levels of wealth between 1989-2013. Consequently, we confirm that the size of the payoffs from owning particular types of wealth are related to the absolute value of wealth holdings. This is also evident in the higher magnitudes of the mean-based OLS estimates compared to the median quantile regression, and the higher quantile regression coefficients of asset composition for the 90^{th} percentile.

In sum, having established the statistical significance of our research hypothesis formalised in the stock-flow consistent model in Chapter 3, in the next section we decompose income and wealth inequality by their components. The inequality decomposition analysis allows us to assess the relative contribution of the different balance sheet items to inequality. Moreover, it facilitates the examination of the role of wealth composition in influencing inequality across gender, race, and generations, which was highlighted by the Post-Keynesian analysis of consumption discussed in Chapter 2 but could not be incorporated into the stock-flow consistent model due to its aggregation. Simultaneously, we can test the validity of the proposed conceptualisation of the household sector in the Chapter 3 model by decomposing the wealth and income gap between different parts of the income distribution by wealth components and the associated income sources.

4.4. Inequality decomposition analysis

In the previous section we established the statistical significance of the impact of balance sheet composition on relative inequality, finding substantial asymmetric effects across the distribution, gender, race, and generations, particularly in terms of the relative holdings of business equity, financial investment assets, unsecured debt, and leverage. This part of the chapter aims to formally assess the contribution of different assets and liabilities and their associated income flows to the overall measures of income and wealth inequality. We thus evaluate the implication of the earlier

stock-flow consistent model regarding the role of the specific patterns of wealth accumulation in driving the overall measures of inequality analysed in the model, arising due to disparities in the returns to wealth and leverage across households determined by the absolute size of wealth holdings. Moreover, we address the limitation of the stock-flow consistent model regarding its inability to incorporate the intersectional dimension of inequality by explicitly focusing on the determinants of income and wealth distribution across gender, race, and generations. In addition, by decomposing the wealth and income gap between the different parts of the income distribution, we gauge the validity of the proposed balance sheet composition underpinning the three-class conceptualisation of households in the model in Chapter 3.

The inequality decomposition analysis is conducted in three parts to account for the impact of the components of income and wealth as well as the socio-economic characteristics of households. Firstly, we apply the Shorrocks (1982) factor decomposition, which typically compares variance of the income factor sources to the variance of total income[68]. The main innovation of our analysis is to extend the decomposition approach to examine the contribution of factor sources to wealth inequality. Secondly, Fields's (2003) regression-based decomposition is utilised to analyse the variance of income and wealth relative to their factor sources controlling for socio-economic characteristics of households[69]. Thirdly, we undertake a comprehensive analysis of the determinants of income and wealth disparities across gender, race, generations, as well as between specific parts of the income distribution using the Oaxaca-Blinder decomposition[70]. The chapter concludes with a comparative evaluation of the regression techniques and the non-parametric methods as tools to analyse inequality through the lens of household wealth composition, arguing that endogeneity problems pose a persistent problem in the regression-based analyses.

The main advantage of the decomposition analysis is the possibility to directly evaluate the contribution of each type of asset and debt and their related income flows to wealth and income inequality. For this reason, the inequality decomposition analysis is conducted separately for income and wealth, each broken down by its factor source. Income is decomposed into wages and capital income earned on different types of wealth (business income, capital gains or losses, taxable and non-taxable interest and dividend income, social security and pension income), as well

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[68] Shorrocks decomposition is implemented in STATA using package *ineqfac* developed by Jenkins (2009).
[69] Fields regression-based decomposition is implemented using STATA module *ineqrbd* developed by Fiorio/Jenkins (2008).
[70] Oaxaca-Blinder decomposition is analysed using STATA module *oaxaca* developed by Jann (2008).

as income from transfers and other sources. Moreover, net wealth is broken down into non-financial assets (primary residence, other real estate, business equity, vehicles and other non-financial assets), financial assets (transaction accounts, financial investment assets, retirement and insurance assets), as well as secured debt (mortgages secured by primary residence and by other property), unsecured debt (instalment loans, credit card balances, and other unsecured lines of credit), and other debt from miscellaneous sources.

Unlike in the linear regression analysis in the previous section, the balance sheet variables in the decomposition analysis are presented in terms of their absolute magnitudes rather than shares in total holdings. This is because the statistical techniques underpinning inequality decomposition do not encounter the problem of the trivial association between the absolute values of income and balance sheet items encountered in the regression analysis. Moreover, the contribution of disparities in the absolute values to the overall inequality measures is more easily interpretable in the decomposition method than the balance sheet composition variables constructed in the linear regression analysis.

The reason for applying more than one decomposition approach in our analysis is that each technique sheds light on the different drivers of inequality. The use of multiple decomposition techniques is common in the inequality decomposition literature (Thompson/Suarez 2015; Brewer/Wren-Lewis 2016). Non-parametric methods such as the Shorrocks decomposition examine which components contribute the most to inequality of an additive concept of income and wealth. Thus, they provide an exhaustive and consistent insight into factor decomposition, avoiding assumptions about the error term of the data generating process. On the other hand, if any of the components are correlated, the non-parametric methods cannot evaluate which factor is more important (Brewer/Wren-Lewis 2016:292). This is addressed using the multivariate regression-based decomposition of Fields (2003), where all factors are considered simultaneously and income/wealth are derived conditionally rather than additively. Moreover, the Fields regression-based approach can assess the impact of other factors on inequality, such as the socio-economic characteristics of households, which is not possible in the additive non-parametric method. However, while accounting for the overall contribution of the socio-economic variables to inequality, the Fields regression-based decomposition cannot evaluate which factors contribute more to inequality across subgroups. To answer this question, subgroup decomposition methods such as the Oaxaca-Blinder approach are applied.

4.4.1. Shorrocks decomposition

To quantify the contribution of wealth composition and its associated income flows to income and wealth inequality, we use Shorrocks (1982) decomposition. It allows us to test the implication of

the stock-flow consistent model from Chapter 3 by evaluating the extent to which the proposed heterogeneity of wealth contributes to inequality.

The decomposition method developed by Shorrocks (1982) has been traditionally applied to analyse income (Schmid 1994; Heshmati 2004; Frassdorf *et al*. 2011; Brewer/Wren-Lewis 2016). This approach breaks down the level of inequality in a given period according to a natural decomposition rule where total income is a sum of its factor components (Cowell/Fiorio 2011:514). It is non-parametric as it does not consider the distribution of income conditional on its factors.

An important property of the Shorrocks decomposition is that it is invariant to the measure of inequality used (*ibid*.). Assuming that total income Y is the sum of a k number of components Y_k (equation 4.4), inequality measure $I(Y)$ can be divided into k components S_k corresponding to the absolute contribution of each income factor to inequality (equation 4.5; Fields 2003).

$$Y = \sum_{k=1}^{k} Y_k \tag{4.4}$$

$$I(Y) = S_k(\sum_{k=1}^{k} Y_k; K) \tag{4.5}$$

The relative factor inequality weight s_k (equation 4.6) is the proportionate contribution of inequality in each factor S_k to the overall inequality measure $I(Y)$. Assuming that the inequality measure $I(Y)$ is symmetric, continuous, and would be equal to zero if all members of the population received the same amount of income (Fields 2003), the relative factor inequality weight s_k can be expressed as the ratio of the covariance of the total income and the k-th income component to the variance of total income (equation 4.7; Brewer/Wren-Lewis 2016). Inequality weights of all factors are assumed to sum to 1 (equation 4.8).

$$s_k = \frac{S_k}{I(Y)} \tag{4.6}$$

$$s_k = \frac{cov(Y_k,Y)}{var(Y)} \tag{4.7}$$

$$\sum_{k=1}^{k} s_k = 1 \tag{4.8}$$

For this property to hold it is additionally assumed that the amount of inequality attributable to any one factor is not dependent on how the remaining factors are grouped, and that any two factors whose distributions are proportionate to each other should yield the same value of the relative contribution to inequality (*ibid*.).

The above assumptions are fulfilled by most of the inequality measures conventionally used in the literature, such as the Gini index, the Atkinson index, the generalised entropy indices, the coefficient of variation, and centile measures (Fields 2003).

In the analysis below, we first decompose net worth inequality by its source. Then, the Shorrocks decomposition is applied to the inequality of income net of debt payments. The default inequality measure chosen for this analysis is the coefficient of variation, which was also used in the stock-flow consistent model in Chapter 3. The reason behind the choice of this indicator is its decomposability (see section 1.1. in Chapter 1) and ability to encompass both income and wealth, resulting in a more consistent comparison of inequality decomposition across these two concepts. Moreover, we report the mean share of each factor to the overall income or wealth and compare this to the inequality contribution of each component.

Figure 4.2 below and Table A3.4 in Appendix III present results of the Shorrocks decomposition for net wealth. Because of the definition of net wealth, the contribution of debt to wealth inequality is negative, with higher absolute values signifying higher contribution to inequality. We find that secured debt contributed -0.9% to net wealth inequality in 1989, rising to -1.5% in 2010 in absolute terms before settling back at -0.9% in 2013. The contribution of unsecured debt was -0.6% in 1989, peaking at -1.1% in 1992 and turning positive at 0.3% in 2013. The contribution of other debt fell in absolute terms from -0.2% in 1989 to -0.1% in 2013.

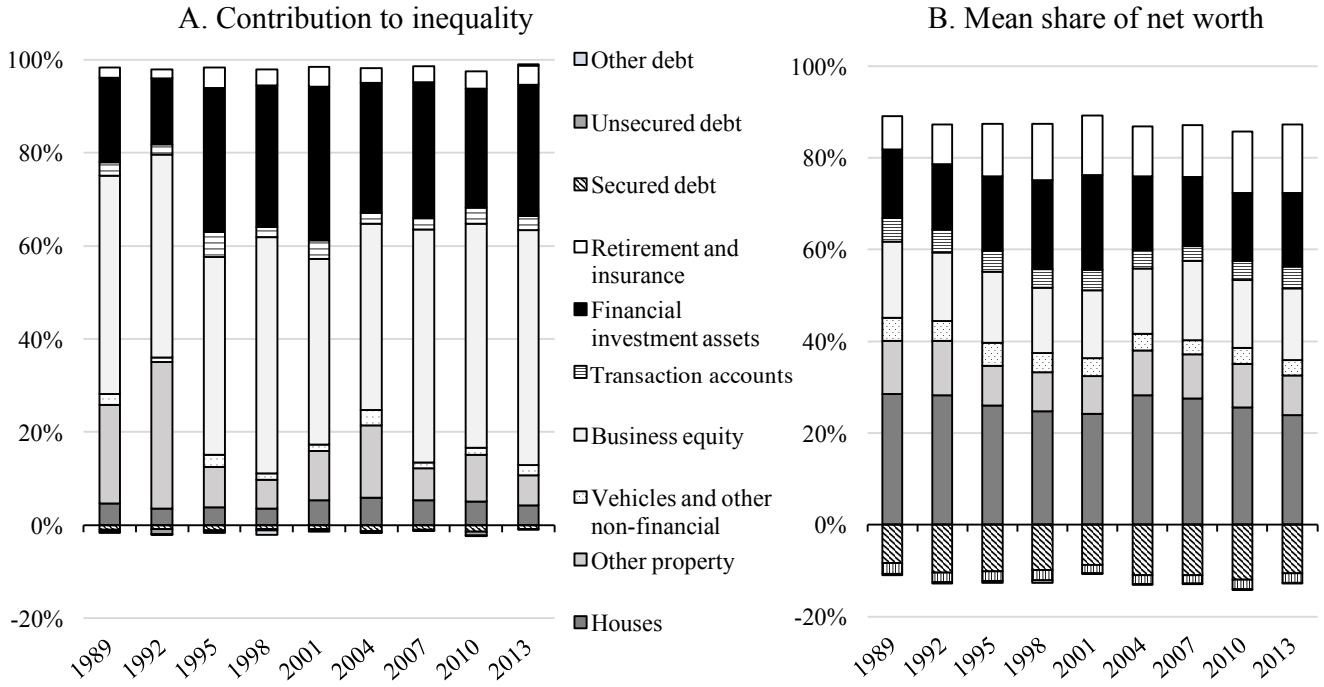
Among non-financial assets, the contribution of business equity to the inequality of net worth increased from 48.5% in 1989 to 51.5% in 2013, while the contribution of other real estate fell from 21.9% to 6.5% in the same period. Primary residence contributed 4.7% to net worth inequality in 1989, peaking at 6% in 2004 before settling at 4.3% in 2013. The contribution of vehicles and other non-financial assets to net worth inequality fluctuated between 1%-3% in the period.

Among financial assets, the contribution of financial investments assets to net wealth inequality rose from 18.8% in 1989 to 33.9% in 2001, falling to 28.7% in 2013. Transaction accounts were the second largest factor among the financial assets, contributing an average of 3.2% to net worth inequality between 1989-2013, peaking at 5.5% in 1995. Finally, retirement and insurance assets increased their contribution to net wealth inequality from 2.3% in 1989 to 4.2% in 2013.

The contribution to inequality differs from the overall mean share of net wealth of the various assets and debt. Primary residence is estimated to be the largest component of net worth, with the share rising from 36.4% in 1989 to 38.4% in 2004 before decreasing to 32.2% in 2013. The share of business equity increased from 21.4% of net worth in 1989 to 23.2% in 2007, falling to 20.9% in 2013. The share of other real estate in net worth declined from approximately 15% in 1989 and 1992 to 11.5% in 2013. Similarly, the share of vehicles and other non-financial assets in net worth decreased from 6.3% in 1989 to 4.5% in 2013. Among financial assets, the share of net

worth attributed to financial investments assets rose from 19.1% in 1989 to 26.5% in 2001, decreasing to 21.6% in 2013. In contrast, the share of retirement and insurance assets increased steadily from 9.3% in 1989 to 19.9% in 2013. The share of transaction accounts in net worth fluctuated between 4.4% and 6.6% in the period. Moreover, the share of secured debt in net worth increased in absolute terms from -10.6% in 1989 to -16.7% in 2010, falling to -14.2% in 2013. In contrast, the share of unsecured debt remained more stable, fluctuating between -2.2% to -3% in the period. Finally, the mean share of other debt in net worth more than doubled in absolute terms from -0.3% in 1989 to -0.7% in 1998, falling to -0.2% in 2013.

Figure 4.2 Shorrocks decomposition for net wealth, USA 1989-2013



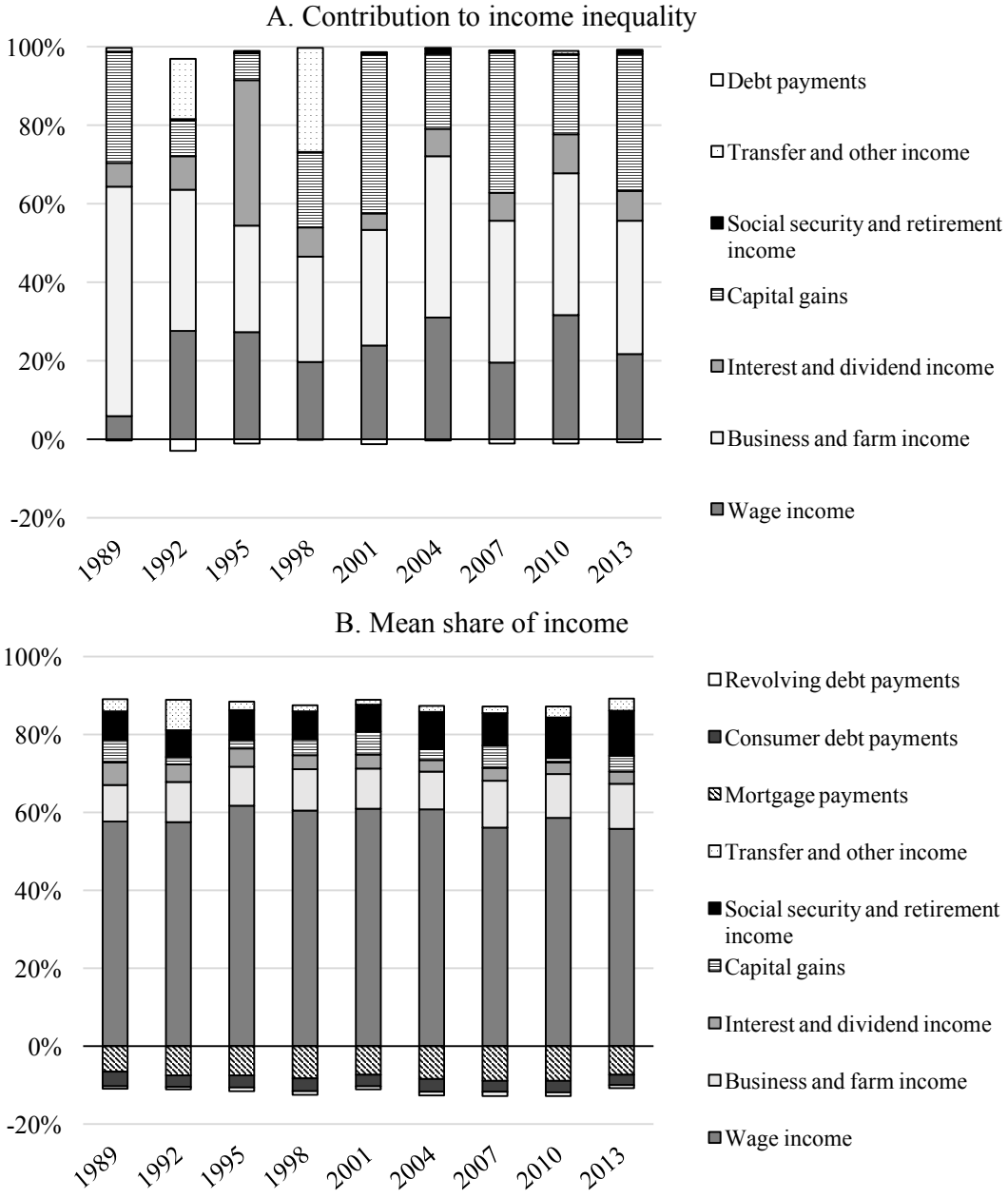
The contribution of balance sheet variables to net wealth translated into income inequality through disparities in capital income. Figure 4.3 presents results of the Shorrocks inequality decomposition for income between 1989 and 2013. Overall, results show that business income, capital gains, and wages contributed the most to income inequality in the period. The contribution of business income fell from 58.7% in 1989 to 27% in 1998, after which it increased to 41.4% in 2004 and declined again to an average of 30.9% between 2007-2013. Furthermore, the contribution of capital gains to income inequality was almost a third at 28.4% in 1989, falling to 6.9% in 1995. While the data doesn't allow us to decompose the contribution of capital gains further, we suspect that its observed fluctuations represent volatility of stock and house prices. Moreover, the contribution of disparities in wages to overall income inequality increased from 6% in 1989 to 32.4% in 2010, falling to 22.1% in 2013.

Among the remaining income sources, the contribution of interest and dividend income to the overall income inequality increased from 6.1% in 1989 to 7.6% in 2013, peaking at 37.8% in 1995. The contribution of social security and retirement income to income inequality rose from 0.2% in 1989 to 0.6% in 2013, peaking at 1.3% in 2004. Furthermore, the contribution of transfer income decreased from 0.9% in 1989 to 0.4% in 2013, although it reached 16.4% and 26.7% in 1992 and 1998 respectively. Finally, the contribution of debt payments increased from -0.3% in 1989 to -0.8% in 2013 in absolute terms, peaking at -3.6% in 1992[71]. Table A3.5 in Appendix III presents a more detailed breakdown of the contribution of debt to inequality, showing that among the various types of debt it is mortgage payments which contribute the most to inequality, followed by consumer debt and revolving debt payments (with the exception of the 1989 wave).

As in the case of net worth, Panel B in Figure 4.3 shows that the contribution of the different income sources to inequality did not correspond to the mean share of each component to net income in our sample. The estimated mean shares were more stable over time than the relative factor inequality weights presented in Panel A in Figure 4.3. The share of wages in total net income increased from 73.9% in 1989 to 81.4% in 2004, declining to 71.2% in 2013. The share of business income in total net income rose from 12% in 1989 to 16.3% in 2007, falling to 14.8% in 2013, while the share of interest and dividend income declined from 7.4% in 1989 to 3.9% in 2013. The share of capital gains relative to income fluctuated more visibly in the period, peaking at 7.8% in 2007. In turn, the share of social security and retirement income in total net income grew from 9.3% in 1989 to 14.7% in 2013. The share of transfer and other income in total net income averaged 3.7% between 1989-2013, peaking at 9.9% in 1992. Finally, the share of mortgage payments rose in absolute terms from -8.3% in 1989 to -12% in 2007, falling to -9.4% in 2013, while the share of consumer debt payments remained approximately constant at 4% over the period. The share of revolving debt payments increased in absolute terms from -0.8% in 1989 to -1% in 2013.

[71] Recall that decomposition here is conducted for income net of debt payments, hence debt contributes negatively to income inequality by definition. Hence, the greater the absolute value of the estimated contribution of debt, the higher its contribution to inequality.

Figure 4.3 Shorrocks decomposition for income, USA 1989-2013



Overall, results of the Shorrocks decomposition reveal that assets, specifically business equity and financial investment assets, contribute more to wealth inequality than debt. This is connected with income inequality, which is estimated to be determined primarily by capital income flowing from business ownership and capital gains, and increasingly by wage income.

In the next subsection, we apply the regression-based inequality decomposition of Fields (2003) to analyse how the above results hold when income and wealth are estimated conditionally rather than additively. In this way, we consider the correlated determinants of inequality associated with its social dimension, controlling for the impact of household socio-economic characteristics on the contribution of balance sheet items to inequality.

4.4.2. Regression-based inequality decomposition

The regression-based inequality decomposition (RBD) treats the factor components of income or wealth as explanatory variables in a regression model. It is based on Fields (2003), who draws from Shorrocks (1982) non-parametric decomposition. The advantage of a parametric decomposition such as RBD is its ability to consider the role of correlated factors such as household socio-economic characteristics in determining inequality, which cannot be included in the non-parametric additive method of Shorrocks (Heshmati 2004).

The RBD technique follows the estimation of a linear regression model (equation 4.9) using OLS. At any point in time:

$$z_i = \sum_{k=0}^{N} \beta_k x_{k,i} + \epsilon_i \tag{4.9}$$

Where z_i is the natural logarithm of the dependent variable Z_i for each observation (equation 4.10), which in our analysis is either income or net wealth at the household level, $x_{k,i}$ is a set of explanatory variables which influence Z_i, and ϵ_i is the residual term.

$$z_i = \ln (Z_i) \tag{4.10}$$

To maintain consistency with the earlier decomposition analysis, regressors correspond to the aforementioned sources of income and wealth. While the intercept is included in the linear regression, it is not used for the decomposition analysis as it is constant for each observation. Importantly, the residual contribution to inequality unexplained by the proposed regression model is included[72].

RBD assesses the contribution of the variance of each regressor times its corresponding coefficient squared, and the covariance between explanatory variables to the overall variance in the dependent variable. Similarly to the Shorrocks decomposition, RBD assesses the contribution of the regressors to inequality of the dependent variable by estimating the relative inequality weight s_k for each explanatory variable. In fact, RBD is analogous to the Shorrocks decomposition when the product of each explanatory variable and its coefficient $\beta_k x_{k,i}$ is considered as one factor (Brewer/Wren-Lewis 2016:294). Thus, the relative inequality weight s_k of the estimated composite component $\hat{\beta}_k x_{k,i}$ can be expressed as the ratio of the covariance of that component with the mean dependent variable z to the estimated variance of z (4.11).

[72] An alternative approach to RBD not adopted in this chapter is to perform decomposition on the predicted regression, which evaluates the contribution of each right-hand side component of the regression equation to inequality in the predicted values of the dependent variable, omitting the error term.

$$s_k = \frac{cov(\hat{\beta}_k x_{k,}, z)}{\hat{\sigma}^2(z)} \tag{4.11}$$

Thus, as in the Shorrocks decomposition, the underlying measure of inequality does not influence the result in the RBD method (Fields 2003).

The majority of studies apply RBD to explain income inequality (cf. Heshmati 2004; Cowell/Fiorio 2011). The original feature of the analysis in this chapter is to extent RBD to analyse the determinants of wealth inequality, accounting for balance sheet variables and household characteristics.

Table 4.8 presents results of the Fields decomposition for net wealth[73]. The residual component contributes more than one third to inequality in net wealth in each wave. Such significant contribution of the residual term to inequality of the dependent variable is common in the literature (cf. Brewer/Wren-Lewis 2016). The contribution of balance sheet variables was 14.4% in 1989, rising to 15.5% in 2004, and decreasing to 12.9% in 2013. Household characteristic contributed 48.2% to wealth inequality in 1989, increasing to 50.3% in 2004, and falling to 47.7% in 2013.

Among the balance sheet variables, results of the Fields decomposition uphold the finding that assets contribute more to inequality than debt established in the Shorrocks decomposition. The contribution of assets was 12.9% in 1989, and increased to 14.3% in 1995 before falling to 12.6% in 2013, while liabilities contributed 1.4% to wealth inequality in 1989, rising to around 2.7% in 2004 and 2007. In 2013, the contribution of debt to wealth inequality fell to 0.3%[74].

Among assets, non-financial assets are found to contribute a greater portion to wealth inequality than financial assets, although the impact of non-financial assets fell from 11.9% in 1989 to 9.8% in 2013. Primary residence contributed the most among non-financial assets over time, with the relative inequality weight of 10.7% in 1989, rising to 10.8% in 2010 after the crisis, and falling to 9.5% in 2013. Other real estate contributed an average of 0.3% to net wealth inequality between 1989-2013, peaking at 0.6% in 2007. Similarly, the contribution of vehicles and other non-financial assets to wealth inequality averaged 0.3% in the period. Moreover, the

[73] Note that in contrast to the non-parametric Shorrocks decomposition, where income and net wealth were constructed based on their additive definition as the sum of components, in the parametric decomposition we use the values of net wealth and total income provided in the dataset.
[74] Because this method is based on the estimation of a conditional distribution of income and wealth, the contribution of debt is not negative by definition as in the case of the additive non-parametric decomposition.

contribution of business equity to wealth inequality decreased from 0.4% in 1989 to 0.1% in 2013, reaching 0.3% in 2007.

In contrast to the declining influence of non-financial assets, financial assets became a greater driver of wealth inequality over time as their contribution rose from 1% in 1989 to 2.9% in 2013, peaking at 3.5% in 2001. Retirement and insurance assets contributed the largest portion to net wealth inequality out of all the types of financial assets, with the relative inequality weight increasing from 1.3% in 1989 to 2.5% in 2013. Transaction accounts contributed an average of 0.3% to wealth inequality in this period. Curiously, the relative inequality weight of financial investment assets was negative between 1989-1992 and in the crisis years 2007-2010, suggesting their alleviating effect on net wealth inequality. Over the whole period, however, the contribution of financial investment assets in determining wealth inequality increased from -0.6% in 1989 to 0.3% in 2001, reaching 0.04% in 2013.

Among the debt variables[75], secured debt was a more important driver of wealth inequality in the period studied than unsecured debt. The relative inequality weight of secured debt rose from 1.2% in 1989 to 3.1% in the crisis in 2007, declining to 0.4% in 2013. Debt secured by primary residence contributed 1% to wealth inequality in 1989, peaking at an average of 2.6% between 2004-2007 before falling to -0.01% in 2013. In contrast, the contribution of debt secured by other property increased over time from 0.2% in 1989 to 0.4% in 2013, peaking at 0.7% in 2007. Unsecured debt contributed 0.5% to inequality in 1989, which declined -0.1% in 2013. The contribution of instalment debt and credit card balances averaged 0.1% and -0.05% respectively in this period. Finally, other debt contributed to reducing inequality between 1989-2013 at an average of -0.1%.

Among the socio-economic characteristics of households, age and educational attainment have the largest impact on the overall net wealth inequality. The relative inequality weight of age decreased over time from 25% in 1989 to 19.8% in 2013, while the contribution of educational attainment rose from 17.2% to 22.8% in the same period. Differences in gender of the household head contributed 4.4% to income inequality in 1989, increasing to 5.3% in 2004 before falling to 2.7% in 2013. Furthermore, the relative inequality weight of self-employment decreased from 2.1% in 1989 to 1.8% in 2013. In contrast, the contribution of wealth disparities across race and marital status of the household head fluctuated at around 0% in the period. In contrast, differences

[75] Other lines of credit are excluded to avoid perfect collinearity problem among regressors in the regression equation.

in the number of children and labour force participation had an alleviating impact on wealth inequality between 1989-2013, averaging -0.9% and -0.3% respectively.

Overall, the Fields decomposition shows that disparities in the balance sheet structures are a sizeable determinant of wealth inequality when household characteristics are accounted for and wealth is defined in conditional terms through a linear regression model. In contrast to the non-parametric Shorrocks decomposition, primary residence is estimated to be a more important driver of inequality among the balance sheet variables than business equity and financial investment assets.

We argue that the differences in balance sheet composition contributed to income inequality through generating unequal capital income and debt repayment flows. Table 4.9 presents results of the multivariate regression-based decomposition for income. The residual term contributed an average of 13.7% to income inequality between 1989-2013, peaking at 24.1% in 1995. Income sources explained 20.1% of income inequality in 1989, which fell to 8.1% in 2013. Household characteristics determined more than two-thirds of income inequality in the period studied, with the contribution of 65.9% in 1989 rising to 74% in 2013.

Unlike in the Shorrocks decomposition, in RBD it is wages rather than capital income that contributed more to inequality between 1989-2013. In fact, capital income is estimated to reduce inequality over time. In contrast, transfer income exacerbated inequality in the period, with the estimated negative relative inequality weight of -0.04% in 1989 rising to 0.8% in 2013. This indicates that income redistribution through transfers did not sufficiently alleviate income inequality in the period studied.

The relative inequality weight of wage income was 21.4% in 1989, decreasing to 8.4% in 2013, while capital income reduced income inequality by 1.3% in 1989, although this effect declined in absolute terms to -0.1% in 2001, reaching -1% in 2013. Each of the individual components of capital income contributed less than 1% in absolute terms to either exacerbating or alleviating inequality. The relative inequality weight of income from business ownership was negative in 1989 at -0.04%, but this increased from 1992 onwards, with a positive contribution to inequality of 0.9% in 2010-2013. Similarly, interest and dividend income reduced inequality by 1% in 1989, and this effect declined to -0.06% in 2013. Furthermore, capital gains contributed 0.5% to income inequality in 1989, which fell to 0.3% in 2013. However, between 1992-1995 and in 2010, the relative inequality weight of capital gains was marginally positive, indicating an exacerbating effect on income inequality. In contrast, the impact of social security and retirement income on reducing inequality increased over time, with the relative inequality weight rising in absolute terms from -0.7% in 1989 to over -2% in 2010 and 2013.

While the overall contribution of the individual income sources in the regression-based decomposition of income inequality fell in the period studied, the contribution of debt payments was increasing. It rose from 4.9% in 1989 to 5.6% in 2013, peaking at 5.9% in the crisis in 2007. Until 2001, it was payments of consumer debt that drove this increase. In 1989, consumer debt payments explained 3.5% of income inequality, decreasing to 0.5% in 2004 before reaching 2.1% in 2013. In contrast, the contribution of mortgage repayments to inequality rose from 1.5% in 1989 to 3.3% in 2013, peaking at 3.9% in 2010. The contribution of revolving debt payments was around 0% in the period.

Among household characteristics, educational attainment and gender of the household head had the highest positive contribution to inequality over time. The relative inequality weight of educational attainment declined from 67.4% in 1989 to 57.2% in 2013, while differences in income across gender of the household head explained 14.6% of income inequality in 1989, falling to 9.1% in 2013. Furthermore, the number of children and employment status had an exacerbating effect on income inequality in the period. The relative inequality weight of the number of children decreased from 9.5% in 1989 to 7.1% in 2013. The differences in income between employed households and those not working accounted for 7.6% of income inequality in 1989, peaking at 12.3% in 2007 before falling to 8.8% in 2013. In contrast, the contribution of self-employment to income inequality over time was oscillating around 0%. Other socio-economic factors estimated to reduce inequality are age, marital status, and race of the household head. The relative inequality weight of age was -11.9% in 1989, rising in absolute terms to -12.3% in 1995. However, it turned positive in 2010 after the crisis, contributing 1.5% to income inequality in 2013, which signifies rising intergeneration income inequality over time. Similarly, the alleviating impact of marital status on inequality diminished over time. In 1989, the differences in income between single and married households reduced income inequality by 12.4%, but this effect fell to -2.7% in 2013. Similarly, income disparities between Blacks/Hispanics vs. Whites/other ethnicities reduced income inequality by 8.9% in 1989, decreasing to -7.7% in 2013.

Overall, results of the Fields decomposition for income show that educational attainment, gender, and wage inequality were the main determinants of the overall income inequality between 1989-2013 defined in conditional terms in a linear regression model, while age, race, marital status, and social security and retirement income were the main factors reducing inequality. Moreover, payments on mortgages and consumer debt are estimated to have contributed increasingly to income inequality in the period. Household characteristics are estimated to contribute more to income than wealth inequality. It is surprising that capital income, which is estimated to be the main determinant of income inequality in the Shorrocks decomposition, is found here to have an alleviating impact on inequality.

The differences in results between the Fields and the Shorrocks decomposition can be explained by their methodological differences. Recall that while the Shorrocks decomposition defines income as an exhaustive sum of all components and inequality contribution is determined by the mean value of each factor source, the Fields multivariate regression-based decomposition considers a composite factor component $\hat{\beta}_k x_{k,i}$ (compare equations 4.7 and 4.11). Consequently, the Fields relative inequality weights are sensitive to the OLS estimates of the coefficients for each type of income. As indicated previously, the OLS estimation may suffer from serious endogeneity issues in our case due to reverse causality – while ownership of the different types of wealth influences its absolute size due to disparate returns and leverage, the absolute size of wealth may also determine which types of assets and debt can be afforded. For this reason, one needs to consider the results of both the non-parametric and the parametric decompositions in light of their relative merits outlined above in order to understand the impact of balance sheet structure and household characteristics on inequality.

In sum, the above decomposition analysis supports the implications of the stock-flow consistent model in Chapter 3 that balance sheet composition influences income and wealth inequality. This is highlighted by the high contribution of capital income to income inequality, and of business equity and financial investment assets to wealth inequality in the Shorrocks decomposition, as well as the large contribution of primary residence and wages to wealth and income inequality in the Fields decomposition. In the next section, we seek to analyse how balance sheet composition and household characteristics explain the intersectional dimension of wealth and income inequality discussed by the Post-Keynesian analyses of consumption in Chapter 2. Moreover, by analysing the income and wealth disparities in more detail across the income distribution, we assess the validity of the three-class conceptualisation of households based on wealth composition proposed in the stock-flow consistent model.

Table 4.8 Fields decomposition for net wealth

Log Net Worth	**1989**	**1992**	**1995**	**1998**	**2001**	**2004**	**2007**	**2010**	**2013**
Residual	37.43	37.24	38.79	37.82	36.10	34.22	36.95	37.72	39.43
Household characteristics	48.21	47.98	46.83	47.88	49.69	50.33	48.75	47.95	47.68
Age	25.09	26.91	26.40	24.73	22.97	23.26	23.34	23.33	19.81
Educational attainment	17.20	18.63	18.09	21.02	22.39	23.06	22.02	21.37	22.82
Female	4.36	2.94	2.38	3.23	3.72	5.25	3.44	2.90	2.71
Black/Hispanic	0.07	-0.91	0.00	-1.26	0.10	-1.52	-0.50	-0.32	0.37
Single	-0.12	-0.31	-0.09	0.01	-0.20	-0.77	0.09	0.53	1.20
Number of children	-0.23	-1.18	-0.97	-0.97	-0.67	-0.79	-1.44	-1.05	-0.96
Self-employed	2.04	2.21	1.34	1.85	1.71	2.14	1.98	1.79	1.79
Out of labour force	-0.21	-0.30	-0.31	-0.73	-0.34	-0.29	-0.19	-0.59	-0.07
Balance sheet variables	*14.36*	*14.77*	*14.38*	*14.30*	*14.21*	*15.45*	*14.30*	*14.33*	*12.89*
Assets	12.95	12.48	14.33	13.73	12.65	12.73	11.60	14.11	12.64
Non-financial	11.95	10.36	11.89	10.27	9.18	9.67	9.87	11.35	9.75
Primary residence	10.74	9.31	11.46	9.29	8.35	9.24	8.79	10.82	9.45
Other real estate	0.04	0.14	0.23	0.53	0.25	0.27	0.64	0.29	0.13
Vehicles and other	0.73	0.66	0.00	0.38	0.35	0.06	0.14	0.18	0.06
Business equity	0.44	0.24	0.19	0.07	0.22	0.10	0.31	0.06	0.12
Financial	1.00	2.12	2.44	3.46	3.47	3.06	1.73	2.76	2.88
Transaction accounts	0.27	0.52	0.15	0.43	0.15	0.66	0.05	0.13	0.36
Financial investment assets	-0.58	-0.01	0.11	0.18	0.27	0.07	-0.22	-0.19	0.04
Retirement and insurance assets	1.31	1.61	2.18	2.86	3.05	2.33	1.90	2.82	2.48
Debt	1.41	2.30	0.05	0.57	1.57	2.72	2.70	0.22	0.25
Secured	1.20	2.41	-0.06	0.49	1.60	2.82	3.06	0.30	0.40
By primary residence	1.00	2.44	-0.14	0.58	1.35	2.74	2.36	0.28	-0.01
By other real estate	0.20	-0.03	0.08	-0.09	0.25	0.08	0.71	0.03	0.41
Unsecured	0.55	-0.01	0.15	0.23	0.04	0.13	-0.34	-0.07	-0.14
Instalment debt	0.51	0.08	0.17	0.27	0.04	0.00	0.01	0.00	-0.04
Credit card balances	0.04	-0.09	-0.02	-0.04	0.00	0.13	-0.35	-0.07	-0.10
Other debt	-0.34	-0.11	-0.03	-0.15	-0.08	-0.23	-0.02	-0.02	-0.01
Total	100	100	100	100	100	100	100	100	100

Note: All values in percentages.

Table 4.9 Fields decomposition for income

Log Income	**1989**	**1992**	**1995**	**1998**	**2001**	**2004**	**2007**	**2010**	**2013**
Residual	9.02	16.78	24.14	16.61	12.54	11.31	8.40	11.72	12.30
Household characteristics	65.99	67.31	63.62	70.35	70.65	76.00	76.41	76.66	74.02
Age	-11.93	-12.21	-12.29	-5.48	-7.14	-3.69	-5.75	2.27	1.55
Educational attainment	67.42	67.08	56.23	60.68	66.07	64.98	64.26	61.12	57.17
Female	14.63	11.31	14.78	12.64	8.82	10.75	9.66	8.57	9.08
Black/Hispanic	-8.87	-8.20	-5.70	-7.01	-7.47	-9.71	-6.83	-7.76	-7.69
Single	-12.41	-8.61	-6.56	-7.05	-6.04	-4.40	-3.66	-2.62	-2.69
Number of children	9.53	7.32	5.73	7.05	5.87	7.57	5.99	6.70	7.05
Self-employed	0.01	0.23	-0.87	-0.32	-0.11	0.26	0.45	0.09	0.69
Out of labour force	7.60	10.40	12.29	9.84	10.65	10.25	12.31	8.28	8.85
Income components	20.05	11.12	6.97	10.02	12.86	10.01	9.30	7.35	8.13
Wages	21.39	11.79	8.60	10.50	12.61	10.14	9.36	8.76	8.40
Capital income	-1.31	-0.71	-1.67	-0.49	-0.05	-0.23	-0.10	-1.46	-1.04
Business income	-0.04	0.53	0.14	0.43	0.53	0.66	0.81	0.94	0.87
Interest and dividends	-1.02	-0.22	-0.63	-0.34	-0.34	0.00	-0.19	-0.06	-0.06
Capital gains	0.47	-0.46	-0.12	0.31	0.31	0.30	0.23	0.00	0.25
Social security and retirement	-0.72	-0.55	-1.06	-0.89	-0.56	-1.19	-0.94	-2.34	-2.08
Transfer income	-0.04	0.04	0.05	0.01	0.31	0.09	0.04	0.06	0.76
Debt payments	4.94	4.79	5.27	3.02	3.95	2.68	5.88	4.28	5.55
Mortgages	1.49	1.74	1.87	0.22	1.12	2.18	3.20	3.92	3.32
Consumer debt	3.45	2.92	2.87	2.08	2.52	0.48	2.65	0.41	2.12
Revolving debt	0.00	0.14	0.53	0.72	0.31	0.02	0.03	-0.06	0.12
Total	100	100	100	100	100	100	100	100	100

Note: All values in percentages.

4.4.3. Oaxaca-Blinder decomposition

The aim of the Oaxaca-Blinder (OB) decomposition analysis is to evaluate the impact of differences in household wealth composition and the associated flows of capital income and debt payments on the social dimension of inequality. This could not be explicitly examined in the stock-flow consistent model in Chapter 3 due to its high level of aggregation. The Post-Keynesian analyses of consumption discussed in Chapter 2 highlighted that the impact of financial sector transformation on inequality influenced the disparities in income and wealth across gender, race, and generations through leveraged homeownership and increasing indebtedness of women, ethnic minorities, and the young. The OB decomposition allows to test this proposition by quantitatively evaluating the contribution of different assets and debt and the associated income flows to income and wealth inequality across these social characteristics. Moreover, by decomposing the disparities in income and wealth in more detail across the income distribution we gauge the validity of the three-class conceptualisation of households based on their wealth composition proposed in the stock-flow consistent model in Chapter 3.

The OB decomposition typically examines the contribution of income sources to explaining the estimated difference in mean income (expressed in the natural logarithm) between two mutually exclusive subpopulation groups. It was originally applied to analyse wage discrimination across gender (Blinder 1973; Oaxaca 1973), and was recently extended to poverty (Biewen/Jenkins 2005), health inequality (O'Donnell *et al.* 2007), as well as wealth disparities across race in the USA (Thompson/Suarez 2015), gender in Germany (Sierminska *et al*. 2010), and in the Eurozone (Mathä *et al*. 2014). In this section, we use the OB decomposition to investigate the contribution of wealth composition and the related capital income flows to the gap in income and wealth across gender, race, generations, and in more detail across the income distribution, comparing the bottom 90% to the top 10% as well as the bottom 20% to the top 80%. The decomposition of the intergenerational wealth gap and the disparities in wealth and income across the distributional groups constitute the most original features of our analysis.

The OB technique decomposes the difference in the outcome variable across the two subgroups into explained and unexplained variation. The explained variation in the mean value of the dependent variable across subgroups is the contribution of the proposed model variables, while the unexplained variation is related to unobserved structural factors, such as discrimination.

Underlying the OB decomposition in each wave of the data is the following system of linear equations 4.12 and 4.13:

$$z_i^A = \beta_0 + \sum_{k=1}^{n} \beta_k x_{k,i}^A + \epsilon^A \tag{4.12}$$

$$z_i^B = \gamma_0 + \sum_{k=1}^{n} \gamma_k x_{k,i}^B + \epsilon^B \quad (4.13)$$

Where z_i^A and z_i^B correspond to the natural logarithm of income and wealth across subgroups A and B respectively, regressed on k explanatory variables. The log of net wealth is explained by the values of primary residence, other real estate, vehicles and other non-financial assets, business equity, transaction accounts, financial investment assets, retirement and insurance assets, as well as debt secured by main residence and other property, unsecured forms of debt including instalment loans, credit card balances, and other lines of credit, and other debt. The log of income is explained by its sources, including wages, business income, pension income, capital gains, interest and dividend income, transfer income, and debt payments. As in the RBD method, we use the reported values of net worth and total income form the dataset.

Based on these two models, a counterfactual equation (4.14) is constructed, where the coefficients of the subgroup B regression are replaced with the corresponding coefficients of the subgroup A regression.

$$z_i^{B\prime} = \beta_0 + \sum_{k=1}^{n} \beta_k x_{k,i}^B + \epsilon^B \quad (4.14)$$

The decomposition exercise concerns the following equation, expressing the difference between the average log of income and wealth for both subgroups (equation 4.15):

$$\overline{z^A} - \overline{z^B} = \left(\overline{z^A} - \overline{z^{B\prime}}\right) + \left(\overline{z^{B\prime}} - \overline{z^B}\right) \quad (4.15)$$

The first expression in brackets on the right-hand side corresponds to the difference explained by model variables (income sources and balance sheet composition). If there was no significant difference between the coefficients of subgroup A and subgroup B, this term would be zero. The second expression in brackets shows the unexplained variation in the mean value of the dependent variable $\overline{z}$, corresponding to differences in the coefficients of the subgroup B regression and the counterfactual subgroup A regression.

Substituting for the respective expressions of the average of z_i of both subgroups and the counterfactual regression of subgroup B, we obtain the following:

$$\overline{z^A} - \overline{z^{B\prime}} = \sum_{k=1}^{n} \beta_k \left(\overline{x_k{}^A} - \overline{x_k{}^B}\right) = \sum_{k=1}^{n} \beta_k^A \Delta\overline{x_k} \quad (4.16)$$

$$\overline{z^{B\prime}} - \overline{z^B} = (\beta_0 - \gamma_0) + \sum_{k=1}^{n} (\beta_k - \gamma_k)\overline{x_k{}^B} = \Delta\beta_k \overline{x_k{}^B} \quad (4.17)$$

Expression in (4.16) explains the variation in $\bar{z}$ between subgroups A and B as the differences in the values of the explanatory variables of each group, i.e. the explained gap in endowments. Conversely, expression (4.17) attributes the difference in $\bar{z}$ to the variation between coefficients of the regression of subgroup A and subgroup B, i.e. the unexplained gap in

coefficients. In a more general case in equation 4.18, a third component of the difference in income encountered in equation 4.15 can be derived, corresponding to the gap arising from the interaction of the variation in the explanatory variables and the differences in the model coefficients, i.e. the interaction term between the differences in endowments and coefficients (Daymont/Andrisani 1984).

$$\overline{z^A} - \overline{z^B} = \beta_k^A \Delta\overline{x_k} + \Delta\beta_k \overline{x_k{}^B} + \Delta\beta_k \Delta\overline{x_k} \tag{4.18}$$

In the analysis below, we report the contribution of all three components of equation 4.18. However, because of the clarity of interpretation, we only examine the explained part of inequality in detail, analysing the contribution of household characteristics, income sources, debt payments, and balance sheet variables. This is because the income and net wealth gap across subgroups explained by the differences in endowments constitutes the portion of inequality accounted for by the proposed set of explanatory variables.

Gender

Wealth inequality

Table 4.10 presents results of the Oaxaca-Blinder decomposition of the net wealth gap among male and female-headed households. The first part of the table shows the estimated log of net worth and its difference for male and female-headed households over time, and the estimated percentage contributions of differences in endowments, coefficients, and the interaction term.

The wealth gap between male and female-headed households is estimated to have fallen slightly in our sample, from 1.12 in 1989 to 1.08 in 2013. Nevertheless, the log of net wealth of female households is estimated to constitute around 90% of the value of net wealth of male-headed households. Differences in endowments are estimated to explain the largest portion of the wealth gap – between 40.2% and 134.3% – apart from the 2007 and 2013 waves, when differences in endowments reduced the wealth gap by one third, and increased it by 21.9% respectively. The above 100% contributions are expected given the variation in explanatory variables, and have been encountered in the previous literature (cf. Thompson/Suarez 2015).

Differences in balance sheet variables explain the larger positive portion of the gap in endowments across male and female households, while disparities across household socio-economic characteristics contributed negatively to inequality. The crisis year 2007 is an anomaly, when the differences in the balance sheet variables contributed to reducing the endowments gap across gender, while the contribution of household characteristics was positive.

Similarly to the findings of the Shorrocks and the Fields decomposition for the overall wealth inequality, assets contributed more to the gender wealth gap than debt between 1989-2013. Differences in assets explained 98.5% of the differences in endowments in 1989, rising to 312% in 2013, and a negative contribution in 2007 of -186.43%. Differences in debt holdings accounted for 19.1% of the endowments gap in 1989, peaking at 24.5% in 2004 before falling to 13.3% in 2013. Similarly to assets, in 2007 debt reduced the endowments gap across gender by -13.1%, and the contribution was also negative in 1995 and 2001.

Among assets, non-financial assets contributed more to the endowments gap than financial assets, although the contribution of the latter increased more over time. Differences in non-financial asset holdings explained 60.8% of the differences in endowments across gender in 1989, rising to 161.7% in 2013, and a negative contribution in 2007 of -135.6%. Financial assets accounted for 37.6% of the endowments gap in 1989, falling to -50.9% in 2007, and rising to 150.5% in 2013.

Among non-financial assets, differences in primary residence holdings explained the largest portion of the endowments gap. Moreover, the contribution of differences in the ownership of other property increased overtime and continued to be positive throughout the 2007 crisis. Furthermore, the impact of the differences in vehicles and other non-financial asset holdings on the endowments gap across gender is estimated to have fallen over time. In contrast, differences in the ownership of business equity accounted for an increasing portion of the endowments gap over time, although the contribution was smaller compared to the other assets.

Among financial assets, inequality of retirement and insurance assets had the largest contribution to the endowments gap across gender. This was followed by the contribution of differences in the ownership of transaction accounts, but it fluctuated between negative and positive values between 1989-2013. We find that the contribution of differences in financial investment assets to the endowments gap across gender declined over time, rebounding somewhat in the latest wave of the data.

Among debt holdings, the contribution of the differences in secured debt holdings to explained inequality, particularly backed by primary residence, was higher than that of unsecured debt until 2004. However, the latter became greater during and after the 2007 crisis, driven primarily by changes in the contribution of differences in instalment debt holdings. Moreover, differences in holdings of other debt accounted for a decreasing and lower portion of explained inequality across gender.

Among household characteristics, differences in age are estimated to reduce the explained gender wealth gap, with the effect increasing in absolute terms between 1989-2013. Differences

among single and married households are estimated to reduce the differences in endowments across gender, with the effect rising in absolute terms over time. Moreover, differences in the number of children had an alleviating effect on the differences in endowments across gender between 1989-2001 and in 2010, turning positive in 2004. In contrast, labour force participation, educational attainment, race, and self-employment are estimated to contribute positively to the differences in endowments.

Overall, results of the OB decomposition for gender show that balance sheet composition contributed more to the explained gender wealth gap than socio-economic characteristics over 1989-2013. Asset inequality explained more of the endowments gap across gender than differences in debt holdings. This is consistent with the balance sheet analysis in Chapter 1, as debt was more equally distributed across gender between 1989-2013. It also reflects the Post-Keynesian analyses of consumption in Chapter 2, which highlighted the role of the subprime lending expansion in increasing the indebtedness of women. Differences in holdings of primary residence and retirement and insurance assets were found to contribute the most to the explained gender inequality between 1989-2013, although the contribution of business equity and financial investment assets increased over time, particularly after 2007. This is consistent with the earlier results of the linear regression analysis. Moreover, unsecured debt holdings accounted for an increasing part of the gender wealth gap after the Great Recession. In addition, labour force participation, race, and educational attainment explained the largest portion of the explained gender wealth gap. Our results regarding the large contribution of inequality in retirement and insurance assets and business equity to the gender wealth gap is consistent with Sierminska *et al*. (2010), although we estimate a greater contribution of housing to gender wealth inequality. This is due to the institutional differences as the median household in Germany is not a homeowner because of the extensive provision of social housing.

Table 4.10 Oaxaca-Blinder decomposition of the gender net wealth gap

Log Net Worth	**1989**	**1992**	**1995**	**1998**	**2001**	**2004**	**2007**	**2010**	**2013**
Male	11.55	11.43	11.51	11.70	11.92	11.89	11.95	11.72	11.68
Female	10.43	10.55	10.73	10.74	10.68	10.66	10.91	10.65	10.60
Difference	1.12	0.89	0.78	0.95	1.25	1.24	1.04	1.07	1.08
Endowments	67.76%	134.31%	55.25%	40.20%	75.48%	57.12%	-31.32%	52.41%	21.85%
Coefficients	30.78%	32.73%	23.69%	33.59%	37.60%	55.20%	45.32%	37.99%	24.55%
Interaction	1.46%	-67.04%	21.06%	26.21%	-13.08%	-12.31%	86.00%	9.60%	53.60%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
Endowments									
Household characteristics	-17.57%	33.12%	-54.09%	-95.33%	15.59%	-31.53%	299.54%	-48.73%	-225.48%
Age	-44.30%	-29.71%	-52.38%	-56.83%	-16.15%	-40.69%	109.66%	-35.47%	-118.11%
Educational attainment	5.13%	7.47%	6.59%	12.69%	10.37%	8.99%	-25.51%	13.64%	36.06%
Black/Hispanic	4.56%	1.70%	16.13%	6.13%	8.31%	7.41%	-11.02%	7.24%	18.09%
Single	0.00%	52.06%	-49.30%	-39.25%	0.73%	-27.88%	272.18%	-41.46%	-214.85%
Number of children	-0.75%	-5.10%	-10.31%	-22.98%	-2.09%	2.55%	12.35%	-1.45%	4.99%
Self-employed	8.65%	1.35%	1.10%	-9.11%	4.37%	3.31%	-8.31%	-6.32%	9.68%
Out of labour force	9.14%	5.35%	34.09%	14.03%	10.05%	14.79%	-49.81%	15.10%	38.67%
Balance sheet variables	*117.57%*	*66.88%*	*154.09%*	*195.33%*	*84.41%*	*131.53%*	*-199.54%*	*148.73%*	*325.48%*
Assets	98.47%	62.00%	163.72%	180.30%	101.01%	107.04%	-186.43%	145.10%	312.20%
Non-financial	60.84%	21.84%	103.79%	131.85%	72.78%	53.13%	-135.58%	79.89%	161.69%
Primary residence	49.08%	14.10%	90.59%	122.31%	78.00%	52.28%	-139.06%	65.99%	166.94%
Other real estate	3.09%	0.40%	1.91%	-3.17%	3.20%	1.45%	7.10%	6.54%	9.90%
Vehicles and other	9.74%	7.80%	12.62%	17.68%	-3.32%	0.83%	-4.83%	-3.54%	-19.50%
Business equity	-1.07%	-0.47%	-1.33%	-4.97%	-5.10%	-1.43%	1.21%	10.91%	4.36%
Financial	37.63%	40.17%	59.93%	48.45%	28.23%	53.91%	-50.85%	65.20%	150.51%
Transaction accounts	11.19%	0.59%	0.28%	4.15%	1.87%	-0.95%	-22.33%	22.99%	-26.54%
Financial investment assets	13.01%	0.45%	4.08%	0.96%	-0.42%	0.54%	-1.55%	0.15%	18.67%
Retirement and insurance assets	13.44%	39.13%	55.57%	43.35%	26.78%	54.32%	-26.97%	42.06%	158.38%
Debt	19.10%	4.87%	-9.63%	15.02%	-16.60%	24.49%	-13.10%	3.63%	13.29%
Secured	12.85%	9.65%	-14.12%	24.47%	-16.57%	18.54%	-9.03%	-4.90%	-0.79%
By primary residence	11.88%	8.30%	-26.79%	19.34%	-16.25%	15.85%	-3.75%	-9.02%	-1.21%
By other real estate	0.97%	1.36%	12.67%	5.14%	-0.31%	2.69%	-5.28%	4.13%	0.43%
Unsecured	18.02%	3.13%	-1.79%	-5.73%	1.10%	1.10%	5.77%	7.37%	7.19%
Instalment debt	16.44%	1.56%	-3.75%	-4.39%	0.32%	-2.31%	9.63%	6.53%	12.22%
Credit card balances	1.59%	1.57%	1.96%	-1.34%	0.78%	3.41%	-3.86%	0.83%	-5.02%
Other debt	-11.78%	-7.91%	6.28%	-3.72%	-1.13%	4.85%	-9.84%	1.16%	6.88%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Income inequality

To evaluate the contribution of income flows associated with wealth composition to the gender income inequality, Table 4.11 presents the Oaxaca-Blinder decomposition of the income gap across gender As expected, the income gap among male and female households is smaller than the net wealth gap. While the log income gap decreased over time in the sample, falling from 0.9 in 1989 to 0.8 in 2013, incomes of female-headed households constituted only around 90% of the incomes of male-headed households in the period. The majority of this income gap – between 86% to 120% – is explained by the differences in endowments across male and female households, i.e. is explained by the proposed set of explanatory variables (recall equation 4.15).

Among the explanatory variables, income sources contributed the most to the differences in endowments, followed by differences in household characteristics, and debt payments. Among income sources, wages explained the majority of the differences in endowments, rising from 63.7% in 1989 to 79.2% in 2013. Interestingly, in 2004 before the crisis the contribution of wages to the endowments gap decreased temporarily to 7.7%, as the contribution of capital income rose to 9.5% and the contribution of debt payments peaked at 27.1%. Capital income explained a smaller part of the gap in endowments than wages, rising from 8.9% to 1989 to 13.2% in 2010 before decreasing to 7.8% in 2013. Among the various types of capital income, social security and retirement income and business income contributed an increasing portion to the endowments gap. The contribution of differences in interest and dividend income and capital gains was comparatively lower, and experienced a decrease between 1989-2013, peaking at the time of the Great Recession. Finally, differences in the receipts of transfer income reduced the differences in endowments among male and female-headed households (except for the 1992 and 1995 waves).

Among debt payments, differences in mortgage payments accounted for the largest part of the endowments gap between male and female households, rising from 9.5% in 1989 to 23.6% in 2004 before falling to 2.7% in 2013. Differences in consumer debt payments accounted for 1.5% of the endowments gap in 1989, rising to 4.3% in 2007, and declining to 1.9% in 2013. Differences in revolving debt payments explained 1.6% of the differences in endowments in 1989, peaking at 7.8% in 1992, and falling to 0.03% in 2013.

Among household characteristics, differences in labour force participation, marital status, and educational attainment explained the largest part of the differences in endowments among male and female households between 1989-2013, while differences in age contributed to reducing the endowments gap. The large contribution of differences between single and married household to income inequality reflects the observation in Table A1.15 in Appendix I that female-headed households are predominantly single. Furthermore, income differences among Black/Hispanic

households and White/other contributed positively to the endowments gap across gender, although this contribution declined between 1989-2013. This highlights the intersectional dimension of race and gender in income inequality. Similarly, the positive contribution of differences in the number of children to the gender gap in endowments declined over time. In addition, the contribution of the income disparities between self-employed households and the rest was lower compared to the other socio-economic characteristics.

In sum, we find that income sources contributed a greater portion to the net income gap across gender than household characteristics, and this contribution increased over time. Debt payments have raised their contribution to the net income inequality across gender before the Great Recession, and this was driven by the differences in mortgage payments, although payments on consumer debt contributed an increasing portion to inequality after the 2007 crisis. Differences in wages accounted for the largest portion of the gender income gap, which increased between 1989-2013. Transfer income is found to have contributed little to reducing the gender income gap. Across household characteristics, marital status, labour force participation, and educational attainment had the highest contribution to income inequality across gender in this period.

Table 4.11 Oaxaca-Blinder decomposition of the gender income gap

Log Income	**1989**	**1992**	**1995**	**1998**	**2001**	**2004**	**2007**	**2010**	**2013**
Male	10.91	10.85	10.90	10.97	11.08	11.08	11.08	11.00	11.00
Female	10.02	9.99	9.94	10.09	10.15	10.19	10.24	10.25	10.20
Difference	0.90	0.86	0.96	0.88	0.93	0.89	0.84	0.75	0.79
Endowments	111.87%	50.75%	79.91%	101.49%	117.08%	86.36%	100.22%	115.35%	122.91%
Coefficients	17.68%	18.35%	32.47%	31.49%	24.72%	25.96%	18.52%	15.94%	10.76%
Interaction	-29.55%	30.90%	-12.38%	-32.98%	-41.80%	-12.32%	-18.74%	-31.29%	-33.67%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
Endowments									
Household characteristics	15.23%	-18.10%	-6.87%	36.75%	22.87%	56.38%	11.55%	-0.89%	8.91%
Age	-4.17%	-7.40%	-3.19%	-4.82%	-1.44%	-2.93%	-5.81%	-2.40%	-2.50%
Educational attainment	4.36%	14.73%	3.45%	3.13%	4.47%	4.53%	3.67%	1.23%	1.41%
Black/Hispanic	4.23%	4.38%	3.86%	2.51%	1.75%	1.11%	0.99%	0.43%	0.97%
Single	0.00%	-49.27%	-25.43%	24.40%	11.42%	42.29%	1.67%	-7.47%	2.31%
Number of children	4.31%	1.16%	1.27%	0.59%	0.09%	0.80%	0.75%	1.46%	1.16%
Self-employed	2.69%	-3.06%	2.18%	-1.80%	-0.11%	-1.61%	3.46%	0.70%	2.02%
Out of labour force	3.80%	21.36%	11.00%	12.73%	6.69%	12.18%	6.81%	5.17%	3.53%
Income components	72.16%	88.00%	95.67%	57.85%	69.41%	16.52%	73.58%	95.56%	86.49%
Wages	63.71%	83.91%	89.27%	59.24%	62.80%	7.67%	73.34%	85.45%	79.22%
Capital income	8.87%	3.71%	6.24%	-0.68%	8.25%	9.48%	0.98%	13.19%	7.75%
Business income	0.16%	1.70%	-0.02%	1.69%	2.23%	1.70%	1.58%	9.21%	1.56%
Interest and dividends	0.34%	1.02%	0.88%	1.01%	1.65%	0.99%	2.43%	-0.56%	0.87%
Capital gains	6.32%	0.32%	0.59%	-0.67%	-0.77%	2.99%	-3.31%	0.32%	0.47%
Social security and retirement	2.05%	0.68%	4.80%	-2.71%	5.13%	3.79%	0.29%	4.22%	4.85%
Transfer income	-0.42%	0.38%	0.16%	-0.71%	-1.64%	-0.62%	-0.75%	-3.08%	-0.49%
Debt payments	12.61%	30.11%	11.19%	5.40%	7.72%	27.10%	14.87%	5.32%	4.61%
Mortgages	9.54%	19.23%	7.39%	6.01%	5.85%	23.58%	9.81%	4.36%	2.69%
Consumer debt	1.53%	3.11%	2.75%	-1.03%	0.95%	1.25%	4.32%	0.85%	1.88%
Revolving debt	1.55%	7.76%	1.06%	0.43%	0.92%	2.27%	0.74%	0.11%	0.03%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Race

Wealth inequality

Table 4.12 shows results of the OB decomposition for the net wealth gap across Black/Hispanic households and White/other. The wealth gap increased over time from 1.5 in 1989 to 1.7 in 2013. Differences in endowments explained by the estimated regression model accounted for the largest part of the wealth gap, increasing from 73.3% in 1989 to 91.6% in 2013.

Balance sheet variables are estimated to explain the majority of differences in endowments across race, although the contribution decreased from 80.6% in 1989 to 58.5% in the crisis in 2007, before rising to 70.8% in 2013. Household characteristics accounted for an increasing portion of the gap in endowments, rising from 19.5% in 1989 to 41.5% in 2007 before declining to 29.2% in 2013.

Among balance sheet variables, disparities in asset holdings contributed more to the gap in endowments across race than differences in debt ownership. Assets explained 80.6% of the differences in endowments in 1989, falling to 59.1% in 2001, before increasing to 76% in 2013. In contrast, differences in debt holdings across race are estimated to reduce the endowments gap, and this negative effect rose in absolute terms from -0.1% in 1989 to -5.2% in 2013, with a peak of -15.7% in 1995.

Among assets, non-financial assets explained more of the endowments gap across race than financial assets in the period studied. However their contribution fell over time from 70.5% in 1989 to 50.9% in 2013, peaking at 86.9% in 1995. In contrast, the portion of the differences in endowments explained by disparities in financial assets holdings increased from 10.1% in 1989 to 25.1% in 2013, with a high of 26.1% in 2004 before the crisis.

Among non-financial assets, primary residence accounted for the largest albeit decreasing part of the endowments gap across race. The contribution of differences in vehicles and other non-financial assets and other property fluctuated between positive and negative values over time. In contrast, differences in the ownership of business equity are estimated to reduce the endowments gap, with the effect rising in absolute terms between 1989-2013.

Among financial assets, differences in transaction accounts explained the most of the differences in endowments across race, increasing between 1989-2013. Moreover, the contribution of retirement and insurance assets to the explained inequality across race rose in this period. Surprisingly, differences in the ownership of financial investment assets across race are estimated to reduce the endowments gap and this effect increased in absolute terms.

Among debt, differences in unsecured debt contributed more to the endowments gap across race in the period, while secured debt is estimated to have reduced this gap. Differences in unsecured debt holdings accounted for 3% of the differences in endowments across race in 1989, rising to 3.5% in 2001, and decreasing to 1.7% in 2013. This was driven by differences in instalment debt holdings before the 2007 crisis, and the fall in the contribution of disparities in credit card debt after the Great Recession. On the contrary, differences in secured debt holdings reduced the gap in endowments across race by 2.7% in 1989, rising to -17.9% in 1995, and decreasing in absolute terms to -5.5% in 2013. This alleviating effect on the endowments gap across race was driven by the differences in the ownership of debt secured by primary residence. In contrast, the contribution of differences in debt secured by other property across race was generally positive and increased between 1989-2013. Finally, disparities in other debt holdings tended to reduce the differences in endowments across race, with the effect rising in absolute terms from -0.4% in 1989 to -1.4% in 2013, although the contribution was positive in 1992-1995 and 2004-2007, averaging 0.8%.

Among household characteristics, differences in age, educational attainment, and marital status contributed the most to explained wealth inequality across race between 1989-2013, while labour force participation is estimated to have reduced these disparities. The contribution of wealth disparities across male- and female-headed households to the endowments gap across race fluctuated between positive and negative values. Similar pattern is observed for the contribution of differences in the number of children and self-employment.

In sum, we find that the explained wealth inequality between Blacks/Hispanics and Whites/other ethnicities was determined primarily by the increasing contribution of financial assets, specifically transaction accounts and retirement and insurance assets, as well as disparities in age, educational attainment, and differences across marital status and gender. This reflects that limited access to banking services and pension schemes among minority households contributed to the racial wealth inequality. Moreover, debt is found to have contributed to reducing wealth inequality over time, although this was driven by secured debt holdings, as disparities in unsecured debt contributed positively to wealth inequality, particularly before the Great Recession. This indicates that disparities in homeownership restricted access to secure credit for minority households, inducing them to take out unsecured debt.

Table 4.12 Oaxaca-Blinder decomposition of the racial net wealth gap

Log Net Worth	**1989**	**1992**	**1995**	**1998**	**2001**	**2004**	**2007**	**2010**	**2013**
White/Other	11.52	11.44	11.53	11.68	11.92	11.90	11.97	11.80	11.77
Black/Hispanic	10.01	10.05	10.11	10.31	10.30	10.34	10.53	10.22	10.10
Difference	1.51	1.39	1.42	1.36	1.62	1.56	1.44	1.59	1.66
Endowments	73.27%	123.74%	100.84%	93.16%	107.82%	116.05%	76.93%	98.28%	91.61%
Coefficients	45.11%	39.86%	50.64%	37.48%	45.15%	35.17%	41.32%	37.89%	38.12%
Interaction	-18.38%	-63.60%	-51.48%	-30.64%	-52.97%	-51.22%	-18.25%	-36.16%	-29.73%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
Endowments									
Household characteristics	19.45%	23.72%	18.00%	31.67%	21.12%	21.60%	41.54%	27.88%	29.17%
Age	6.59%	6.70%	5.57%	19.58%	9.22%	9.99%	33.08%	16.75%	11.46%
Educational attainment	1.65%	7.22%	5.76%	11.44%	6.09%	8.21%	8.03%	12.01%	13.52%
Female	-0.62%	-0.16%	-0.09%	3.26%	5.13%	4.25%	6.05%	2.37%	0.10%
Single	9.60%	2.34%	4.50%	0.35%	0.55%	0.03%	-0.57%	2.00%	4.78%
Number of children	1.37%	5.41%	2.21%	-0.89%	-0.41%	0.08%	0.70%	-1.26%	1.05%
Self-employed	0.43%	3.30%	1.72%	0.33%	2.46%	0.16%	0.69%	-0.07%	0.68%
Out of labour force	0.43%	-1.09%	-1.67%	-2.40%	-1.92%	-1.13%	-6.45%	-3.91%	-2.43%
Balance sheet variables	*80.55%*	*76.28%*	*82.00%*	*68.33%*	*78.88%*	*78.40%*	*58.46%*	*72.12%*	*70.83%*
Assets	80.61%	83.56%	97.71%	72.83%	78.12%	83.29%	59.07%	79.30%	75.99%
Non-financial	70.53%	65.07%	86.89%	61.46%	31.15%	57.21%	47.55%	59.73%	50.91%
Primary residence	70.28%	60.26%	75.15%	52.31%	32.99%	60.46%	43.18%	55.00%	53.66%
Other real estate	-1.39%	2.12%	-0.04%	0.32%	2.73%	1.85%	1.88%	-0.85%	0.41%
Vehicles and other	3.87%	2.25%	9.94%	10.95%	-2.14%	-0.59%	4.82%	8.16%	-1.39%
Business equity	-2.22%	0.44%	1.84%	-2.11%	-2.42%	-4.51%	-2.34%	-2.58%	-1.77%
Financial	10.08%	18.49%	10.82%	11.36%	46.96%	26.08%	11.53%	19.57%	25.08%
Transaction accounts	-1.62%	18.96%	17.31%	2.61%	28.86%	17.08%	10.08%	12.23%	22.27%
Financial investment assets	-0.26%	-6.26%	-16.73%	-7.48%	0.58%	-2.81%	-29.86%	-7.50%	-5.21%
Retirement and insurance assets	11.96%	5.80%	10.24%	16.23%	17.53%	11.81%	31.31%	14.84%	8.02%
Debt	-0.06%	-7.29%	-15.71%	-4.49%	0.77%	-4.88%	-0.61%	-7.19%	-5.16%
Secured	-2.67%	-10.08%	-17.90%	-6.48%	-2.63%	-8.03%	-1.24%	-8.25%	-5.51%
By primary residence	-3.05%	-8.25%	-16.81%	-8.52%	-2.83%	-7.94%	-1.25%	-9.54%	-8.02%
By other real estate	0.38%	-1.84%	-1.09%	2.04%	0.20%	-0.09%	0.01%	1.30%	2.52%
Unsecured	3.04%	1.98%	0.48%	2.57%	3.50%	2.74%	0.49%	1.31%	1.74%
Instalment debt	2.98%	1.64%	-0.10%	1.64%	3.23%	0.60%	0.19%	-0.27%	0.22%
Credit card balances	0.06%	0.34%	0.58%	0.92%	0.27%	2.14%	0.30%	1.58%	1.52%
Other debt	-0.43%	0.82%	1.72%	-0.58%	-0.10%	0.40%	0.15%	-0.25%	-1.40%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Income inequality

To illustrate the contribution of household wealth composition to income inequality, Table 4.13 shows results of the Oaxaca-Blinder decomposition for the income gap across race, estimating income inequality between Black/Hispanic households and White/other. Similarly to gender, and unlike for wealth, the racial income gap is estimated to have decreased in the sample over time, from 0.8 in 1989 to 0.5 in 2010, with a recent increase to 0.7 in 2013. The majority of the racial income gap is explained by the differences in endowments of the explanatory variables covering household characteristics, income sources, and debt payments.

Income sources contributed the most to the explained differences in endowments across race, followed by household characteristics, and debt payments. Among income sources, differences in wages explained 48.1% of the gap in endowments across race, rising to 59.9% in 2013, and declining to 15.9% in 2010. Capital income accounted for 24.4% of the differences in endowments across race in 1989, increasing to 29.7% in 2010 and falling to 21.4% in 2013. Among the various types of capital income, differences in social security and retirement income explained the largest portion of the differences in endowments, and the contribution increased between 1989-2013. This was followed by the contribution of differences in business income to the endowments gap across race, which declined over time, peaking in 2010. Moreover, interest and dividend income contributed to widening of the differences in endowments in the 1990s, but this effect changed to reduce the gap in endowments since 1998. Similarly, the contribution of differences in capital gains was not consistent over time, fluctuating between positive and negative values. Lastly, the contribution of transfer income to the endowments gap across race was positive but comparatively low. This suggests that the social transfer policy did not alleviate income inequality across race to a great extent.

Among debt payments, differences in mortgage payments accounted for an increasing part of the gap in endowments across race, rising from 4.7% in 1989 to 21.5% in 2010 before declining to 3.5% in 2013. Differences in revolving debt payments accounted for 1.1% of the differences in endowments in 1989, increasing to 3.7% in 2010, and reaching 1.6% in 2013. The contribution of differences in consumer debt payments in explaining the endowments gap across race followed an inverted-U shaped trajectory, rising from 0.3% in 1989 to 3% in 2004 before the crisis, and declining to 0.9% in 2013.

Among household characteristics, educational attainment, age, marital status, and gender contributed the most to the differences in endowments explaining the racial income gap, while labour force participation, the number of children, and self-employment contributed to reduce the endowments gap.

Overall, we find that the explained income inequality across Black/Hispanic households and Whites/other ethnicities was driven by the differences in wage receipts, social security and retirement income, business income, mortgage payments, as well as educational attainment, marital status, and age. Importantly, the contribution of debt payments was particularly large immediately after the 2007 crisis, driven by the rising contribution of payments on unsecured debt holdings. These findings reflect the differences in employment security across households, which results in their limited access to pension income for minorities. The rising contribution of debt payments on mortgages and unsecured debt to the explained racial inequality suggests differences in the borrowing conditions across race associated with the expansion of subprime lending in the 2000s.

Generations

Wealth inequality

Table 4.14 presents results of the OB decomposition of the net wealth gap between households aged less than 35 and those aged 35 and above between 1989-2013. It is estimated to have increased from 1.71 in the log terms in 1989 to 1.84 in 2007, falling to 1.68 in 2013. In the period, net wealth of households aged below 35 constituted around 85% of the size of net wealth of households aged 35 and over. The majority of the intergenerational net wealth gap is explained by the proposed regression model, which contributed 166.8% to the gap in 1989, rising to 255.3% in 2013.

Balance sheet variables are estimated to explain the largest part of the difference in endowments across generations, and this contribution increased between 1989-2013. In contrast, the contribution of household characteristics to the endowments declined over time.

Among balance sheet variables, assets are estimated to contribute more to the endowments gap than debt. The impact of differences in asset holdings across age groups experienced a U-shaped path in the period studied, falling from 49% in 1989 to 34.2% in 2004, and increasing during and after the crisis, reaching 71.4% in 2013. In contrast, the impact of debt is found to be ambiguous, increasing the endowments gap by an average of 1.2% over 1989-1995, declining to -4.9% in 2013.

Table 4.13 Oaxaca-Blinder decomposition of the racial income gap

Log Income	**1989**	**1992**	**1995**	**1998**	**2001**	**2004**	**2007**	**2010**	**2013**
White/Other	10.82	10.73	10.74	10.83	10.95	10.96	10.96	10.92	10.91
Black/Hispanic	10.05	10.13	10.10	10.24	10.38	10.40	10.48	10.44	10.35
Difference	0.76	0.60	0.64	0.59	0.57	0.55	0.48	0.47	0.56
Endowments	82.66%	91.92%	109.92%	80.67%	87.08%	87.21%	89.17%	79.14%	113.56%
Coefficients	36.36%	28.79%	44.29%	35.84%	31.81%	22.79%	37.29%	24.38%	28.93%
Interaction	-19.01%	-20.71%	-54.21%	-16.51%	-18.89%	-10.00%	-26.46%	-3.52%	-42.49%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
Endowments									
Household characteristics	20.92%	14.41%	26.05%	22.55%	29.09%	35.81%	22.17%	28.24%	10.82%
Age	0.93%	1.50%	6.19%	9.42%	8.59%	3.58%	11.21%	11.90%	1.98%
Educational attainment	8.37%	11.49%	8.99%	11.19%	16.74%	21.47%	15.74%	22.81%	6.73%
Female	3.08%	4.46%	1.80%	7.28%	9.03%	4.95%	2.09%	6.33%	1.13%
Single	8.24%	2.99%	9.20%	3.78%	3.90%	7.93%	5.04%	6.58%	4.64%
Number of children	-2.73%	-4.22%	2.10%	-2.67%	-0.90%	-0.33%	-0.81%	-6.05%	-1.86%
Self-employed	0.72%	-1.13%	-1.03%	0.03%	-1.67%	0.96%	0.47%	-2.91%	0.88%
Out of labour force	2.30%	-0.69%	-1.21%	-6.48%	-6.59%	-2.75%	-11.57%	-10.40%	-2.68%
Income components	72.99%	81.72%	66.18%	64.48%	58.82%	49.10%	74.09%	45.54%	83.14%
Wages	48.05%	58.18%	35.04%	40.33%	50.37%	37.98%	50.81%	15.87%	59.90%
Capital income	24.37%	23.67%	32.84%	24.18%	8.54%	11.61%	24.74%	29.67%	21.42%
Business income	8.84%	10.96%	7.25%	3.70%	5.30%	-4.88%	8.55%	12.33%	0.53%
Interest and dividends	0.93%	4.32%	21.45%	-3.51%	0.73%	-14.91%	-4.62%	-0.06%	-3.05%
Capital gains	1.33%	-4.52%	-6.60%	2.74%	-10.83%	4.65%	-1.68%	0.92%	-0.61%
Social security and retirement	13.27%	12.92%	10.74%	21.25%	13.34%	26.74%	22.48%	16.48%	24.55%
Transfer income	0.57%	-0.13%	-1.70%	-0.03%	-0.09%	-0.49%	-1.45%	0.00%	1.82%
Debt payments	6.10%	3.87%	7.77%	12.97%	12.09%	15.09%	3.74%	26.21%	6.04%
Mortgages	4.70%	2.01%	1.20%	6.64%	9.64%	9.73%	1.38%	21.51%	3.54%
Consumer debt	0.27%	1.03%	2.97%	2.33%	2.63%	3.00%	0.87%	1.01%	0.88%
Revolving debt	1.13%	0.84%	3.60%	4.00%	-0.18%	2.37%	1.49%	3.70%	1.62%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Among assets, non-financial assets are estimated to explain more of the differences in endowments across generations than financial assets, although the importance of the latter increased after the 2007 crisis. Differences in non-financial assets holdings across age groups explained 33.6% of the differences in endowments in 1989, falling to 20.5% in 2010 before increasing to 45.3% in 2013. In contrast, differences in the holdings of financial assets accounted for 15.4% of the endowments gap across generations in 1989, declining to 4.5% in 2004, after which the contribution rose to 29.8% in 2010, reaching 26% in 2013.

Among non-financial assets, differences in holdings of primary residence across age groups accounted for the largest part of the endowments gap, declining between 1989-2004 and increasing since. This reflects the increases in homeownership among the youngest group before the Great Recession, and the sharp decline since, which was observed in the balance sheet analysis in Chapter 1. Similarly, the contribution of differences in other property holdings to the endowments gap across generations increased over time, as did the contribution of disparities in vehicles and other non-financial assets. In contrast, differences in business equity holdings across generations accounted for a positive but decreasing part of the endowments gap over time.

Among financial assets, disparities in the holdings of retirement and insurance assets across age groups explained the greatest part of the differences in endowments, followed by financial investment assets, whose contribution to the endowments gap across generations increased rapidly around the time of the Great Recession. In contrast, the impact of differences in the holdings of transaction accounts on the intergenerational endowments gap decreased over time, peaking in 2004.

Among debt components, secured debt contributed more to the endowments gap across age groups than unsecured debt, although the impact of both types of debt was not unambiguous in the period studied. The contribution of other debt holdings to the endowments gap was comparatively low and fluctuated between positive and negative values between 1989-2013. Differences in unsecured debt holdings across generations reduced the differences in endowments by 0.1% in 1989, but this turned positive at 1.7% in 1992, reaching 0.3% in 2013. This was driven primarily by the increasingly positive contribution of differences in the holdings of instalment debt compared to the negative contribution of credit card debt. Among the types of secured debt, disparities in mortgages secured by primary residence had a greater negative contribution to the differences in endowments across age groups than debt secured by other real estate.

Among household characteristics, age differentials accounted for the greatest portion of the differences in endowments. Differences in net wealth between self-employed households and the rest, as well as between Blacks/Hispanics and Whites/other ethnicities contributed positively to

deepening wealth inequality across generations between 1989-2013. Similarly, disparities in the number of children increased the explained intergenerational wealth inequality over time, albeit at lower magnitudes. The impact of net wealth disparities between single and married households is estimated to be mixed, while labour force participation, gender, and educational attainment contributed to reduce the difference in endowments across age groups over time.

Overall, results of the Oaxaca-Blinder decomposition of the intergenerational net wealth gap show that apart from age differences, disparities in the holdings of primary residence, other real estate, vehicles and other non-financial assets, and retirement and insurance assets determined the explained intergenerational wealth inequality between 1989-2013. The contribution of financial assets, particularly retirement and insurance assets as well as financial investment assets, increased after the Great Recession. This indicates that young households have had less access to pensions compared to the older households and their peers in the previous waves of the data. Similarly, it reflects the observation that homeownership became less affordable for the young after the Great Recession. In contrast to the racial wealth gap, but in line with the findings for gender, disparities in unsecured debt, particularly instalment debt, explained more of the intergenerational wealth inequality than differences in secured debt holdings.

Table 4.14 Oaxaca-Blinder decomposition of the intergenerational net wealth gap

Log Net Worth	**1989**	**1992**	**1995**	**1998**	**2001**	**2004**	**2007**	**2010**	**2013**
Aged 35+	11.70	11.53	11.62	11.78	11.93	11.91	12.03	11.77	11.69
Aged <35	9.99	10.08	10.19	10.13	10.34	10.17	10.19	9.94	10.02
Difference	1.71	1.46	1.43	1.65	1.59	1.74	1.84	1.83	1.68
Endowments	166.82%	167.25%	201.29%	148.52%	205.30%	163.55%	228.51%	164.47%	255.28%
Coefficients	53.08%	24.13%	33.67%	35.46%	25.06%	26.41%	32.88%	23.33%	7.08%
Interaction	-119.90%	-91.37%	-134.96%	-83.98%	-130.36%	-89.97%	-161.39%	-87.80%	-162.36%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
Endowments									
Household characteristics	49.90%	49.71%	51.94%	66.12%	56.52%	65.33%	57.90%	48.31%	33.61%
Age	55.16%	58.79%	61.83%	70.52%	59.59%	67.22%	61.44%	51.85%	35.41%
Educational attainment	-1.11%	-2.73%	-2.11%	-1.35%	-0.34%	0.16%	0.28%	-0.74%	-0.56%
Female	-1.90%	-1.44%	0.06%	-0.09%	-0.43%	-1.57%	-1.58%	-0.83%	-0.29%
Black/Hispanic	0.36%	0.50%	0.98%	1.55%	0.44%	1.14%	1.39%	1.24%	0.31%
Single	0.00%	-0.20%	0.04%	0.25%	0.17%	0.02%	-0.11%	0.05%	0.01%
Number of children	0.53%	1.12%	0.52%	0.89%	0.49%	0.12%	0.58%	-0.17%	0.15%
Self-employed	0.81%	0.70%	0.63%	1.43%	0.39%	1.06%	1.11%	0.89%	0.40%
Out of labour force	-3.96%	-7.03%	-10.01%	-7.08%	-3.80%	-2.81%	-5.20%	-3.98%	-1.81%
Balance sheet variables	*50.10%*	*50.29%*	*48.06%*	*33.88%*	*43.48%*	*34.67%*	*42.10%*	*51.69%*	*66.39%*
Assets	49.00%	49.29%	46.55%	33.91%	44.29%	34.24%	42.07%	50.37%	71.35%
Non-financial	33.55%	36.19%	29.70%	25.00%	27.46%	29.71%	25.21%	20.53%	45.30%
Primary residence	27.71%	29.25%	25.33%	11.13%	13.49%	6.53%	15.11%	4.29%	30.16%
Other real estate	2.56%	0.08%	3.59%	6.23%	5.04%	8.95%	6.20%	11.85%	3.02%
Vehicles and other	2.13%	6.65%	1.14%	8.27%	6.77%	14.21%	3.58%	3.98%	12.23%
Business equity	1.15%	0.20%	-0.36%	-0.61%	2.16%	0.01%	0.32%	0.41%	-0.11%
Financial	15.44%	13.10%	16.85%	8.91%	16.84%	4.53%	16.86%	29.84%	26.04%
Transaction accounts	0.67%	0.34%	5.09%	0.97%	-0.03%	3.70%	1.45%	1.04%	-2.99%
Financial investment assets	1.98%	-0.36%	3.05%	2.99%	-0.22%	-12.18%	-1.72%	5.39%	3.38%
Retirement and insurance assets	12.80%	13.12%	8.71%	4.95%	17.09%	13.01%	17.12%	23.41%	25.65%
Debt	1.10%	1.00%	1.50%	-0.03%	-0.81%	0.43%	0.03%	1.32%	-4.96%
Secured	0.30%	0.01%	-0.91%	-0.45%	-0.48%	0.34%	-1.21%	0.83%	-5.39%
By primary residence	1.31%	-0.29%	-1.13%	-0.16%	-0.16%	0.99%	-0.44%	1.29%	-5.35%
By other real estate	-1.01%	0.30%	0.22%	-0.28%	-0.32%	-0.65%	-0.77%	-0.46%	-0.04%
Unsecured	-0.07%	1.72%	0.02%	0.03%	0.50%	0.49%	0.40%	-0.93%	0.33%
Instalment debt	-0.10%	1.65%	0.05%	-0.02%	0.50%	0.22%	0.61%	0.00%	0.96%
Credit card balances	0.03%	0.07%	-0.02%	0.04%	0.00%	0.27%	-0.21%	-0.93%	-0.63%
Other debt	0.87%	-0.73%	2.39%	0.39%	-0.84%	-0.41%	0.84%	1.42%	0.11%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Income inequality

To analyse the contribution of disparities in capital income and debt payment flows associated with the heterogeneity of wealth composition, Table 4.15 shows results of the Oaxaca-Blinder decomposition of income inequality across age groups. The intergenerational income gap is estimated to have increased over time from 0.3 in the log terms in 1989 to 0.4 in 2013. The majority of the gap is explained by the proposed regression model (i.e. by differences in endowments), accounting for 279.5% in 1989 rising to 394.7% in 2013.

Household characteristics explained the majority of the gap in endowments across generations, followed by disparities in income components. The contribution of debt payments was estimated to have a mixed impact on the differences in endowments over time, reducing the endowments gap in 1989, 1995, and 2007, and widening the gap in 1992, 1998-2004, and in 2010-2013.

Among household characteristics, differences in age accounted for the majority of the intergenerational differences in endowments. The magnitude of the contribution of the other socio-economic variables was comparatively low. Differences in income across race and marital status contributed positively to the endowments gap, while the contribution of differences in the number of children and self-employment was mixed between 1989-2013. In contrast, the contribution of labour force participation, educational attainment, and income differences across gender to the explained intergenerational income gap was negative.

Among income components, capital income contributed more to the differences in endowments than wage income. Differences in capital income receipts across age groups explained 26.1% of the endowments gap in 1989, although this contribution declined to 13.3% in 2013, with an anomalous negative effect of -26.3% in 2004. This was driven by a comparatively high contribution of social security and retirement income, and of business income. Differences in the receipts of capital gains and interest and dividend income across age groups had a mixed contribution to the explained income gap. Moreover, wages accounted for 3.6% of the differences in endowments across generations in 1989, increasing to 9.6% in 2013, with a peak of 12.5% in 2004. Disparities in the receipts of transfer income across generations contributed an average of 0.1% to the endowments gap between 1989-2013, signalling insufficient impact of the social transfer policy in alleviating the intergenerational income inequality.

Among debt payments, the contribution of differences in mortgage debt payments across generations was positive and increased from 0.3% of the differences in endowments in 1989, peaking at 3.8% in 2004, before falling to 0.1% in 2013. Disparities in payments on revolving debt initially reduced the differences in endowments across generations by an average of 0.1% between

1989-1995, but the effect became positive since 1998, with a peak of 1.4% in 2004. In contrast, differences in payments on consumer debt are estimated to reduce the endowments gap across age groups, with the contribution of -0.4% in 1989 increasing in absolute terms to -0.5% in 2013.

Overall, the Oaxaca-Blinder decomposition of the intergenerational income gap shows that income disparities across households younger than 35 years and those aged 35 and above were driven primarily by differences in capital income receipts, in addition to the dominant impact of the age differential. This finding stands in contrast to the decomposition of income inequality across gender and race, where inequality was found to be determined by wage income disparities. Nevertheless, the impact of wage inequality on the intergenerational income gap has increased over time. Moreover, as in the case of gender and race, income transfers have contributed little to reducing the income gap across generations. These results suggest that access to wealth ownership determined the intergenerational income gap between 1989-2013. Moreover, the intergenerational income inequality has become increasingly driven by worse employment opportunities among the young compared to the older households and their peers in the previous waves of the survey.

Table 4.15 Oaxaca-Blinder decomposition of the intergenerational income gap

Log Income	**1989**	**1992**	**1995**	**1998**	**2001**	**2004**	**2007**	**2010**	**2013**
Aged 35+	10.73	10.66	10.68	10.81	10.90	10.91	10.92	10.88	10.86
Aged <35	10.47	10.45	10.45	10.44	10.58	10.54	10.60	10.49	10.44
Difference	0.27	0.21	0.23	0.37	0.32	0.37	0.32	0.39	0.42
Endowments	279.46%	621.91%	492.11%	240.34%	336.77%	244.04%	382.22%	332.20%	394.71%
Coefficients	103.72%	106.95%	134.46%	106.16%	85.01%	90.62%	82.34%	84.99%	68.64%
Interaction	-283.18%	-628.86%	-526.57%	-246.50%	-321.78%	-234.65%	-364.56%	-317.18%	-363.35%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
Endowments									
Household characteristics	68.84%	92.13%	70.51%	78.94%	88.18%	109.99%	89.42%	85.58%	77.13%
Age	91.68%	102.15%	80.59%	91.50%	99.96%	120.33%	98.24%	90.67%	80.42%
Educational attainment	-5.05%	-1.96%	-0.98%	-0.98%	-0.47%	-0.37%	-0.34%	-0.98%	-0.45%
Female	-1.43%	-0.54%	-0.95%	-0.27%	0.12%	-0.88%	-0.63%	-0.17%	-0.03%
Black/Hispanic	1.58%	0.30%	1.36%	1.03%	0.78%	-0.09%	0.98%	0.29%	0.33%
Single	0.39%	0.22%	0.35%	0.61%	2.36%	0.84%	-0.58%	1.07%	1.10%
Number of children	-2.09%	0.42%	0.46%	0.64%	0.34%	0.78%	0.84%	0.05%	0.34%
Self-employed	0.12%	-0.42%	-0.18%	0.72%	-0.58%	0.98%	0.58%	0.15%	0.14%
Out of labour force	-16.37%	-8.04%	-10.16%	-14.29%	-14.33%	-11.60%	-9.65%	-5.52%	-4.71%
Income components	31.60%	7.06%	29.72%	20.36%	11.66%	-14.67%	11.14%	10.66%	22.84%
Wages	3.58%	0.77%	6.49%	10.83%	4.35%	12.49%	7.50%	6.54%	9.61%
Capital income	26.10%	6.29%	23.18%	9.50%	7.21%	-26.32%	3.80%	4.38%	13.29%
Business income	4.39%	1.01%	6.89%	0.05%	2.30%	-3.30%	3.97%	1.84%	3.15%
Interest and dividends	-1.43%	2.70%	1.38%	0.85%	1.35%	-39.19%	2.48%	-15.08%	-1.37%
Capital gains	5.82%	-0.97%	1.24%	-4.55%	3.81%	2.75%	-13.88%	0.17%	-1.60%
Social security and retirement	17.32%	3.56%	13.67%	13.14%	-0.25%	13.42%	11.23%	17.44%	13.11%
Transfer income	1.92%	0.00%	0.05%	0.03%	0.11%	-0.84%	-0.17%	-0.26%	-0.07%
Debt payments	-0.44%	0.81%	-0.23%	0.70%	0.15%	4.67%	-0.56%	3.76%	0.04%
Mortgages	0.29%	1.25%	1.51%	0.95%	2.06%	3.82%	0.95%	3.30%	0.05%
Consumer debt	-0.40%	-0.56%	-1.61%	-0.57%	-1.92%	-0.49%	-1.57%	-0.33%	-0.51%
Revolving debt	-0.33%	0.12%	-0.13%	0.33%	0.02%	1.35%	0.06%	0.79%	0.49%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Top 10% vs. bottom 90% of income distribution

The purpose of decomposing the wealth and income gap between the bottom 90% and the top 10% of the income distribution is to assess which asset and debt holdings contributed to the concentration of wealth and income at the top of the distribution. Thus, we evaluate the validity of the proposed balance sheet composition underlining the three-class conceptualisation of the household sector in the stock-flow consistent model developed in Chapter 3, gauging the differences between the top group of households and the rest of the distribution.

Wealth inequality

Table 4.16 shows results of the Oaxaca-Blinder decomposition of the net wealth gap between households in the bottom 90% of the income distribution vs. households in the top 10%. The net wealth gap in the logarithmic terms is estimated to have risen steadily over time, from 2.58 in 1989 to 2.98 in 2013. Differences in endowments explained by the proposed regression model accounted for the largest portion of the net wealth gap, falling over time from 156.2% in 1989 to 144.7% in 2013.

Balance sheet variables explained the largest albeit declining portion of the endowments gap between the bottom 90% and the top 10% of the income distribution, while the contribution of household characteristics is estimated to be lower and have increased over time.

Among balance sheet variables, assets are found to contribute more to the endowments gap as debt is estimated to have a reducing effect. Differences in asset holdings across the bottom 90% and the top 10% explained 86.7% of the endowments gap in 1989, increasing to 87.1% in 2013, with an average peak of 91.4% over 1995-2001. In contrast, the impact of debt was negative at -2.3% in 1989, rising in absolute terms to -14.2% in 2010 and reaching -6.3% in 2013. However, the contribution of disparities in debt ownership to the explained wealth concentration was temporarily positive averaging 2.8% immediately before and during the crisis in 2004-2007.

Among assets, non-financial assets explained more of the differences in endowments between the bottom 90% and the top 10% of the income distribution than financial assets. Differences in non-financial asset holdings between the two groups accounted for 61.3% of the endowments gap in 1989, declining to 44.9% in 2007, before reaching 60.7% in 2013. In turn, differences in the holdings of financial assets explained 25.5% of the differences in endowments across the two groups, rising to 26.5% in 2013.

Among non-financial assets, differences in the holdings of primary residence as well as vehicles and other non-financial assets accounted for the greatest and increasing portion of the endowments gap. In contrast, the contribution of differences in the holdings of other real estate

and business equity to the endowments gap between the bottom 90% and the top 10% decreased over time.

Among financial assets, differences in holdings of retirement and insurance assets contributed the most to the endowments gap between the bottom 90% and the top 10% of the income distribution, followed by financial investment assets. The contribution of differences in the holdings transaction accounts to the gap in endowments between the bottom 90% and the top 10% was mixed between 1989-2013, fluctuating around positive and negative values.

Among debt components, secured debt is estimated to have a larger reducing effect on the differences in endowments across the bottom 90% and the top 10% than unsecured debt, although its impact turned briefly positive before the Great Recession. Differences in secured debt holdings across the two groups reduced the endowments gap by an average of 2.8% between 1989-2001, turning positive at an average of 3.7% over 2004-2007 before returning to a negative contribution since 2010. This was driven by the impact of differences in debt secured by primary residence. In contrast, the contribution of differences in the holdings of mortgages secured by other real estate was positive albeit lower throughout the period.

Conversely, differences in the unsecured debt holdings contributed positively to widen the differences in endowments between the bottom 90% and the top 10% of the income distribution over 1989-1992, averaging 0.3%. However, since 1992 this effect turned negative, rising in absolute terms from -0.02% in 1995 to -1.1% in 2013. This was driven by changes in the contribution of differences in the instalment debt holdings as disparities in credit card debt holdings contributed positively to the endowments gap over the period, although the magnitude of this effect was low.

Among household characteristics, disparities in net wealth due to educational attainment, marital status, and labour force participation are estimated to have the largest contribution to the differences in endowments between the bottom 90% and the top 10% of the income distribution, followed by race, gender, and self-employment. The impact of differences in age across the two groups was mixed in the period.

In sum, results of the Oaxaca-Blinder decomposition of the net wealth gap between households in the bottom 90% and the top 10% of the income distribution show that wealth inequality between these two groups was driven primarily by differences in the ownership of primary residence, vehicles and other non-financial assets, and retirement and insurance assets, as well as disparities across the levels of educational attainment, marital status, labour force participation, and, to a lesser extent, race, gender, and self-employment. Importantly, the ownership of financial investment assets became a greater determinant of wealth concentration at

the top decile before the Great Recession and in the most recent wave of the data. This supports our inclusion of securitised financial assets in the balance sheet of rentiers in the stock-flow consistent model in Chapter 3. Moreover, we find that the overall contribution of debt to the explained wealth concentration was negative in the period, which supports the inclusion of rentier debt in the Chapter 3 model by highlighting the incorporated differences in debt accumulation motives between the middle class and the rentiers.

Income inequality

To assess the impact of income flows associated with wealth composition on income concentration, Table 4.17 presents results of the Oaxaca-Blinder decomposition of the net income gap between households in the bottom 90% of the income distribution vs. households in the top 10%. The income gap is estimated to have increased over time, from 1.85 in the logarithmic terms in 1989 to 1.99 in 2013. The majority of the income gap is explained by differences in endowments across households in the bottom 90% and the top 10% of income distribution.

Differences in receipts of the various income components between the bottom 90% and the top 10% of the distribution accounted for the greatest portion of the differences in endowments explaining the net wealth gap. In contrast, the impact of household characteristics on the differences in endowments across the bottom 90% and the top 10% decreased over time. Differences in debt payments across the two groups accounted for a lower and a decreasing portion of the gap in endowments in the period studied.

Among income components, differences in wages across the bottom 90% and the top 10% explained the largest part of the gap in endowments, falling from 59.3% in 1989 to 54% in 2013, with a peak of 70.1% in 1995. Differences in capital income accounted for 21.9% of the gap in endowments across the two groups, increasing to 41.2% in 2013, with the highest contribution of 48% in the crisis in 2007. This was driven by the high and increasing contribution of differences in business income and capital gains to the endowments gap between the bottom 90% and the top 10%, followed by the differences in interest and dividend income and, to a smaller extent, disparities in social security and retirement income. Furthermore, the contribution of transfer income to the endowments gap between the bottom 90% and the top 10% of the income distribution was positive, declining from 1.3% in 1989 to an average of 0.5% between 1992-2010 before rising to 2.5% in 2013.

Among household characteristics, educational attainment, labour force participation, and marital status contributed the most to widening of the differences in endowments between the bottom 90% and the top 10% of the income distribution, followed by disparities across gender, race, age, and the number of children. The impact of these household variables declined between

1989-2013, with a minor pickup in the last wave of the data. Moreover, the contribution of self-employment to the explained income gap between the top 10% and the bottom 90% was mixed and fluctuated between positive and negative values over time.

Among debt payments, differences in mortgage payments between the bottom 90% and the top 10% of the income distribution explained the largest part of the differences in endowments in 1989 at 2.9%, but this effect declined over time to an average of 0.2% over 2004-2010, turning negative at -0.5% in 2013. Similarly, the contribution of differences in consumer debt payments to the endowments gap across the two groups was greater in the first half of the period, rising from 0.4% in 1989 to 0.9% in 1998, falling thereafter to reach 0.2% in 2013. Lastly, differences in the revolving debt payments declined steadily over time, from 1.7% in 1989 to an average of 0.03% over 2001-2013.

Overall, results of the Oaxaca-Blinder decomposition of the income gap between households in the bottom 90% and the top 10% of the income distribution reveal that disparities in wage receipts were the main driver of income inequality across the two groups between 1989-2013. This validates the inclusion of the rentier wage in the rentier income equation in the stock-flow consistent model in Chapter 3. Moreover, the finding that the contribution of disparities in capital income, particularly business income and capital gains, increased overtime also supports our distinction of the middle class from the rentier class based on these capital income inflows from wealth ownership.

Table 4.16 Oaxaca-Blinder decomposition of the Top 10%–Bottom 90% net wealth gap

Log Net Worth	**1989**	**1992**	**1995**	**1998**	**2001**	**2004**	**2007**	**2010**	**2013**
Top 10%	13.57	13.29	13.29	13.54	13.92	13.98	14.14	13.97	14.03
Bottom 90%	10.99	10.94	11.05	11.18	11.33	11.27	11.37	11.13	11.06
Difference	2.58	2.35	2.24	2.36	2.59	2.71	2.77	2.84	2.98
Endowments	156.21%	155.38%	146.43%	170.89%	170.29%	154.70%	157.25%	115.23%	144.71%
Coefficients	74.32%	69.54%	77.19%	75.29%	69.48%	71.79%	70.70%	66.99%	72.08%
Interaction	-130.52%	-124.92%	-123.63%	-146.17%	-139.77%	-126.48%	-127.95%	-82.22%	-116.79%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
Endowments									
Household characteristics	15.55%	14.54%	15.56%	12.18%	11.35%	17.84%	16.53%	25.67%	19.18%
Age	0.33%	-1.04%	0.36%	-0.35%	-0.15%	0.61%	0.77%	0.65%	0.24%
Educational attainment	5.04%	5.29%	5.21%	5.22%	5.02%	7.01%	6.50%	10.73%	8.61%
Female	1.76%	1.19%	0.75%	1.23%	1.52%	3.47%	2.41%	2.83%	1.25%
Black/Hispanic	1.95%	1.16%	2.21%	1.11%	1.70%	1.93%	1.86%	2.83%	2.25%
Single	3.31%	3.45%	3.00%	2.62%	1.28%	1.36%	1.54%	3.77%	3.13%
Number of children	0.02%	-0.67%	-0.30%	-0.23%	0.00%	0.04%	0.03%	-0.02%	0.04%
Self-employed	1.86%	2.46%	1.51%	1.31%	0.52%	2.03%	1.83%	1.79%	1.39%
Out of labour force	1.27%	2.71%	2.81%	1.27%	1.46%	1.39%	1.59%	3.08%	2.27%
Balance sheet variables	*84.45%*	*85.46%*	*84.44%*	*87.82%*	*88.65%*	*82.16%*	*83.47%*	*74.33%*	*80.82%*
Assets	86.73%	87.11%	94.89%	88.61%	90.80%	79.44%	80.56%	88.57%	87.14%
Non-financial	61.25%	49.83%	58.55%	48.02%	65.48%	48.31%	44.90%	78.32%	60.67%
Primary residence	40.62%	41.03%	49.85%	31.31%	37.71%	34.90%	33.03%	70.15%	45.23%
Other real estate	6.60%	0.78%	2.17%	1.29%	2.87%	6.34%	3.24%	0.01%	0.27%
Vehicles and other	7.78%	6.81%	4.81%	11.44%	20.08%	8.02%	6.28%	9.15%	16.21%
Business equity	6.25%	1.21%	1.72%	3.98%	4.82%	-0.95%	2.35%	-0.98%	-1.04%
Financial	25.48%	37.27%	36.34%	40.59%	25.32%	31.13%	35.65%	10.25%	26.47%
Transaction accounts	-0.44%	9.48%	3.77%	9.77%	3.87%	-3.20%	11.87%	0.46%	-1.64%
Financial investment assets	8.84%	6.03%	4.20%	12.84%	2.81%	13.81%	-2.16%	-0.89%	9.43%
Retirement and insurance assets	17.08%	21.77%	28.37%	17.98%	18.64%	20.51%	25.94%	10.68%	18.68%
Debt	-2.29%	-1.65%	-10.45%	-0.79%	-2.15%	2.72%	2.91%	-14.24%	-6.32%
Secured	-1.84%	-1.03%	-9.92%	0.44%	-1.43%	3.42%	4.03%	-12.81%	-5.48%
By primary residence	-3.33%	-0.92%	-11.76%	-0.21%	-2.53%	2.94%	2.44%	-13.92%	-6.67%
By other real estate	1.49%	-0.12%	1.85%	0.66%	1.10%	0.48%	1.60%	1.11%	1.19%
Unsecured	0.44%	0.23%	-0.02%	-0.45%	-0.15%	-0.46%	-0.73%	-1.20%	-1.07%
Instalment debt	0.42%	0.05%	-0.14%	-0.24%	-0.18%	-0.73%	-0.32%	-1.29%	-1.10%
Credit card balances	0.02%	0.17%	0.13%	-0.21%	0.03%	0.27%	-0.41%	0.08%	0.03%
Other debt	-0.89%	-0.85%	-0.51%	-0.78%	-0.57%	-0.24%	-0.39%	-0.22%	0.23%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 4.17 Oaxaca-Blinder decomposition of the Top 10%–Bottom 90% income gap

Log Income	**1989**	**1992**	**1995**	**1998**	**2001**	**2004**	**2007**	**2010**	**2013**
Top 10%	12.33	12.21	12.24	12.34	12.55	12.52	12.61	12.53	12.56
Bottom 90%	10.48	10.43	10.44	10.54	10.64	10.64	10.65	10.61	10.57
Difference	1.85	1.79	1.80	1.80	1.91	1.88	1.95	1.92	1.99
Endowments	139.43%	120.23%	166.11%	178.34%	207.62%	275.17%	332.98%	301.89%	307.39%
Coefficients	82.41%	82.34%	86.01%	82.17%	81.82%	83.33%	75.42%	78.04%	77.62%
Interaction	-121.85%	-102.57%	-152.12%	-160.50%	-189.44%	-258.50%	-308.40%	-279.93%	-285.01%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
Endowments									
Household characteristics	12.51%	15.23%	9.37%	7.81%	6.44%	2.56%	2.09%	1.80%	2.46%
Age	0.33%	0.00%	0.17%	0.15%	0.09%	0.09%	0.07%	0.09%	0.10%
Educational attainment	3.97%	5.21%	2.61%	2.57%	2.69%	0.61%	0.57%	0.48%	0.48%
Female	1.03%	1.02%	1.58%	1.11%	0.67%	0.50%	0.17%	0.16%	0.02%
Black/Hispanic	1.78%	0.79%	0.91%	0.61%	0.47%	0.14%	0.15%	0.05%	0.10%
Single	2.48%	3.72%	1.44%	1.32%	1.40%	0.61%	0.52%	0.44%	0.90%
Number of children	0.16%	0.34%	0.04%	0.11%	0.03%	0.10%	0.01%	0.06%	0.07%
Self-employed	0.71%	-0.11%	0.39%	0.25%	-0.23%	-0.27%	-0.09%	-0.04%	0.16%
Out of labour force	2.06%	4.25%	2.22%	1.68%	1.31%	0.78%	0.69%	0.56%	0.63%
Income components	82.56%	78.78%	86.45%	87.54%	91.26%	97.01%	97.50%	97.74%	97.72%
Wages	59.29%	62.02%	70.12%	59.15%	61.56%	58.40%	49.28%	62.26%	53.98%
Capital income	21.97%	16.70%	15.66%	27.51%	28.78%	38.18%	48.02%	34.84%	41.20%
Business income	1.51%	3.47%	1.49%	5.63%	8.54%	20.38%	24.21%	22.93%	20.00%
Interest and dividends	4.46%	13.49%	11.55%	6.09%	2.38%	6.42%	7.30%	6.36%	6.02%
Capital gains	14.30%	-0.18%	1.02%	15.01%	17.37%	8.81%	14.48%	3.40%	10.97%
Social security and retirement	1.70%	-0.08%	1.59%	0.78%	0.49%	2.57%	2.03%	2.15%	4.21%
Transfer income	1.30%	0.06%	0.67%	0.87%	0.91%	0.43%	0.20%	0.64%	2.54%
Debt payments	4.93%	5.99%	4.18%	4.65%	2.30%	0.43%	0.41%	0.47%	-0.18%
Mortgages	2.89%	4.52%	3.40%	3.64%	1.75%	0.05%	0.13%	0.31%	-0.45%
Consumer debt	0.36%	0.75%	0.50%	0.85%	0.52%	0.31%	0.27%	0.16%	0.22%
Revolving debt	1.68%	0.72%	0.27%	0.16%	0.03%	0.07%	0.02%	0.00%	0.05%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Bottom 20% vs. top 80% of income distribution

The decomposition of the income and wealth gap between the bottom 20% and the top 80% of the income distribution enables us to assess the validity of the constructed balance sheet composition of the bottom group in the three-class household sector proposed in the stock-flow consistent model. We analyse the contribution of the differences in balance sheet composition to inequality between the lowest income group and the rest of the distribution, which indirectly evaluates the distinction between the middle and the working class based on homeownership undertaken in the model in Chapter 3.

Wealth inequality

Table 4.18 presents results of the Oaxaca-Blinder decomposition of the net wealth gap between households in the bottom 20% of income distribution vs. households in the top 80%. The wealth gap is estimated to have increased over time from 2.14 in the logarithmic terms in 1989 to 2.24 in 2013. The majority of the wealth gap is explained by the regression model, as differences in endowments contributed 253.2% in 1989, falling to 119.8% in 2013.

Balance sheet variables explained the majority of the differences in endowments between the bottom 20% and the top 80%, falling over time due to the decline in the contribution of debt, which fluctuated between positive and negative values over time. In contrast, differences in asset holdings between the two groups explained a larger and increasing part of the endowments gap between 1989-2013. Similarly, the impact of household characteristics on the differences in endowments increased in this period, but its magnitude was comparatively low.

Among asset holdings, non-financial assets are estimated to have contributed more to the differences in endowments between the bottom 20% and the top 80% than financial assets. Disparities in non-financial asset ownership across the two groups explained 63.5% of the endowments gap in 1989, increasing to an average of 70.2% over 2007-2013. This was driven by the contribution of differences in the holdings of primary residence, which rose between 1989-2013. Similarly, the impact of differences in the ownership of vehicles and other non-financial assets on the endowments gap between the two groups increased in the period. In contrast, the contribution of differences in business equity and other real estate holdings was mixed over time and fluctuated between positive and negative values.

Moreover, financial assets explained 21.7% of the differences in endowments between the bottom 20% and the top 80% in 1989, increasing to 32.4% in 2013, with a negative impact of -7.3% in 2010 immediately after the financial crisis. Among financial assets, differences in the ownership of retirement and insurance assets explained the largest part of the endowments gap

between the bottom 20% and the top 80%, while the contribution of disparities in transaction accounts and financial investment assets fluctuated between positive and negative values between 1989-2013.

Among debt components, secured debt is estimated to have a greater negative effect on the differences in endowments between the bottom 20% and the top 80% than unsecured debt. Differences in the holdings of secured debt between the two groups reduced the endowments gap by 7.3% in 1989, increasing in absolute terms to an average of -29.5% over 2010-2013. This was driven by changes in the contribution of differences in holdings of debt secured by primary residence, while the contribution of differences in the holdings of debt secured by other real estate fluctuated in the period. Furthermore, differences in unsecured debt holdings explained 24.8% of the endowments gap between the bottom 20% and the top 80% of the income distribution in 1989, declining to -4.2% in 2013. This was driven by changes in the contribution of differences in instalment debt holdings, as the impact of differences in the credit card debt holdings was comparatively higher and increased between 1989-2013. In contrast, the contribution of differences in other debt holdings to the endowments gap rose from -2.9% in 1989 to 6% in 2007 during the crisis, declining to an average of 0.1% over 2010-2013.

Among household characteristics, differences in the level of educational attainment, labour force participation, marital status, as well as gender and race accounted for the largest part of the endowments gap between the bottom 20% and the top 80% of the income distribution. Furthermore, the contribution of differences in net wealth between self-employed households and others was positive but low between 1989-2013, while the impact of disparities in the number of children was mixed. In contrast, differences in age had a negative effect on the endowments gap between the bottom 20% and the top 80%, and the effect increased in absolute terms over time.

Overall, results of the Oaxaca-Blinder decomposition of the net wealth gap between households in the bottom 20% and in the top 80% of the income distribution show that wealth inequality among these groups between 1989-2013 was driven by primarily the differences in the ownership of main residence, vehicles and other non-financial assets, as well as disparities in educational attainment and labour force participation. This supports the differentiation of the middle class from the working class in the stock-flow consistent model in Chapter 3 by their homeownership. Moreover, the increasing contribution of differences in the ownership of retirement and insurance assets to the explained wealth inequality between these groups signals that households in the bottom quintile had a more limited access to private pension wealth than households in the top 80%. Furthermore, the declining contribution of differences in secured debt coupled with the rising impact of the disparities in credit card balances on the explained wealth

inequality across these two groups supports the distinction between secured and unsecured debt in the stock-flow consistent model, and its allocation to the middle and the working class respectively.

Income inequality

To understand the impact of wealth composition on income inequality, Table 4.19 shows results of the Oaxaca-Blinder decomposition of the net income gap between households in the bottom 20% of income distribution vs. households in the top 80%. In contrast to net wealth inequality, the income gap in the logarithmic terms is estimated to have fallen over time, after an initial increase from 1.8 in 1989 to 1.84 in 1998, to 1.64 in 2010, rising to 1.67 in 2013. Differences in endowments explained by the regression model accounted for the largest part of the net income gap over time, increasing from 34.2% in 1989 to 484.5% in 2013.

Differences in income components are estimated to have the highest contribution to the differences in endowments between households in the bottom 20% vs. the top 80% of the income distribution. The contribution of household characteristics and debt payments was mixed between 1989-2013, fluctuating between positive and negative values.

Among income components, differences in wage receipts contributed the most to the endowments gap between the bottom 20% and the top 80%, increasing from an average of 69.3% over 1989-1992 to 110.7% in 1995 before declining to 69.6% in 2013. Disparities in the receipts of capital income initially reduced the endowments gap by an average of 10.7% in 1989 and 1995, turning positive in 1998 and increasing to 30.7% in 2013. This was driven by the high contribution of differences in the receipts of business income, capital gains, and social security and retirement income to the endowments gap between the two groups. In contrast, differences in the receipts of interest and dividend income accounted for a lower portion of the endowments gap, and the contribution was initially negative. Moreover, differences in the receipts of transfer income contributed to widening of the differences in endowments across the bottom 20% and the top 80% by 12.6% in 1992, decreasing to 0.1% in 2013, with a negative effect averaging -0.9% in the remaining waves. This indicates that the social transfer policy in the USA in that period failed to target the poorest households in the bottom quintile of the distribution.

Among household characteristics, disparities across race, level of educational attainment, and the number of children have had the highest contribution to the differences in endowments between the bottom 20% and the top 80% of the income distribution. The contribution of income disparities due to differences in gender, labour force participation, marital status, and self-employment was mixed in the period, while differences in age contributed to reducing the endowments gap.

Among debt payments, differences in payments on revolving debt had the highest contribution to the endowments gap between households in the bottom 20% vs. in the top 80% of the income distribution, falling from 16.3% in 1989 to 0.04% in 2013, with a marginally negative effect in 1998 and 2004. Similarly, differences in mortgage payments across the two groups accounted for 4.5% of the endowments gap in 1989, turning negative in 1992 and reaching -0.1% in 2013. In contrast, the impact of differences in payments on consumer debt on the endowments gap between the bottom 20% and the top 80% increased over time, from -2.3% in 1989 to a positive average of 0.3% over 1998-2001, declining to 0.02% in 2013.

Overall, results of the Oaxaca-Blinder decomposition of the income gap between the bottom 20% and the top 80% of the income distribution show that differences in wages across the two groups contributed the most to income inequality explained by the proposed regression model. Nevertheless, differences in capital income receipts, particularly business income, capital gains, and social security and retirement income, have become greater determinants of inequality, particularly since the mid-2000s. The importance of capital gains supports the validity of introducing the middle class into the household sector in the stock-flow consistent model in Chapter 3 based on homeownership and recognising the growing heterogeneity of wealth towards the bottom of the distribution. This is also motivated by the increasing wealth gap between the bottom 20% and the top 80%, compared to the estimated decline in the income gap.

Table 4.18 Oaxaca-Blinder decomposition of the Bottom 20%–Top 80% net wealth gap

Log Net Worth	1989	1992	1995	1998	2001	2004	2007	2010	2013
Top 80%	11.60	11.49	11.59	11.79	11.97	11.96	12.03	11.81	11.79
Bottom 20%	9.43	9.71	9.88	9.79	9.85	9.73	9.99	9.67	9.55
Difference	2.17	1.79	1.71	2.00	2.12	2.23	2.04	2.14	2.24
Endowments	253.16%	133.48%	83.75%	163.63%	145.83%	107.39%	152.98%	60.45%	119.76%
Coefficients	60.02%	61.60%	62.48%	61.85%	65.08%	61.30%	60.72%	60.88%	57.01%
Interaction	-213.18%	-95.08%	-46.22%	-125.48%	-110.91%	-68.69%	-113.69%	-21.34%	-76.77%
Total	11.60	11.49	11.59	11.79	11.97	11.96	12.03	11.81	11.79
Endowments									
Household characteristics	0.20%	9.79%	19.49%	2.25%	4.48%	14.23%	14.37%	37.11%	26.04%
Age	-1.83%	-10.04%	-11.07%	-3.40%	-5.05%	-5.41%	-7.38%	-7.28%	-4.02%
Educational attainment	-1.18%	3.63%	3.56%	2.75%	5.23%	4.86%	9.37%	16.57%	9.09%
Female	3.30%	-1.11%	-1.70%	-1.66%	-0.86%	11.73%	2.52%	12.45%	0.26%
Black/Hispanic	0.84%	1.94%	5.84%	0.12%	2.68%	2.92%	0.91%	3.68%	2.59%
Single	0.42%	6.72%	10.20%	4.32%	1.17%	-5.64%	2.49%	1.54%	7.02%
Number of children	0.28%	-1.46%	-5.62%	-1.19%	-0.52%	1.27%	-0.32%	5.22%	1.27%
Self-employed	0.38%	2.57%	2.60%	0.30%	-0.61%	1.22%	1.81%	0.60%	0.56%
Out of labour force	-2.00%	7.54%	15.68%	1.01%	2.46%	3.29%	4.97%	4.32%	9.27%
Balance sheet variables	*99.80%*	*90.21%*	*80.51%*	*97.75%*	*95.52%*	*85.77%*	*85.63%*	*62.89%*	*73.96%*
Assets	85.18%	122.24%	115.55%	89.26%	119.24%	95.53%	81.82%	76.68%	105.01%
Non-financial	63.50%	82.39%	112.53%	53.07%	116.75%	92.48%	53.98%	83.93%	72.62%
Primary residence	47.88%	56.95%	89.58%	40.96%	63.15%	88.81%	49.94%	83.62%	56.20%
Other real estate	3.06%	8.44%	4.26%	-4.83%	7.38%	5.17%	-3.04%	0.32%	-3.19%
Vehicles and other	0.94%	17.99%	20.33%	15.17%	38.43%	4.59%	8.80%	1.21%	21.53%
Business equity	11.62%	-0.99%	-1.64%	1.77%	7.79%	-6.10%	-1.72%	-1.23%	-1.91%
Financial	21.68%	39.85%	3.01%	36.18%	2.49%	3.05%	27.84%	-7.25%	32.39%
Transaction accounts	4.25%	12.99%	2.50%	1.80%	0.47%	-9.36%	-2.85%	8.58%	-5.08%
Financial investment assets	8.24%	7.47%	-1.56%	2.68%	-5.18%	-4.67%	0.27%	-1.24%	6.37%
Retirement and insurance assets	9.20%	19.38%	2.06%	31.70%	7.20%	17.07%	30.41%	-14.59%	31.10%
Debt	14.62%	-32.03%	-35.03%	8.49%	-23.72%	-9.75%	3.81%	-13.78%	-31.05%
Secured	-7.29%	-30.51%	-51.13%	2.64%	-22.89%	-29.58%	-0.75%	-31.93%	-27.04%
By primary residence	-5.96%	-13.03%	-53.72%	-0.52%	-14.33%	-27.35%	-1.55%	-30.13%	-26.90%
By other real estate	-1.33%	-17.47%	2.59%	3.16%	-8.56%	-2.23%	0.80%	-1.80%	-0.13%
Unsecured	24.75%	-1.34%	13.24%	6.84%	0.37%	19.78%	-1.42%	18.21%	-4.19%
Instalment debt	6.72%	-0.50%	8.65%	6.17%	-1.23%	8.63%	-1.87%	-0.11%	-7.94%
Credit card balances	18.04%	-0.84%	4.58%	0.66%	1.60%	11.14%	0.45%	18.32%	3.76%
Other debt	-2.85%	-0.18%	2.86%	-0.99%	-1.20%	0.05%	5.98%	-0.06%	0.17%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 4.19 Oaxaca-Blinder decomposition of the Bottom 20%–Top 80% income gap

Log Income	**1989**	**1992**	**1995**	**1998**	**2001**	**2004**	**2007**	**2010**	**2013**
Top 80%	11.01	10.96	10.99	11.07	11.19	11.18	11.19	11.12	11.10
Bottom 20%	9.21	9.16	9.09	9.24	9.37	9.39	9.46	9.48	9.43
Difference	1.80	1.80	1.90	1.84	1.81	1.79	1.73	1.64	1.67
Endowments	34.16%	143.05%	94.26%	151.21%	233.30%	286.05%	365.84%	372.40%	484.54%
Coefficients	60.78%	62.80%	66.38%	64.87%	63.25%	63.48%	60.45%	61.50%	58.14%
Interaction	5.06%	-105.85%	-60.64%	-116.09%	-196.54%	-249.52%	-326.29%	-333.90%	-442.68%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
Endowments									
Household characteristics	13.44%	2.54%	4.25%	2.02%	0.62%	-0.26%	0.39%	-0.33%	-0.33%
Age	-0.16%	-0.45%	-0.94%	-0.34%	0.02%	-0.02%	-0.10%	-0.01%	-0.01%
Educational attainment	6.03%	-0.03%	-0.29%	0.86%	0.74%	-0.27%	-0.06%	0.05%	-0.06%
Female	-0.86%	1.02%	2.24%	0.18%	-0.26%	0.43%	-0.19%	-0.02%	-0.10%
Black/Hispanic	6.87%	1.00%	1.67%	0.53%	-0.22%	-0.02%	0.01%	-0.06%	0.00%
Single	0.45%	-1.14%	-1.57%	-0.58%	0.83%	-0.61%	0.41%	-0.07%	0.07%
Number of children	6.06%	0.18%	0.36%	-0.08%	-0.01%	0.11%	-0.01%	0.06%	-0.04%
Self-employed	-0.17%	0.38%	0.51%	0.31%	-0.64%	-0.08%	0.09%	0.04%	0.01%
Out of labour force	-4.78%	1.58%	2.29%	1.14%	0.16%	0.18%	0.24%	-0.31%	-0.19%
Income components	68.04%	103.15%	92.04%	98.98%	98.78%	101.00%	100.64%	101.29%	100.41%
Wages	72.66%	65.89%	110.68%	80.16%	86.82%	77.47%	71.60%	76.64%	69.60%
Capital income	-4.38%	24.61%	-17.03%	19.32%	11.80%	24.28%	29.96%	25.87%	30.71%
Business income	1.45%	11.13%	2.60%	6.54%	6.98%	13.08%	15.88%	15.80%	15.33%
Interest and dividends	-4.84%	6.84%	0.90%	4.27%	0.96%	2.07%	4.53%	1.07%	3.14%
Capital gains	-9.47%	3.46%	-27.38%	4.70%	1.82%	2.47%	5.93%	2.35%	4.48%
Social security and retirement	8.49%	3.18%	6.85%	3.81%	2.04%	6.66%	3.62%	6.64%	7.76%
Transfer income	-0.25%	12.64%	-1.61%	-0.50%	0.15%	-0.75%	-0.92%	-1.22%	0.10%
Debt payments	18.53%	-5.69%	3.70%	-0.99%	0.60%	-0.74%	-1.02%	-0.97%	-0.08%
Mortgages	4.51%	-6.32%	1.28%	-1.28%	-0.43%	-0.89%	-1.51%	-1.06%	-0.13%
Consumer debt	-2.30%	0.22%	0.22%	0.33%	0.26%	0.20%	0.19%	-0.01%	0.02%
Revolving debt	16.32%	0.41%	2.21%	-0.04%	0.77%	-0.05%	0.30%	0.10%	0.04%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Summary

In this subsection, we analysed the determinants of wealth and income inequality between 1989 and 2013 using the OB decomposition across gender, race, generations, and in more detail across the distribution of income between the top 10% and the bottom 90% as well as between the bottom 20% and the top 80%. We established that disparities in the ownership of primary residence and, to a lesser extent, private pension wealth were the main drivers of wealth inequality across the analysed subgroups. Similarly, we found that the disparities in wages, business income, capital gains, and retirement income contributed the most to income inequality across subgroups, and the higher contribution of wages was the most consistent.

The main original feature of this analysis was to comprehensively examine the intersectional nature of income and wealth inequality determined by the heterogeneity of household wealth composition. We thus addressed the limitation of the stock-flow consistent model in Chapter 3, which did not explicitly account for the social dimension of wealth inequality. Moreover, by decomposing the gap in income and wealth gap between the bottom 90% and the top 10%, as well as between the bottom 20% and the top 80% of the income distribution, we provided empirical support for the proposed construction of the balance sheet structures of the three classes of households in the stock-flow consistent model. Specifically, the high contribution of wage inequality to the income gap between the top 10% and the bottom 90%, together with the negative contribution of debt disparities motivated the inclusion of the rentier wage and the rentier debt in the model. Moreover, rising wealth inequality between the bottom 20% and the top 80% driven by disparities in homeownership justified the distinction of the middle class from the working class.

4.4.4. Decomposition analysis summary

The inequality decomposition analysis in this chapter combined non-parametric and parametric approaches to empirically evaluate the finding of the stock-flow consistent model developed in Chapter 3 and asses which types of wealth were the key drivers of inequality in the USA between 1989-2013. The analysis was conducted for both wealth and income, considering the different types of assets and liabilities, and the associated income flows from wealth ownership, as well as income from employment and transfers. We used three approaches to decompose the level of income and wealth inequality over time – the Shorrocks decomposition, the regression-based Fields decomposition, and the Oaxaca-Blinder decomposition.

A common conclusion from all three decomposition approaches was that differences in asset ownership contributed more to wealth inequality than disparities in debt between 1989-2013. Non-financial assets were estimated to explain a greater portion of wealth inequality than financial

assets. In the parametric approaches, wage income contributed more to income inequality than capital income, while in the non-parametric approach the contribution of wages to income inequality increased over time. In addition, the parametric approaches estimated a higher contribution of debt payments to income inequality than the Shorrocks decomposition. Moreover, transfer income was found not to reduce inequality to a great extent, suggesting that the current policy of social transfers did not sufficiently alleviate income polarisation in the US society. Furthermore, among household characteristics considered in the parametric approaches, educational attainment, race, and gender consistently emerged as sizeable determinants of both income and wealth inequality.

Comparison of the results of the Fields decomposition and the Oaxaca-Blinder decomposition showed that the precise contribution of income sources, debt payments, and balance sheet variables differed substantially across the population, confirming the relevance of the intersectional analysis of the research hypothesis. The Oaxaca-Blinder decomposition was found to give greater weight to capital income and debt holdings than the Fields decomposition, emphasising disparities in social security and retirement income, and business income. Moreover, the contribution of unsecured debt and financial investment asset ownership to wealth inequality increased at various moments of time across the analysed subgroups.

Results of the Oaxaca-Blinder decomposition supported our argument that wealth composition was a substantial driver of wealth and income inequality across gender, race, and generations due to the political economy of securitisation and subprime lending discussed by the Post-Keynesian analyses of consumption on Chapter 2. We thus addressed the limitation of the stock-flow consistent model from Chapter 3, which could not take this social dimension of wealth distribution into account. Moreover, the rising wealth inequality between the bottom 20% and the top 80% of the income distribution driven by disparities in homeownership, together with the increasing contribution of capital gains to income inequality indicated that the introduction of the middle class in the household sector in the model based on the differences in homeownership was valid. Simultaneously, the increasing contribution of wages alongside capital income and the negative impact of debt holdings to the explained inequality between the top 10% and the bottom 90% motivated our definition of the capitalist class as working rentiers accumulating debt. This analysis enabled us to examine how the extreme ends of the distribution differ from the rest, providing justification for the division of households in the stock-flow consistent model in Chapter 3.

In sum, the decomposition analysis in this chapter showed that in order to understand the determinants of income and wealth inequality since the 1980s is it necessary to consider the

intersectional dimension of wealth heterogeneity, which generates inequality through disparate income flows across households dependent on the absolute size of wealth. We conclude that the variation of the decomposition results is not a weakness of the analysis but it rather highlights the importance of a comprehensive consideration of wealth composition across the various heterogeneous groups in the US society in analysing inequality. Consequently, we refrain from choosing the preferred decomposition method. Both the non-parametric and the parametric approaches have their merits, keeping in mind their methodological differences. Instead we argue that the regression-based techniques of Fields and Oaxaca-Blinder, which allow for correlation among the determinants of inequality, need to be complemented by the non-parametric Shorrocks decomposition given the potential problems of regression estimation highlighted earlier in this chapter, such as endogeneity problems associated with reverse causality.

4.5. Summary

The empirical results of the analysis in this chapter confirmed the finding of the stock-flow consistent model developed in Chapter 3, namely that differences in wealth composition influenced inequality by generating disparities in leverage and the returns to wealth dependent on its absolute size. The linear regression analysis, together with the non-parametric median slope estimation, established the statistical significance of the relationship between household balance sheet composition and relative inequality, measured in terms of the position of household income relative to the median. We found that greater relative ownership of primary residence, low-yielding transaction accounts, and unsecured debt pushed households away from the median towards the bottom of the income distribution. In contrast, higher accumulation of business equity, high-yielding financial investment assets, secured debt, as well as retirement and insurance assets and other property pulled households further away from the median towards the top of the income distribution. The latter effects were found to be driven primarily by the processes of securitisation and subprime lending between 2001-2007 and were not shared equally across gender, race, and generations.

Moreover, the inequality decomposition analysis assessed the quantitative contribution of wealth components and their associated income flows to the absolute measures of wealth and income inequality. In addition to business equity, financial investment assets, retirement and insurance assets, and their associated income flows, the analysis highlighted the contribution of disparities in homeownership and wages in determining wealth and income inequality. These were particularly sizeable in generating income and wealth disparities across gender, race, and generations. Moreover, the detailed analysis of the gap in income and wealth across the distribution, comparing the top 10% to the bottom 90% as well as the bottom 20% to the top 80%,

validated the proposed classification of balance sheet structures in the three-class household sector developed in the stock-flow consistent model. It confirmed the relevance of including the rentier wage, accounting for differences in debt accumulation motives, and distinguishing between the working and the middle class based on homeownership in analysing the dynamics of inequality in the context of financial sector transformation.

Overall, our analysis showed that there is a visible intersectional dimension of the impact of wealth composition on inequality. While we were not able to resolve the causal debates highlighted in Chapter 1, we exposed the role of financial sector transformation in exacerbating the racial, gender, and intergenerational disparities in wealth and income through differences in household balance sheet composition across these social categories. The high contribution of housing to the gender, racial, and intergenerational inequality supported the insights of the Post-Keynesian analyses of consumption discussed in Chapter 2. These highlighted that the processes of securitisation and subprime lending induced an unsustainable accumulation of wealth among women, ethnic minorities, and the young, based on leveraged homeownership. This was also reflected in the rising contribution of capital gains income to income inequality alongside wages. This insight is particularly relevant in light of the restructuring of the US housing market after the Great Recession making homeownership more exclusive due to rising house prices. Consequently, our analysis shows that disparities in homeownership, together with access to secured debt, pension wealth, and high-yielding assets such as business equity and financial investment assets continue to define the inequality and the intersectional dimension of income and wealth distribution.

The most original features of our analysis include the application of a combination of parametric and non-parametric estimation methods which are commonly used in the income inequality literature to analyse the distribution of wealth, particularly in terms of the variance-based decompositions of Shorrocks and Fields, the quantile regression, and the Theil-Sen median slope estimation. Moreover, the linear regression analysis introduces a new specification into the inequality determination literature, constructing measures of relative inequality and balance sheet composition variables. The main limitation of our approach concerns the potential implications of endogeneity, omitted variable bias, heteroscedasticity, and serial correlation for the reliability of our parametric results, and the inability to account for correlation among factor components in the non-parametric approaches.

In sum, we establish empirical support for the research hypothesis formalised in the stock-flow consistent model, answering the final research question regarding the precise channels through which wealth ownership influences inequality in the US society. We conclude that

analyses which do not explicitly consider wealth distribution cannot fully explain the observed increases in income and wealth inequality in the USA since the 1980s. Consequently, the consideration of household wealth composition as an independent determinant of inequality with a visible intersectional dimension across gender, race, and generations has important policy implications. In the next chapter, we analyse how our research findings inform the current policy debates on reducing inequality in the literature.

Chapter 5

Policy implications

In the previous chapters, we showed that differences in the household balance sheet structures had become a significant determinant of the income and wealth distribution in the USA since the 1980s. Households with more diverse asset portfolios consisting of profitable financial assets, business equity, and various types of property were able to accumulate larger returns on their wealth and thus enjoy greater income increases than households relying on primary residence and low-yielding financial assets as their main source of wealth. The ability to accumulate wealth among the low- and middle-income households was undermined by the volatility of house prices and became tied to the financial market performance. Given the low valuation of their assets and stagnating income growth associated with the broader liberalisation measures in the USA, households in the middle and the bottom of the income distribution suffered from higher leverage than households at the top, even though the latter group was indebted the most both in terms of the value of debt and ownership rates.

In this chapter, we analyse the policy implications of our research findings that household wealth heterogeneity generates inequality because of differences in leverage and the associated returns to wealth dependent on its absolute size. We attempt to answer the following questions: what policy strategies to alleviate income and wealth inequality have been put forward in the literature? Are these policy proposals suitable to tackle inequality in the USA in the context of the disparities in household wealth composition across the distribution? What are the implication of these policies for the racial, gender, and intergenerational inequality? Finally, what are the potential obstacles to implementing these policies in the present US context?

We first recall policy implications of the existing literature on inequality discussed in Chapter 2. From the standpoint of the permanent income hypothesis, inequality is seen as a natural outcome of market processes arising due to differences in skills and marginal productivities across households. Consequently, the standard recommendation to reduce inequality is investment in human capital through education (Murphy/Topel 2016). However, empirical evidence suggests that the recently observed decreases in human capital inequality have not been accompanied by falling income and wealth inequality (Castelló-Climent/Doménech 2014). In this context, several policy proposals explicitly focused on taxation and the distribution of market income and wealth have been put forward in the recent literature. We discuss these policy proposals in detail, and evaluate their effectiveness in reducing wealth inequality in light of our research findings regarding the importance of wealth distribution for overall inequality. We first review the global

wealth tax developed by Piketty (2014), followed by Atkinson's (2015) proposals of reducing wealth inequality. Moreover, we discuss Galbraith's (2016) three-tier approach to inequality alleviating policies, extending his recommendations regarding the distribution of income to wealth, as well as Stiglitz's (2012) policy recommendations of improving market transparency.

These policy proposals are assessed against the questions stated above, highlighting several issues for consideration. Firstly, we argue that distinct policy measures targeting wealth inequality have greater potential to reduce economic inequality than policies aimed at improving the distribution of income alone. Secondly, we argue that taxation would be more effective if complemented by policies affecting the distribution of market outcomes. The latter could be focused not only on promoting sustainable asset ownership among low-wealth households but also on alleviating their debt burden. Such mix of policies is likely to be more successful in promoting a more egalitarian distribution of wealth and income in the long run, simultaneously addressing the racial, gender, and intergenerational inequalities.

5.1. Summary of the key policy recommendation in the literature

In light of Piketty's (2014) emphasis on the importance of wealth distribution for overall inequality, he emphasises the need for policy to explicitly target wealth inequality. Piketty advocates the introduction of a progressive global wealth tax, drawing from earlier proposals for wealth taxation (Thurston 1963; Thurow 1972; Shakow 1986; Wolff 1995,1996). He puts forward several other measures addressing income inequality, such as progressive income taxes, but argues that these are not sufficient to reduce the inequality of wealth. This is because income taxes only affect returns earned from wealth but not the stock of wealth, which continues to earn large returns. In contrast, taxation of wealth directly reduces the amount of wealth which decreases its growth (r) relative to income (g). Importantly, such wealth tax must be implemented globally in order to escape revenue losses due to tax evasion[76] associated with the mobility of wealth. Piketty proposes the global wealth tax to be imposed on an annual basis on the value of all assets owned by an individual which exceed $1.35 million, less the value of debt. The associated tax rate would increase from 1% on net assets valued between $1.35 to $6.75 million to 2% for net asset holdings over $6.75 million.

[76] It is important to distinguish between tax evasion and tax avoidance. While both practices pose problems to effective redistribution, only tax evasion is illegal (cf. Pressman 2016). In contrast, tax avoidance is a practice of using the legal system to switch to non-taxable forms of income/wealth to reduce tax burden.

Wealth taxation is also a part of Atkinson's (2015) outstanding policy program to combat rising inequality in high-income countries. He puts forward 15 comprehensive policy proposals and 5 further ideas to pursue to reduce income and wealth inequality. The first four proposals are aimed at the distribution of income and concern policies promoting employability-enhancing innovation, improving the bargaining power of workers, guaranteed public employment at the minimum wage, and a national pay program involving the creation of a new institution called the Social and Economic Council. Proposals 12 to 15 concentrate on improving social security systems and international cooperation on development issues.

Proposals 5 to 7 explicitly focus on policies affecting the distribution of wealth. Highlighting that there are differences in the rates of return on wealth across households (Piketty's *r*), Atkinson postulates the establishment of a national savings bonds program with maximum holdings per person, which would guarantee a positive rate of return on savings for small savers, thus equalising to a certain extent the return on wealth across households (Atkinson 2015:167-8). Furthermore, to improve the ability to accumulate wealth among households at the bottom of the distribution, Atkinson proposes payment of a capital endowment on reaching adulthood (similar propositions were put forward earlier in Sandford 1969; Atkinson 1972; Ackerman/Alstott 1999; LeGrand/Nissan 2000). This would be equivalent to a minimum inheritance, and would thus alleviate the unequal distribution of bequests, although Atkinson does not specify how much should be paid out or whether the use of such capital endowment should be subjected to any restrictions (e.g. financing of education). Moreover, in order to improve the intergenerational wealth distribution, Atkinson emphasises the importance of building up of net worth by the state through accumulating state assets. He thus urges to see beyond national debt towards public assets as a part of the economic legacy passed down to the future generations.

In order to fund the national savings bonds programme, the payments of capital endowment, and the acquisition of state assets, Atkinson suggests various progressive income and wealth tax reforms in proposals 8 to 11. He postulates to increase the marginal tax rates on personal income up to 65% for the top earners. Moreover, he proposes to extend the Earned Income Tax Credit-type measures, which exclude wage income from taxes until a certain threshold, to a larger base of low-income families. In terms of taxing wealth, Atkinson is in favour of replacing the inheritance tax with a progressive lifetime capital receipts tax (Atkinson 2015:194). He argues that this would increase revenue coming from this form of taxation, which has stood at only around 0.2% of national income in the USA since the 1990s (Boadway *et al*. 2010). Importantly, he advocates switching from the present taxation of inheritance upon giving to taxing wealth receipts, which would provide greater incentives for spreading wealth more equally. The final form of wealth taxation put forward by Atkinson is a progressive property tax linked to the ability to pay.

While not explicitly proposed, Atkinson ponders the possibility of introducing an annual wealth tax *à la* Piketty. He is optimistic about its success for two reasons. Firstly, the increasing levels of wealth inequality make the need for a general wealth tax more pressing (Weale 2010:834). Secondly, the accumulation of household wealth has not been a result of rising savings but rather of increasing asset prices (Atkinson 2015:200). In fact, the personal savings rate in the USA has declined from 13.3% in 1971 to just 2.6% in 2005, stabilising at around 5% since 2014 (source: BEA 2017). For this reason, the introduction of a wealth tax would not directly impede savings as these have not contributed to the observed wealth increases.

A different distinction between the various areas of policy action to reduce inequality is undertaken by Galbraith (2016). He distinguishes between three levels of policy responses to inequality, albeit focusing on income – changing the structure of market incomes, redistribution through taxes and transfers, and affecting the costs of living through public goods provision or taxing sales and consumption. Unionisation, minimum wage policies, national wage bargaining, and the Earned Income Tax Credit are some of the more effective measures improving the distribution of market incomes. Galbraith argues that promoting education may not be as relevant for reducing inequality in the context of today's corporate structure in the USA as traditionally envisaged in the income inequality and poverty literature. This is because income inequality arises primarily due to high salaries paid in the highly innovative winner-take-all markets, which are restricted to a small number of employees (Galbraith 2016:142). Consequently, unless provided publicly at all levels, higher education is bound to exacerbate inequality rather than alleviate it.

Galbraith argues that progressive income taxation is a more powerful tool of alleviating inequality than sales taxes or social insurance policies because it takes into account final household welfare. The latter are deemed problematic as they are highly regressive. For instance, non-wage income and incomes above a certain threshold are excluded from contributions to Social Security and Medicaid. In addition, they may inflate inequality measures while simultaneously creating low-income high-wealth households. Furthermore, the disproportionate impact of sales taxes on the lower income households is hidden from the conventional income inequality measures, which exclude final consumption.

Moreover, Galbraith considers a financial transaction tax as a means of reducing inequality, but he argues that it would have little impact on the structure of market incomes (2016:139). However, we argue that financial transaction tax could contribute to reigning in *wealth* concentration at the global level. This is because it could reduce the amount of wealth accumulated in the financial sector, thus lowering the value of the associated returns to high-yielding financial assets.

Galbraith is sceptical about Piketty's annual wealth tax proposition for two reasons. Firstly, problems of valuation make it difficult to adequately assess the value of wealth on an annual basis, creating incentives for tax avoidance (for instance by shifting towards tax exempt forms of wealth before the valuation date) and generating high costs of detailed record keeping required to adequately redistribute wealth (*ibid*.:156). Secondly, partial liquidation of non-money financial assets needed to pay the tax would lower the price of these assets, thus reducing the tax revenue. An alternative form of wealth taxation proposed by Galbraith is taxation of land. He argues that given the unproductive nature of land, its taxation would have a less damaging effect on incentives and could thus face comparatively less opposition than the annual wealth tax (*ibid*.:159). Moreover, the fixed locality of land would make this tax more effective in capturing rents. Similar benefits accrue to the estate and gift taxes, which provide a check on today's outcomes and future opportunities, improving the intergenerational distribution of income.

Taxation and financial sector regulation have also been put forward as the means to reduce inequality by Stiglitz (2012). His policy proposals are mainly concerned with reducing income inequality through improving market competition and reducing market imperfections which allow for rent seeking. Nevertheless, some of his proposals on financial sector reform, bankruptcy laws, public investment, taxation, and corporate policy carry positive implications for alleviating wealth inequality. Firstly, increasing banking transparency, restricting leverage and excessive risk taking, reducing interconnectedness across financial institutions, and regulating predatory lending practices are important in curbing the excessive wealth concentration at the top and reducing the balance sheet volatility of households towards the middle and the bottom of the distribution. Secondly, reforming bankruptcy laws to make them more debtor-friendly has capacity not only to discourage lax lending practices by banks, but also to alleviate the high debt burden of highly leveraged households. Similar benefit accrues to increasing public investment in education, healthcare, social protection programs, and subsidised savings to the poor, which would reduce the need for debt accumulation among the low-income households. Moreover, Stiglitz advocates increasing the taxation of inheritance to alleviate the intergenerational wealth inequality, as well as enforcing more progressive income and corporate taxes to discourage rent seeking. Similarly, reducing government subsidies to corporations has capacity to lower the return on business equity and reduce the market power of individual firms.

Like Galbraith, Stiglitz (2014) is also sceptical of Piketty's global wealth tax proposal. He argues that it is politically unfeasible and discourages incentives for productive activities. Instead, he proposes to improve the existing income and corporate taxation to promote competition and economic efficiency, which would reduce the size and the availability of rents in the economy. For this reason, he advocates to gradually phase out tax subsidies such as mortgage deductions, as

these narrow the tax base, favour rich homeowners, and encourage excessive borrowing and housing consumption, which drives up the prices of housing and allows for rent seeking. This can have another positive impact for alleviating wealth inequality by reducing the possibility of tax avoidance through accumulating mortgage debt against property wealth by the rich.

Overall, the above works represent some of the most comprehensive views on the role of economic policy in reducing wealth and income inequality. Piketty's global wealth tax proposal seems to be received rather sceptically by other scholars in the field. In the remainder of this chapter, we assess these criticisms as well as the rest of the proposed policies to redistribute wealth and influence its market distribution. This evaluation is conducted along two lines of argument. Firstly, we support Piketty's call for the necessity to explicitly address the distribution of wealth to combat rising economic inequality. Secondly, in line with Galbraith and Stiglitz, we argue that taxation is not enough to achieve this goal and needs to be complemented by policies affecting the distribution of market wealth as well as measures reducing the debt burden of households towards the bottom of the distribution. We support these arguments by analysing the potential implications of the discussed policies on the income and wealth disparities across race, gender, and generations, which are particularly relevant in the US context.

5.2. Addressing income vs. wealth inequality

The research undertaken in this thesis has shown that the dynamics of wealth distribution are crucial for understanding inequality in the context of financial sector transformation in the USA since the 1980s. This is because of the differences in wealth composition across households, which generate disparate flows of capital income as the returns to wealth depend on its absolute size. This relationship between wealth heterogeneity and inequality has an intersectional dimension, shaping the distribution of income and wealth across class, gender, race, and generations. Consequently, policy measures aiming to alleviate inequality without paying explicit attention to the distribution and composition of wealth cannot achieve sustained reductions in income and wealth inequality.

However, paralleling the focus of economic theory, most the existing policy measures to reduce inequality have been concentrated on income rather than wealth, regarding income as a sufficient tool to alleviate wealth inequality. One argument in favour of this approach states that since saving enables the accumulation of wealth, redistribution of income would contribute to reducing wealth inequality (Schneider *et al.* 2016). However, as evidenced by the review of the Post-Keynesian literature in Chapter 2, saving rates are heterogeneous among households, and they are observed to have fallen since the 1980s. Consequently, redistribution of income by itself cannot promote a more equal wealth accumulation through saving. Moreover, since our research findings have shown that inequality emerges because the returns to wealth are dependent on its

absolute size, taxation of income would not reduce the stocks of wealth holdings, and differences in the returns and accumulation of wealth would persist (which parallels Piketty's argument). For this reason, policy aiming to reduce inequality should be explicitly focused on targeting the distribution of wealth.

Among measures addressing income inequality, policies such as cash transfers have been implemented to provide income subsidies for those at the bottom of the distribution. In addition, redistributive measures taxing saving or consumption have been considered as ways of indirectly decreasing wealth inequality (Schneider *et al*. 2016: 141). However, these forms of taxation are not even likely to effectively reduce income inequality as they risk putting a greater tax burden on small savers and households towards the middle and the bottom of the distribution, particularly in the context of the rising costs of privatised public services (cf. ITEP 2004) and the insufficient support of the government income transfers, as evidenced by the decomposition analysis in Chapter 4.

While it is important to target low-income households through income subsidies and transfers, it is crucial to address high incomes at the top of the distribution. This would involve reigning in high wages earned by executives who earn salaries above their marginal contributions to economic productivity, particularly in the financial sector (cf. Arestis *et al*. 2013, Philippon/Reshef 2012). Progressive taxation of earnings with marginal tax rates increasing with income has great potential to redistribute wage income more equally. However, since a large part of income of households at the top is composed of investment and capital income from wealth ownership, income taxation alone is not enough to effectively reduce income inequality. For this purpose, it is necessary to explicitly address wealth.

An alternative way to reduce wealth inequality through income taxation is by increasing the corporate income tax as it is the households at the top of the distribution which have the largest holdings of the corporate stock. A problem with corporate taxation is that it is enforced at the national level, while modern corporations operate as multi-national entities (Pressman 2016:133). The ability to shift revenues overseas provides strong incentives for race-to-the-bottom in terms of lowering the corporate tax rates across countries. Piketty's solution to this problem is to base the tax on wage payments and sales in a given country rather than corporate revenues (2014:561). Pressman (2016:135) argues that such corporate tax reform has potential to influence not only the distribution of income but also wealth. This is because it would decrease the future after-tax profits of firms, thus reducing the stock valuation and directly affecting wealth holdings of the rich, which, as shown by the analyses in Chapter 1 and 4, are composed in large part of business equity.

Pressman's emphasis on the interplay between the corporate income tax and stock valuation exposes why income taxation and transfers constitute more of a short run solution to wealth inequality in the context of privatised capitalism characteristic of the USA. On the one hand, since the concentration of wealth creates a cumulative process of increasing political influence which furthers the accumulation of wealth (Piketty 2014; Atkinson 2015), income taxation alone is not able to curb the economic power of the rich associated with their large wealth holdings (McCain 2017:83). On the other hand, while increasing the income flows of those worse off would enable them to fund immediate expenses, it would not allow for a sustained accumulation of savings to finance education, healthcare, and other investments. It is thus necessary to explicitly target the distribution of wealth in order to provide a check on the fortunes amassed at the top of the distribution and foster a more sustainable accumulation of wealth and income at the bottom.

Apart from reducing the economic power and returns to wealth of the richest, taxation of wealth holdings would allow to reign in the concentration of wealth by providing incentives to sell assets. Greater mobility of wealth across the distribution induced by asset sales is argued to increase economic efficiency (Pressman 2016:147) and could also reduce the returns on assets, provided that there is enough supply to avoid an asset bubble.

There are other possible policy strategies focused on income inequality which are not explored in this chapter. These include policies improving the stability of employment conditions by regulating casual contracts, supporting wages, and enhancing workers' bargaining power, all of which could be a part of the conscious effort by the state to invest in technological progress (Mazzucato 2013; Proposals 1, 2, and 3 in Atkinson 2015). This is reminiscent of Minsky's proposal of federal government acting as the employer of last resort, which was argued to raise the wage floor and provide public goods and services in high-unemployment areas (Minsky 1965, 1968, 1973; Wray 2007).

In sum, the above discussion supports Piketty's assertion that it is necessary to explicitly target the distribution of wealth to address the limitations of the income taxation in reducing wealth inequality. This is supported by our research findings that inequality emerges because wealth heterogeneity generates unequal capital income flows from returns to wealth, which are determined by the absolute size of wealth holdings. In the next section, we investigate the limits of wealth taxation proposed in the literature and discuss the alternative strategies to affect the distribution of market wealth.

5.3. Redistribution vs. affecting market outcomes

The empirical literature on policy evaluation for income distribution tends to find a stronger redistributive effect of cash transfers relative to taxation (Immervoll *et al*. 2006; Avram *et al*. 2014). However, this positive effect is inflated by the state pension provision. When excluded from social transfers, taxes are estimated to have a comparatively greater impact on reducing income inequality (Guillaud *et al*. 2017). Such empirical research on the relative merits of wealth taxation and direct distribution is yet to be undertaken. The discussion below shows that while most of the implemented policies and current policy recommendations focus on taxation, redistributive measures would be more effective if accompanied by policies influencing the distribution of market wealth. This is because in the present context taxation creates incentives for tax evasion. Moreover, our research findings show that there was an increase in the levels of asset accumulation among the low- and middle-income households in the USA since the 1980s, which was underpinned by the rising leverage levels. Consequently, due to the increased heterogeneity of household wealth composition related to the growing holdings of leveraged wealth towards the middle and the bottom of the distribution, certain forms of wealth taxation risk targeting inappropriate groups of the population.

5.3.1. Taxation

The summary of the policy literature above reveals that Piketty's proposition for the global wealth tax has been severely criticised and labelled as utopian on the grounds that it is politically and logistically impossible to implement (Pressman 2016). However, in light of our research findings we support Piketty's call for the implementation of an annual wealth tax due to its ability to curb the political power associated with the large holdings of wealth. This is because we found that returns to wealth became dependent on its absolute size, which was driven by differences in the balance sheet composition across the distribution. Households with high wealth earn higher returns than households with lower wealth holdings due to their ability to participate in financial securities markets, purchase corporate shares, and accumulate secured forms of debt. Moreover, their high fortunes allow them to access wealth management funds, whose high fees further boost the returns earned on the diversified portfolio of assets.

Nevertheless, we notice the challenges to the implementation of Piketty's global wealth tax. In addition to the political and the logistic obstacles highlighted by Stiglitz (2014) and Galbraith (2016), we support Piketty's concern that taxation of wealth holdings generates incentives for tax avoidance and evasion associated with the mobility of wealth. These are particularly likely in the case of financial wealth owned by the richest households, which is highly liquid. The ability to shift wealth overseas or to other types of holdings highlights the need for a comprehensive design

of the wealth taxation policy, which would capture the diversity of forms which are taken by wealth ownership and its associated capital income flows. Consequently, in light of our research findings regarding the heterogeneity of household wealth composition and its impact on the distribution of income and wealth, we argue that taxation of wealth holdings as envisioned by Piketty would be more effective in reducing wealth inequality if complemented by other types of taxes. An additional advantage of such a comprehensive taxation reform is that many of these alternative forms of taxation are already in place, and their reform would be more feasible to implement in the short run than Piketty's proposition.

The first alternative form of wealth taxation to be considered is the inclusion of capital gains in taxable income. This would prevent large growth of wealth at the top and would provide greater financial stability to households in the middle the distribution, who leverage up in the process of home equity withdrawal (IMF 2017). At present in the USA, much of the capital income earned on high-yielding wealth holdings of the rich is earned from stocks, bonds, and real estate, which are all tax-exempt (Pressman 2016:146). Since these are only taxed once sold, gains from these assets accumulate tax free (Weale 2010:833-834). For this reason, a progressive capital gains tax has potential to immediately redistribute wealth more equally.

Secondly, progressive taxation of wealth transfers – specifically gifts and bequests – could be implemented to avoid the perpetuation of wealth inequality from one generation to the other. In US, taxes on estates (i.e. inheritance) are levied on the donor. We support Atkinson's (2015) call for this type of taxation to be collected on receipt, because it would provide incentives for asset sales, which under conditions mentioned earlier could result in a more equal distribution. However, it has to be emphasised that the estate tax is not enough to reduce wealth inequality without a general tax on wealth holdings. This is because there are incentives for the richest to take advantage of the existing tax reliefs and pass their wealth throughout their lifetime tax free (Boadway *et al*. 2010). Moreover, current law in the USA only taxes the net value of inheritable wealth (IRS 2017). Rich households can thus accumulate mortgage debt to reduce the taxable value of their real estate, which does not affect their financial stability as their leverage is kept low due to high-yielding asset holdings and high incomes. Consequently, in its current form, the inheritance tax may fall disproportionately on households in the middle of the distribution whose wealth is tied up in housing. For this reason, taxation of wealth transfers could be extended to incorporate transfers among corporations. The financial transactions tax proposed by Galbraith (2016) could be particularly powerful in harnessing the large wealth holdings accumulated in the financial sector and in reducing the rate of return earned on securities and other financial investment assets. Moreover, Atkinson's (2015) idea of the lifetime capital receipts tax could be seriously considered by policymakers. Not only would it diminish the possibilities of spreading

wealth transfers throughout lifetime to avoid the inheritance tax, but it could also boost the currently small revenues from this type of wealth transfer taxation.

Thus, in light of our research findings regarding the influence of household wealth heterogeneity on inequality, we argue that a comprehensive wealth tax reform including taxes on holdings and transfers of wealth has potential to effectively reduce inequality in the USA. Such reform could be based on progressive taxes collected as a proportion of wealth holdings above a certain tax-free threshold with increasing marginal rates, as well as on increases in wealth through a progressive capital gains tax and transaction taxes. Such approach would have an additional advantage of being able to dampen the revenue losses from tax evasion and avoidance. This is because transactions have locality attached to them. Consequently, taxing wealth transfers between individuals as well as financial and non-financial businesses would ensure that redistribution takes place in a given tax jurisdiction, so that tax avoidance becomes costly, and high returns on financial assets held by households at the top of the distribution are limited.

McCain (2017) puts forward a similar proposition of complementing the taxation of wealth holdings with an additional tax on flows. He proposes that the annual wealth tax be accompanied by a tax on net revenue of large businesses, corporations, multinationals, and multi-state organisations. The net revenue tax would be imposed on corporate profits net of input costs as well as wages and salaries paid within the taxing jurisdiction, but including bonuses paid above a certain threshold, transfer payments, and payments for intellectual property rights. It would thus replace the corporate income tax and the sales taxes. The major advantage of introducing such net revenue tax alongside the tax on wealth holdings is that documented wealth tax payments by a company would be deducted from its net revenue, thus reducing the overall tax liability on the transaction tax. As such, the combination of the wealth tax on holdings and the net revenue tax would discourage tax evasion and avoidance by including capital income earned on business equity held by the rich, and providing incentives for tax payments by businesses and high net worth individuals, who will "*want* to report the transaction to save [themselves] taxes" (Higgins 1968:531; Kaldor 1956b; McCain 2017:78). We argue that McCain's proposal deserves consideration by policymakers for two reasons. Firstly, it provides a more adequate coverage of corporate income and wealth than the current corporate income tax, providing a check on the income and wealth of the rich derived from business ownership. Secondly, it would dispose of the problematic sales taxes, which, as argued before, put a disproportionate tax burden on households towards the bottom of the distribution who consume a larger share of their income.

While the comprehensive wealth tax reform has great potential in alleviating wealth inequality, we appreciate that taxation of wealth is problematic. There is a historical record of

failed attempts at the wealth tax implementation, such as the fireplace and window taxes in the 17th century England, and a more recent rollback of wealth taxes across Europe (Pressman 2016:140-141). As mentioned before, one of the main reasons for the failure of the domestic wealth tax on holdings is the possibility of tax evasion and avoidance. In the absence of global cooperation, there are strong incentives for wealth holders to relocate their assets to whichever country offers the lowest tax rates, resulting in the estimated $200bn losses in tax revenue around the world (Zucman 2016). This problem may persist even after introducing a more comprehensive wealth transaction tax if costs of moving funds abroad remain low. Thus, a coordinated global effort focused on a worldwide system of redistribution may be necessary to reign in the perverse incentives to evade taxes, and to alleviate losses in national wealth associated with the shift of the individual and corporate wealth to tax havens (Zucman 2016). However, even this may not solve the problem of tax avoidance. This is because of the presence of wealth arbitrage. Under the arbitrage, asset ownership can be separated from return e.g. through establishing a trust, where a part of wealth is sold in exchange for regular interest payments (Pressman 2016:144). This prevents the identification of the actual owners of wealth, so that taxes cannot be effectively levied.

Furthermore, there are other major challenges to the sustainable redistribution of wealth apart from tax evasion and tax avoidance, which are partly highlighted by Galbraith (2016) and need to be considered in light of our research findings regarding the impact of wealth heterogeneity on inequality. Firstly, adequate taxation of wealth faces substantial valuation issues. While more frequently traded financial assets and property are evaluated more regularly and thus rigorously, consumer durables as well as pension funds and family trusts are more difficult to evaluate because they are either sold infrequently or it is complex to identify the actual asset owner (Pressman 2016:142). Moreover, most contemporary wealth taxes around the world rely on self-declared wealth values, which are likely to be underreported (*ibid.*:145). Furthermore, wealth tax in the form proposed by Piketty faces liquidity problems for wealth owners with little income flows, such as pensioners, or owners of illiquid assets for whom property is the major source of collateral, thus disproportionately affecting the middle-income households (Pressman 2016:143). In this situation, in order to pay the tax on wealth, an individual may be forced to borrow even more against her wealth, which further perpetuates inequality by increasing household leverage.

Similar weakness can be attributed to the taxation of wealth components. In the USA, the property tax is imposed on the gross value of property wealth, thus ignoring the issue of leverage (Pressman 2016:141). Consequently, the greatest tax burden is placed on households in the middle of the distribution, whose balance sheets rely on property wealth. For similar reasons, taxation of the increases in wealth may be problematic as it can easily miss the target, taxing those down in

the distribution whose wealth rises due to the price bubbles occurring in the housing and the financial market.

Overall, the above discussion of the limits to wealth taxation, underpinned by the analysis of household balance sheet structures undertaken in this thesis, shows that one of the greatest challenges to the design and implementation of an effective wealth tax is ensuring that it accurately targets the owners of the highest fortunes. This is evident in the case of income – while top income tax rates in the USA have decreased dramatically since the 1940s stabilising at approximately 35%-40% since the late 1980s, the government tax revenue continues to grow (Pressman 2016:137). Moreover, recent research indicates that the present structure of the tax relief programs is highly regressive – in 2013 the bottom 60% of families received only 12% of funds accruing to these programs, while the top 1% obtained over a quarter of the support (Levin *et al*. 2014:6). This highlights the scope for reforming the current mortgage deductions program to increase its progressivity. Consequently, in contrast to Stiglitz (2012) who argues for its abandonment, we see the potential of the mortgage deduction scheme to effectively reduce wealth inequality by alleviating the debt burden of the lower income borrowers.

In sum, our research findings regarding the increasing heterogeneity of household wealth structures can explain why the middle- and low-income households bear an increasing tax burden compared to the rich (cf. CBO 2014). This is because wealth taxation which does not consider the rise in homeownership and the expansion of private pension schemes among households towards the bottom of the distribution may end up targeting those families who already struggle with stagnant wage growth, high leverage, and the rising costs of housing, healthcare and education. For this reason, the reduction of wealth inequality can be more effective if taxation is accompanied by other measures which explicitly target the distribution of market wealth.

5.3.2. Affecting the distribution of market wealth

The above discussion of the limitations to wealth taxation highlights that taxation alone may not achieve a sustainable reduction in wealth inequality. Thus, in light of our research findings, we support Galbraith's (2012) and Atkinson's (2015) proposals to develop policy strategies directly affecting the distribution of market wealth. We argue that these measures necessitate the dedication of public spending and a coherent government-led strategy which would become the pinnacle of improving the *ex ante* distribution of wealth. Such policies could be focused in a number of areas – affecting the rates of return earned on various assets, direct wealth transfers to low-income households, and asset-building programs, e.g. subsidised saving.

Measures influencing the rates of return earned of the different types of wealth have a potential to reduce wealth inequality by boosting returns for small savers and reigning in high

returns earned on business equity and high-yielding financial assets at the top. Atkinson's (2015) proposal 5 is focused on ensuring a guaranteed positive return on savings for small savers and lower-income households through the national savings bonds program. This is desirable given our finding that returns earned by small savers towards the bottom of the distribution are lower than the average rates of return on wealth. Since the wedge between these two rates constitutes an income for the financial sector, the national savings bonds program could counteract the incentive among financial intermediaries to keep the rate of return for small savers low (Atkinson 2015:167). Moreover, policy could affect the rates of return by limiting the charges imposed by the wealth management funds (*ibid*:164). In addition to these measures, as argued above increased financial regulation and supervision of the financial sector operations could reign in the high returns earned by households at the top of the distribution, who have been the main beneficiaries of financial deregulation and innovation since the 1980s. Furthermore, it would act to disassociate the fate of highly leveraged wealth owners towards the middle and the bottom of the distribution from the whimsies of the financial markets, as was the case in the 2007 crash.

Furthermore, the government can provide direct wealth payments to individuals subject to certain conditions, as put forward by Atkinson (2015) in his proposal 6 of the capital endowment payments and proposal 7 of a public Investment Authority running a sovereign fund raising the net worth of the state. Moreover, creation of an inclusive social security program is vital to providing a sustainable safety net for households at the bottom of the distribution (Atkinson 2015), with potential to improve gender and intergenerational inequalities. These policies are important in promoting the equality of opportunity in the accumulation of wealth. This is because inclusive social security, accumulation of public net worth, and the establishment of the capital endowment payments to the young have the capacity to improve wealth accumulation possibilities for everyone in the society. Consequently, such policies constitute more long terms solutions to wealth inequality. This means that the initial reduction in inequality may be rather small compared to other policy measures which explicitly address the excessive concentration of wealth at the top or target low wealth households.

In line with this argument, the *ex ante* policies can also promote asset holdings and subside savings among the poor. This has been the objective of measures proposed and partially implemented in the USA such as the Individual Development Accounts (IDAs), the Children's Savings Accounts (CSAs), and the Universal Savings Accounts (USAs). IDAs were implemented at the federal and the state level in 1996 as savings accounts drawn from the household earned income, which match savings of low-income households with public and privately raised funds. In turn, CSAs are federal and state matched savings accounts encouraging investment in education by low-income families (Cramer/Newville 2009). After the completion of a college degree, any

remaining funds on the CSA can be spent on the accumulation of other assets, e.g. housing. Finally, USAs are proposed tax-free savings accounts aimed at small savers, which would be available to any adult citizens and permanent residents (US Congress 2017a). Contributions to the USAs would resemble the Individual Retirement Accounts (IRAs) with the difference that funds could be withdrawn at any time (versus after retirement under IRAs) and may not exceed $5,500 a year. USAs were first introduced to the Senate Committee on Finance in November 2015, but the proposal has not been developed since (US Congress 2017a and 2017b). The advantage of such measures is that in addition to providing resources to satisfy household financial needs and generate opportunities for investment in human and tangible capital, they offer a more sustained way out of poverty, allowing households to achieve a degree of long term economic security (Sherraden 1991).

However, while promoting asset ownership among low-income households is important in providing a more level playing field for wealth accumulation in the society, our research findings regarding the systemic role of finance in influencing the returns earned on wealth highlight the challenges of asset-based welfare policies arising from the valuation dynamics. Such policies may lead to an unsustainable accumulation of debt among low-income households as the increased demand following the promotion of a particular type of asset ownership may drive up its prices. This is supported by the example of the UK, where the push for homeownership under the Help to Buy and the Buy to Let policy has contributed to rising house prices, and made homeownership unaffordable for first-time buyers (Montgomerie/Buedenbender 2015). This example is particularly important to consider in the US context given the changing structure of the housing market after the Great Recession, which increased the number of households renting their residence (JCHS 2015).

Moreover, similar pitfalls can be attributed to asset-based welfare policies focused on promoting financial literacy and inclusion. This is because they shift the responsibility for the adverse consequences of the unsustainable wealth accumulation towards the individual rather than acknowledging the systemic role of finance in increasing wealth inequality. With the rates of return determined in the financial markets (as evidenced by the case of housing in the recent bubble), these measures threaten to increase inequality even more. Moreover, given the rising costs of private education, expansion of CSAs may not be enough to boost the educational attainment of the youth from low-income families. To even out the educational opportunities more effectively, we echo Galbraith's call for the provision of public education at all levels.

Consequently, our finding that financial sector transformation influences the returns earned on the different types of wealth suggests that the asset-based welfare policies should be closely

supervised by the government. This is to avoid the build-up of leverage among low-income households who may become priced out of the asset markets. If the promotion of asset ownership among low-income households is not managed by the government, it risks to perpetuate inequality through the valuation dynamics. This reveals that to effectively reduce wealth inequality it is necessary to consider the other side of net wealth and leverage – debt.

As suggested by Stiglitz (2012), measures reducing the debt burden of households can be focused on debt forgiveness and restructuring for low-income borrowers, as well as on the regulation of lending practices to discourage predatory lending. Moreover, in the long run the increased provision of public goods and raising wages would act to reduce the necessity to take on debt.

Current debt reduction initiatives in the USA are rather limited and more often applied to businesses and banks. One reason for such insufficient consideration of personal debt relief is the fall in the overall levels of household debt relative to GDP after the Great Recession (see Figure 1.10 in Chapter 1; cf. Bricker *et al*. 2011, 2014). However, our analysis of the data in Chapter 1 shows that households have not deleveraged sufficiently after the Great Recession, which can be explained by stagnant incomes, stringent personal bankruptcy laws, and lower household saving rates (Scott/Pressman 2015). Furthermore, while the problem of subprime mortgages may have been reduced after the 2007 crisis (albeit at the cost of millions of households facing foreclosures, cf. Newman/Schafran 2013), house prices are on the rise again and are close to their pre-recessionary levels (see panel B, Figure 1.12 in Chapter 1). This has a twofold implication for wealth inequality. On the one hand, it provides incentives for refinancing through home equity withdrawal for the existing homeowners and can increase household leverage. On the other hand, rising house prices increase the wealth gap between homeowners and the growing group of renters, making access to housing a decisive factor in perpetuating wealth inequality in the future. Moreover, there has been a rise in the unsustainable patterns of borrowing reminiscing the pre-crisis subprime mortgage lending after the 2007 crisis, however this time they are focused on other forms of borrowing, such as auto loans (see panel B, Figure 1.11 in Chapter 1). Unsecured debt, particularly student loans, vehicle loans, and credit card debt, remains problematic and is on the rise particularly among the low-income households. Consequently, addressing the problem of overindebtedness remains important after the Great Recession and is necessary to combat growing wealth inequality.

As a part of the debt relief initiatives after the 2007 crisis, the 2010 Dodd Frank Act established the Consumer Financial Protection Bureau (CFPB) in order to supervise bank and non-bank institutions, as well as credit reporting and debt collection agencies in order to make lending

conditions more transparent (USA.gov 2017). In light of the growing holdings of unsecured debt among the low-and middle-income households, the authority of CFPB could be strengthened to focus on regulating lending conditions in consumer credit markets.

Overall, the evaluation of the policy proposals put forward in the literature in light of our research findings suggests that the reduction in wealth inequality can be effectively achieved through a mix of policies rather than redistribution alone. We argue in favour of the combination of taxes on capital gains, wealth holdings and transfers, together with policies regulating the returns to wealth, reducing the debt burden, and promoting sustainable asset accumulation for low-income households. We emphasise that all measures need to be comprehensively designed to discourage tax avoidance and target the appropriate parts of the population. For this reason, the government's dedication to public spending and regulation is a pre-requisite for a sustainable alleviation of wealth inequality.

5.4. Social implications of inequality-reducing policies: gender, race, generations

In addition to examining the impact of policies reducing wealth and income inequality across the distribution, it is important to analyse what implications these policies would have for the racial, gender, and intergenerational disparities. This is highlighted by the empirical analysis in Chapter 4, which revealed intersectionalities in the relationship between wealth composition and distribution. While we found that the ownership of houses and pensions constituted one of the key causes of wealth inequality across gender, race, and generations, the presence of asymmetric effects of balance sheet composition on the position in the income distribution calls for a careful consideration of the social impact of the above policies. This is because inequality-reducing policy may have unintended consequences for the social dimension of inequality due to the heterogeneity of wealth composition and leverage across these groups.

5.4.1. Gender

As shown in the inequality decomposition analysis in Chapter 3, labour market characteristics are important determinants of the gender wealth gap in addition to earnings. Differences in the type of employment across men and women in terms of tenure and unionisation have been shown to translate into lesser access and lower value of women's pension wealth (Chang 2006:123). Moreover, since female-headed households recorded in the data are predominantly single and face a disproportionate burden of childcare compared to single male-headed households, their wealth building capabilities are further impeded (*ibid.*; see Table A1.15 in Appendix I). Consequently, in addition to directing resources raised from the wealth tax revenue towards policies improving the wealth accumulation prospects of women, there is an important role of increasing the government

child support programs in alleviating wealth inequality across gender. This is important for both single and married women. For the former, adequate child support would contribute to immediate improvement in their living standards. In the case of married women, increased government support in childcare (through e.g. longer paid maternity leaves and the introduction of paid paternity leaves[77]) could counteract the documented negative effect of marriage on women's human capital accumulation and the disproportionately detrimental effect that divorce has on women's wealth and income (*ibid*.:124).

Furthermore, policy could consider the joint dimensions of race and gender in designing the inequality-reducing policies. As signalled in the analysis in Chapters 1 and 4, these categories are not mutually exclusive and it is Black women that are one of the most marginalised groups in the American society (Crenshaw 1989). Antidiscrimination policies failing to recognise that the cumulative joint impact of race and gender on inequality can be greater than that of these categories individually will not be sufficient to reduce economic inequality among minority women and the rest of the society (*ibid*.). Among the existing policies, IDAs have been shown to be particularly beneficial, with the majority of home purchases through this program undertaken by females and minority individuals, who additionally faced lower foreclosure rates than homebuyers outside the program after the 2007 crisis (Rademacher *et al*. 2010).

5.4.2. Race

As documented in Chapters 1 and 4, there is a substantial wealth gap between white households and Blacks/Hispanics in the USA. This gap has widened after the Great Recession primarily due to the sluggish housing market recovery (Weller/Ahmad 2013). Because of the systematically lower incomes and worse job market opportunities, Black and Hispanic households have faced lower wealth accumulation possibilities than White households. The expansion of subprime lending targeted at ethnic minorities meant that the rise in homeownership among these groups in the 2000s was associated with unsustainable indebtedness characterised by high fees and penalties. Consequently, due to the low levels of home equity Black and Hispanic households were disproportionately affected by foreclosures when the crisis hit and faced significantly greater wealth losses compared to White households (Gruenstein Bocian *et al*. 2011). Importantly, the foreclosure crisis has not been resolved and homeownership rates among Blacks and Hispanics continue to decline (See Table A1.16 in Appendix I, Weller/Ahmad 2013:21). Coupled with low

[77] Paid paternity leaves are only offered in California, and paid family leave legislation has been passed in New Jersey, New York, and Rhode Island (see http://money.cnn.com/2016/06/16/pf/parental-leave-fathers/index.html).

participation of minority households in private pension plans, without government action the racial wealth gap is bound in increase in the future.

In addition to improving wages, employment opportunities, and job security for minority households, policy could be focused on expanding their wealth building capacity and home security. Wolff (1995) argues that wealth taxation would contribute positively to alleviating inequalities among race. Its main benefit would be to provide funding to asset-building programs and capital-endowment-type policies targeting the communities of colour. The subsidised savings programs such as IDAs, USAs, and CSAs could be expanded at favourable terms to minority households, together with the Earned Income Tax Credit, which could be tailored to minority earners by taking into account their lower wages and the precarious nature of their employment.

Furthermore, policies addressing the debt burden of minority households are particularly important. Lending conditions could be more closely supervised by the state, eliminating discrimination in the credit markets, and reducing high fees and penalties charged on loans to minority borrowers. For this purpose, alternative credit scoring models could be considered to combat the unfair lending conditions (Chopra *et al*. 2017). Furthermore, current bankruptcy laws in the USA under Chapter 7 and Chapter 13 favour wealth owners and are thus biased against minority borrowers who are less likely to hold wealth (Dickerson 2004). Consequently, the Bankruptcy Code could be reformed to remove this racial bias. Moreover, policy could aim to prevent further foreclosures by helping in debt renegotiations and partial debt forgiveness. In the medium to long run, housing and other public services could be made more accessible, affordable, and sustainable for minority households. This is particularly important given the low homeownership rates in Black and Latino communities and rising rental costs in the cities.

5.4.3. Generations

Finally, the inequality-reducing policies should consider their potential impact on the intergenerational wealth disparities. As shown in the analysis in Chapter 1, young households are now at a great disadvantage in terms of their wealth accumulation capacities and the sustainability of wealth holdings compared to their peers several decades ago. This is primarily due to the high costs of housing and the increasingly unaffordable rents related to the rising house prices, as well as the inability to find stable and secure employment and to participate in the more ubiquitous private pension plans. Recalling Piketty's concerns, wealth status of parents passed on through inheritance risks becoming the decisive factor shaping the economic wellbeing of the future generations. Thus, the estate tax reform discussed above, as well as the other forms of wealth taxation, play an extremely important role in ensuring a more egalitarian distribution of wealth across generations today and in the future. It is important, however, that these redistribution

policies are complemented by the capital endowment measures and the provision of debt relief to promote sustainable wealth accumulation for the young.

In sum, policies focused on debt relief and increasing government support through social security, subsidised savings, and the provision of affordable homeownership and public services have potential to explicitly reduce wealth inequality across gender, race, and generations. The finding of the inequality decomposition analysis in Chapter 4 that transfer income did not sufficiently alleviate income inequality indicates that there is scope for a more adequate design and implementation of the social transfer policies in the USA. Moreover, the finding that educational attainment is one of the main causes of income and wealth inequality across subgroups suggests that a more inclusive provision of education may alleviate the income and wealth disparities across these social groups. Importantly, as argued earlier, such policy should be focused on public provision across all levels to effectively reduce inequality.

5.5. Obstacles to policy implementation

As highlighted in the discussion so far, the design and implementation of measures that successfully reduce wealth inequality face substantial challenges. There is a number of political obstacles to the effective implementation of policies reducing wealth inequality. On the one hand, redistribution measures tend to be unpopular among voters. On the other hand, concerns over public debt discourage large scale public spending initiatives which we argue are necessary for a sustainable alleviation of wealth inequality.

The political difficulties in implementing higher tax rates for the top incomes can be explained twofold. Firstly, this is because large wealth is linked to greater political power, as the rich are able to lobby political parties against progressive redistribution policies (Piketty 2014:513; Page *et al*. 2013). Secondly, in the presence of aspirational voting, voters may be reluctant to support progressive taxation with increasing marginal rates in hope that they or their descendants could themselves become rich in the future (Schneider *et al*. 2016:149). Such perceptions may be particularly strong if one believes in the "American Dream", seeing prosperity as an outcome of individual effort rather than of a particular socio-institutional structure (cf. Piketty 1995).

Furthermore, the society tends to perceive inequality to be lower than it actually is, and can thus underestimate the degree of taxation necessary to redistribute wealth (Norton/Ariely 2011). Qualitative research on the urban elites in London found that the reference group for a part of individuals in the top 1% is not the median household but rather those at the very top of the distribution belonging to the top 0.1%, 0.01% etc. (Hecht 2017). On the other hand, the poor may have an analogous relative experience of their circumstances, underestimating their own poverty

and disassociating themselves from the poor (Shildrick/MacDonald 2013). Such perceptions further impede the implementation of higher taxes, as those in the top tend to see themselves as worse off while those at the bottom perceive themselves to be better off than observed in monetary terms, and both groups may feel already burdened with taxes compared to their peers (Chin 2014). Such inaccurate views on inequality are related to the limited interactions between the rich and the poor in the urban space, which arises in part from the segregation of impoverished communities in the cities. For this reason, urban planning and social policy focused on counteracting the geographical segregation of poor neighbourhoods may act as a device improving the relational perceptions, which could encourage the society to participate in the redistribution of wealth to alleviate inequality.

Furthermore, the opposition to progressive taxation and higher top tax rates may be alleviated if accompanied by effective public spending programs. However, recent evidence on income suggests that the mix of a high degree of tax progressivity and high average tax rates may not politically feasible in OECD countries (Guillaud *et al*. 2017). In fact, increases in the coverage of social transfers and in tax progressivity tend to be accompanied by lower rates of transfers and taxation respectively. Thus, there may be political trade-offs between the various dimensions of the inequality-reducing policies. Given lower rates, high progressivity of taxes may reduce the government tax revenue and its ability to fund public spending programs. Guillaud *et al*. (2017) argue that it is the rate of transfers rather than coverage that has the largest redistributive effect, while both the rate and the progressivity of taxation can achieve similar degrees of income inequality reduction (*ibid*.). Such research is yet to be conducted for wealth distribution. Nevertheless, we argue that the adequate tax reform focused on targeting the currently tax exempt forms of top incomes (dividends and capital gains) has a potential to secure large absolute amounts of tax revenue even at lower rates (Galbraith 2016:143).

Overall, the role of government in reducing inequality is a common thread in the policy proposals found in the literature. Focusing on the taxation of income, Piketty argues that state capacity has reached its limits in high-income countries, and thus increased state spending does not constitute an adequate way to redistribute income in the future. However, he does not explain why there are persistent differences in the personal tax rates across the developed economies and why they have not been equalised (Pressman 2016:131). Consequently, we argue that there is a scope for a conscious and comprehensive policy strategy by the government to effectively implement higher taxation.

One of the major obstacles to such large scale public spending programs is the opposition to government debt accumulation by economists and the politicians (Reinhart/Rogoff 2010; Pescatori

et al. 2014). However, these reservations tend to be ideologically motivated as empirical evidence on the negative relationship between government debt and economic performance is highly mixed and does not sufficiently address the reverse causality issues (Bonser-Neal 2015). Keynesian theory suggests that public deficit can be associated with positive fiscal multipliers, particularly in times of an economic downturn (Keynes 1936; Lerner 1951; Botta/Tori 2015; Leão 2015; Qazizada/Stockhammer 2015)[78]. In the Post-Keynesian view, fiscal policy is justified due to the persistence of involuntary unemployment in the long run (Fontana 2009:3)[79]. Recent evidence shows that coordinated public investment and wage-led recovery policies can lead to positive increases in economic growth in G20 countries (Onaran 2014).

A more important issue with public debt concerns its distributive implications, which is raised by Piketty (2014). Since the majority of government bonds created through the issuance of public debt are owned by the rich, Piketty argues that increasing public deficit can perpetuate wealth inequality. His preferred solution is to raise taxation and use the proceeds to pay off government debt. Alternative measures of raising inflation and austerity are discouraged. While austerity itself contributes to rising inequality (Ball *et al*. 2013; Rawdanowicz *et al*. 2013), inflation is difficult to control and is highly imprecise. On the one hand, it may reduce the debt burden of borrowers by decreasing the real value of debt (Piketty 2014:544). However, it may simultaneously harm savers and can drive up asset prices, generating asset bubbles and contributing to financial instability (*ibid*.:547).

The consideration of inflation sheds light on the distributive implications of the broader economic policy. Specifically, the alleviation of wealth inequality can be improved by a coordinated fiscal and monetary policy. The role of monetary policy in affecting inequality has been particularly relevant after the Great Recession. The unconventional low-interest rates and quantitative easing (QE) policies adopted after the 2007 crisis by the Federal Reserve have alleviated some of the negative consequences of the recession by restoring confidence in the economy and boosting demand (Ennis/Wolman 2015). However, these measures have had unintended consequences for wealth inequality (Claeys *et al*. 2015; Montecino/Epstein 2015; Domanski *et al*. 2016). On the one hand, through the sales of government bonds QE drove up asset prices. This benefited the asset owners, who are highly concentrated at the top of the distribution

[78] Positive fiscal multiplier means that government spending increases aggregate demand and economic growth (cf. Keynes 1936).

[79] This is in contrast to the New Keynesian view, which questions the usefulness of fiscal policy in the long run. This is because of their assumption that in the long run the economy adjusts to full employment due to rationally optimising decisions of economic agents (see footnote 34 in section 2.1, Chapter 2).

as shown in the analysis in Chapter 1. Furthermore, low interest rates encouraged highly-indebted households to borrow even more. Not only did it weigh negatively on their net wealth, but it also inflated house prices by keeping borrowing costs low and boosting the availability of credit. While the rising house prices have increased the wealth of homeowners, homeownership has become unaffordable for those not on the housing ladder, forcing these groups to rent at increasing costs.

Consequently, the central bank's response to growing inequality could be focused in three areas. Firstly, it could be through a closer supervision of financial activity. In this way, the Fed could monitor how the extra liquidity is invested by banks, prioritising investment in productivity-enhancing activities and discouraging speculative investment in real estate and financial products. Secondly, through financial supervision the Fed could also liaise with CFPB to regulate lending conditions – particularly unsecured lending and lending to low-income borrowers. This could contain the rising leverage and financial instability faced by a large part of the US population. Moreover, the Fed could cooperate with the government to move towards a broader fiscal approach to economic policy. This is to ensure that the positive implications of monetary policy for household wealth through asset price increases are shared more equally. In addition, such coordinated monetary-fiscal policy could serve to reduce macroeconomic volatility (Romer/Romer 2017).

Another important dimension of policy implementation in the US context is whether the analysed inequality-reducing policies should be enacted at the state or the federal level. We argue that the federal coordination is more effective for the implementation of the proposed measures. Firstly, this is because most of the asset-building policies and the existing debt relief legislation are already implemented at the federal level and the proposed reforms aim to extend the existing policies. Secondly, without federal legislation differences in the levels of wealth taxation across states would create incentives for tax avoidance and evasion associated with shifting wealth to states with the lowest tax rates. Furthermore, recent evidence suggests that state taxes tend to be more regressive than federal taxes. In ten states the bottom 20% of taxpayers have been found to pay as much as six times more in terms of their income than the wealthy[80] (Davis *et al*. 2013; ITEP 2017). The curious example of Kansas shows just how damaging the regressive state tax system can be by exacerbating inequality and draining public finances (Ehrenfreund 2017). The 2012 tax reform in Kansas, which raised taxes on the poor and lowered the tax rates for the rich, generated substantial shortfalls in the state budget. In June 2017, the state legislature overturned the reform

[80] These states are Washington, Florida, South Dakota, Illinois, Texas, Tennessee, Arizona, Pennsylvania, Indiana, and Alabama (Davis *et al*. 2013:4).

and increased tax rates. However, since taxes were raised for all earners, the regressive structure was deepened and the tax burden of individuals in the poorest quintile remained nearly three times as much as the tax rate of the richest 1%. This shows that the federal intervention and policy coordination can be more effective in ensuring that the tax system is fair to all households and that everyone can benefit from the subsidised savings programs and debt relief policies.

Finally, what is perhaps the most important prerequisite to a successful distributive policy is fostering of shared values of justice and equality in the society. Without this, any increases in taxation and public spending may face opposition, providing a check on the political willingness to implement the more progressive tax policies (similar point regarding increasing wages is emphasised by Kalecki 1943). In terms of redistribution, the society could be united along the principles of vertical and horizontal equity. According to the principle of vertical equity, individuals with larger wealth should be taxed at relatively higher rates as they have a greater ability to pay taxes (Pressman 2016:146). The principle of horizontal equity states that individuals with an equal capacity to pay taxes should pay the same amount. Importantly, one should consider this capacity not only in terms of the size of assets, but also in terms of leverage, wages, and socio-economic conditions (for example the number of dependents, marital status, and annual expenses on necessities – which would include *inter alia* healthcare and education).

It may be argued that the achievement of the common sense of social justice is an extremely long process and perhaps a utopian task. While it must be acknowledged that establishing shared empathy to social injustice would take time, this should be neither a discouragement for achieving such a prospect nor an excuse for inaction. As in the case of implementing successful inequality reducing policies, the most effective way to move towards the goal of the shared sense of social justice and equality is through the government initiative. Proactive government spending programs focused on reducing inequality through improving public services and investing in research informing about the causes and consequences of inequality can benefit everyone in the society. With such tangible benefits and knowledge, taxpayers may be more willing to pay their taxes and participate in a more egalitarian economic development.

It is crucial, however, that commitment to equality and justice is shared at the global level. Atkinson proposes to establish an international progressive wealth and income tax authority, which would offer personal tax payers the opportunity to opt out of the national tax regimes by entering the global system (Atkinson 2015:201). He ponders the possibility of introducing a minimum net worth required to be a part of the global tax regime. He argues that this could create prestige equivalent to the Forbes 400 list, thus providing incentives for the rich to pay their taxes under a unified global scheme. Such initiative seems to be a feasible goal for international efforts against

tax evasion. However, it needs to be recognised that the issue of tax *avoidance* may not be solved even with global coordination due to the presence of wealth arbitrage (see section 5.3.1). It is for this reason that the sustainable reduction in wealth, income, and social inequalities necessitates shared aspirations towards social justice in the society as a whole.

In sum, the main obstacles to the implementation of the inequality reducing policies discussed in this chapter are related to the political unwillingness to support progressive taxation reforms, concerns over public debt accumulation, and unintended consequences of the asset-based welfare policies and monetary policy for reinforcing inequality through asset price dynamics. For this reason, we argue that global coordination and dedicated public spending programs focused on affordable housing, public provision of education, and improving public services have potential to inspire the common goal of social justice, which could lead to more sustainable reductions in wealth inequality.

5.6. Summary

Based on our findings, this chapter evaluated policies to reduce wealth inequality proposed in the literature. We argued that to achieve a sustained reduction in wealth inequality, a mix of wealth taxation and policies explicitly addressing the distribution of market wealth was particularly effective. The redistributive policies could include an annual wealth tax on holdings, complemented by taxes on wealth transfers, such as capital gains and inheritance. In the future, policymakers could consider developing a lifetime capital receipts tax (Atkinson 2015) and the net revenue tax (McCain 2017). Proceeds from the raised tax revenue could be used to finance government spending programs focused on debt relief, subsidising savings, and providing affordable and sustainable housing and capital endowments to the low-income households. Importantly, such measures, together with establishing a more generous child support system, could explicitly reduce the wealth gap across race, gender, and generations. Moreover, reduction of high returns earned by the rich could be achieved by a closer supervision of the financial sector activity and lending practices (particularly unsecured subprime credit), adequate taxation of wealth, corporate income, and financial transactions, as well as by limiting charges imposed by the wealth management funds. To overcome the political obstacles to increased wealth taxation and public spending, the commitment to achieving greater equality should be shared within the society and globally. Proactive government strategy focused on improving the quality and access to public services and infrastructure through harmonious fiscal and monetary policy and promoting research was argued to be capable of achieving such goal.

Conclusion

This thesis analysed the relationship between financial sector transformation and inequality in the USA since the 1980s, proposing an innovative approach to inequality determination focused on disparities in household wealth structures. The main hypothesis put forward in this work was that changes in financial intermediation, financial deregulation, and securitisation influenced wealth accumulation possibilities across the distribution by generating a hierarchy of monetary claims which favoured the rich and forced the low- and middle-income households into unsustainable indebtedness. This wealth heterogeneity shaped inequality by generating disparities in leverage and rates of return to wealth dependent on its absolute size.

In order to investigate this hypothesis, the thesis posed the following research questions:

(1) How has financial sector transformation influenced income and wealth distribution in the USA since the 1980s?

(2) How do differences in ownership of wealth shape inequality?

(3) Which types of assets and liabilities are held by the US households at different points of the income distribution and how has this balance sheet composition changed over time, particularly in light of the 2007 financial crisis?

Given our research findings, we analysed the implications of the increased heterogeneity of household wealth composition for economic policy aiming to reduce wealth and income inequality in the USA.

i. Theoretical contributions

This thesis contributes to the literature on inequality by developing a novel approach to understanding the determinants of economic inequality in the USA since the 1980s in the context of financial sector transformation. This contribution is both theoretical and empirical. At the theoretical level, we develop a new theory of inequality determination, which argues that inequality arises because the heterogeneity of wealth composition across households generates unequal leverage and returns to wealth which depend on the absolute size of wealth holdings.

Furthermore, the proposed approach highlights the need for an explicit theoretical distinction between income wealth focused on analysing their relative dynamics. Moreover, this theoretical argument regarding inequality determination as an outcome of the interplay between income and wealth draws together dispersed strands of the economic literature from a variety of ideological traditions, evaluating insights of the macroeconomic theories of distribution identified with the Keynesian, New Keynesian, and the Post-Keynesian school of thought, and the neoclassical

microeconomic literature on household portfolio decisions. In addition, it engages with the less known Post-Keynesian analyses of consumption, highlighting the social determination of household wealth accumulation.

Moreover, the three-class stock-flow consistent model developed in this thesis contributes to the Post-Keynesian macro-modelling literature by introducing a new conceptualisation of the household sector in the Post-Keynesian macro-modelling framework based on balance sheet composition rather than sources of income. The increased heterogeneity of workers and capitalists arising due to financial sector transformation is addressed by the introduction of a third class of households identified with the middle class of leveraged homeowners emergent in the processes of securitisation and the subprime lending boom. This contribution is shown to result in higher levels of inequality and macroeconomic instability than the traditional two-class taxonomy of households in the Post-Keynesian macro-models.

In addition, based on incorporating money endogeneity and financial sector complexity into a three-class conceptualisation of households, the formal model of inequality determination contributes to the Post-Keynesian financialisation literature by proposing household wealth composition as the new mechanism in addition to the channel of the shareholder value maximisation and endogenous money creation through which financial sector transformation generates wealth and income inequality.

Lastly, the contribution of the policy analysis undertaken in Chapter 5 is to highlight the importance of the appropriate design of wealth redistribution policies in light of the increased complexity of household balance sheet composition. It presents an original evaluation of the existing policy proposals for reducing inequality, drawing from the analysis of the latest literature and the current policy infrastructure in the USA. It contributes to the current policy debate in the inequality literature by highlighting the potential to effectively reduce wealth inequality through combining a comprehensive wealth tax reform, financial regulation, and measures improving the distribution of market wealth by controlled asset-building programs and personal debt relief. Moreover, it enriches the literature by explicitly analysing the impact of the proposed policies on the racial, gender, and intergenerational wealth inequality.

ii. Empirical contributions

Among the empirical contributions of this thesis, the detailed analysis of income and wealth composition in Chapter 1 is one of the first ones to examine wealth inequality with an explicit focus on class, gender, race, and generations. Moreover, decomposition of inequality measures by the components of income and wealth in Chapter 1 provides a more detailed examination of the differences in the distribution of the individual drivers of inequality than the current literature using the data from the U.S. Survey of Consumer Finances.

The empirical contribution of the macroeconomic model of inequality determination developed in Chapter 3 is its calibration using the US data and the simulation of trends in inequality and leverage, which closely correspond to the observed values in the data. The original feature of the model is its ability to show how the three-class taxonomy of household based on their balance sheet heterogeneity induces higher inequality and greater macroeconomic instability compared to the conventional two-class classification.

The empirical contribution of the analysis in Chapter 4 is to establish a quantitative support for the relationship between household wealth structures and inequality using household level data from the U.S. Survey of Consumer Finances. The thesis contributes to the empirical literature on the determinants of inequality by adopting an original methodological approach combining the econometric and the non-parametric methods and estimation of the relative and overall inequality measures. With help of this approach, we show that analyses of inequality which do not consider wealth distribution cannot fully explain the increasingly unequal distribution of income and wealth observed in the USA since the 1980s. The analysis developed in this thesis is thus one of the first ones to provide a robust examination of wealth composition as the cause of inequality, taking advantages of the relative merits of both econometric and non-parametric approaches. Moreover, the thesis contributes to the inequality decomposition literature by extending its traditional focus on income into examining the determinants of wealth inequality across the distribution, race, gender, and generations. This analysis quantifies the intersectional dimension of the impact of wealth composition on inequality, highlighting the need to account for wealth disparities in analysing the causes of the gender, racial, and intergenerational inequality.

Lastly, the innovative feature of the analysis in this thesis is the empirical validation of the theoretical conceptualisation of the three-class household sector in the stock-flow consistent model, which is undertaken using the Oaxaca-Blinder decomposition method.

iii. Main findings

Chapter 1

To answer the first two research questions, Chapter 1 developed the theoretical link between financial sector transformation and inequality. We demonstrated that in the context of financial sector transformation in the USA since the 1980s, wealth became increasingly important as an independent determinant of economic inequality alongside income. We highlighted that the processes of securitisation generated an explicit interplay between income and wealth. On the one hand, higher income allowed access to high-yielding financial instruments and business equity. On the other hand, greater wealth became associated with higher capital income receipts, and served as collateral to access larger amounts of secured debt, which further facilitated financial investment. Sustained

increases in income and wealth among the rich kept leverage in check as their indebtedness rose. Simultaneously, low wealth levels among households at the bottom of the income distribution limited their wealth accumulation possibilities, which in turn reduced the amount earned in capital gains and placed a greater burden of debt holdings and repayments on household finances. We observed that this relationship between wealth composition and inequality had a distinctive social dimension, influencing income and wealth disparities across gender, race, and generations. Consequently, we argued that analyses of inequality in times of financial sector transformation should explicitly consider the distribution of wealth.

Chapter 2

In light of the call for an explicit consideration of wealth as the determinant of inequality in times of financial sector transformation, Chapter 2 undertook a review of the economic literature on the causes of inequality. It thus aimed to understand what determinants of inequality had been put forward by the existing economic theory and to what extent wealth and finance had been considered. The review of the literature on inequality determination revealed a gap in the existing theories. On the one hand, the heterogeneity of household wealth structures had not been considered by the macroeconomic theories of distribution. This is because with the exception of Piketty (2014) this literature had been focused on income disparities, arising due to the differences in marginal contribution to production, human capital accumulation, skill-biased technological change, and trade openness (mainstream approach), policy choices generating market imperfections and rent seeking behaviour (Stiglitz 2012), financial liberalisation (Galbraith 2012, 2016), declining bargaining power of workers (political economy approach), and differences in the sources of income (the Post-Keynesian approach). On the other hand, the life-cycle theory and the permanent income hypothesis had not considered the impact of financial sector transformation on the portfolio choices of households. They thus downplayed the role of securitisation and subprime lending on wealth accumulation decisions of households, neglecting the consequences of the differences in leverage and rates of return to wealth for inequality. Hence, the thesis aimed to fill the gap in the literature by developing a formal model of inequality determination in a Post-Keynesian macro-modelling framework, drawing from Piketty's insights regarding the interplay between wealth and income and the Post-Keynesian assumption of the social dependence of consumption.

Chapter 3

Based on the analysis of the literature in Chapter 2, we developed a new theory of inequality determination combining Piketty's theory of unequal returns with the Post-Keynesian assumption of the social dependence of consumption in a unified Post-Keynesian macro-modelling framework. We adopted the stock-flow consistent modelling approach because its integrated balance sheet analysis

across the real and financial sectors yielded itself to the examination of the impact of financial sector complexity on household wealth heterogeneity. To account for the increasingly capitalist features of workers, and high wage earnings among the top income group employed as financial executives, we provided a new conceptualisation of the household sector in the Post-Keynesian macro-models.

The main innovation of our model was to define households according to their balance sheet composition rather than the type of income received. Heterogeneity of wealth composition was incorporated into the model by introducing a third class of households identified with the middle class of leveraged homeowners, who emerged during the subprime lending bubble in the 2000s. To explain the distribution of wealth endogenously, we distinguished between different motives for debt accumulation based on the Post-Keynesian analyses of consumption discussed in Chapter 2. This was achieved by introducing relative consumption concerns into the middle class portfolio decisions, and by distinguishing between necessitous borrowing of the working class based on unsecured debt, accumulation of mortgages to satisfy consumption emulation among the middle class, and secured debt as an investment strategy for the rentier class.

Furthermore, we introduced the process of securitisation by analysing a complex financial sector consisting of commercial banks, SPVs/underwriters, and institutional investors. We developed the link between financial sector complexity and inequality by assuming that in addition to receiving profits of all financial institutions, rentiers accumulated securitised assets derived from mortgages to the middle class. Consequently, the main distributional channels in our model emerged through securitisation, payments of housing rentals by the working class to the rentiers, endogenous money creation by commercial banks, as well as consumption emulation and leverage levels determining the amount of debt repayments by the middle and the working class.

The model was calibrated using empirical data to represent the features of the US economy. It was simulated to analyse changes in the overall inequality indices for income and wealth, and in various leverage measures of the household groups. Additionally, we reported the leverage ratio for the whole economy to gauge the impact of household wealth heterogeneity of macroeconomic stability. We compared simulation results of the full model to four reduced scenarios excluding the innovative features of our model – a "pure capitalist" specification with no rentier wage, and specifications without consumption emulation, securitisation, or the middle class. Finally, we tested the robustness of the full specification results to the choice of parameter values by performing a univariate and a multivariate sensitivity analysis, which additionally aimed to reproduce the conditions of an economic downturn corresponding to the Great Recession.

We showed that by accounting for household wealth heterogeneity, rentier wage, relative consumption concerns, and the securitisation of mortgages to the middle class, the model reproduced the stylised facts presented in Chapter 1, namely that wealth inequality exceeded income inequality in

the period. The simulated magnitudes of the Gini coefficient for income and wealth were close to their observed values, while the remaining variables were consistent in terms of trends and ordering across households with the empirical values estimated from the U.S. Survey of Consumer Finances in Chapter 1. Importantly, the model showed that greater heterogeneity of household balance sheet structures, proxied by the introduction of the middle class, resulted in higher inequality levels than scenarios based on the two-class taxonomy of households, or excluding the rentier wage, consumption emulation, or securitisation. The simulation results were shown to be robust to changes in most of the key parameters, particularly in the long run. The model outcome was the most sensitive to changes in the wage share of output, the firm profit retention ratio, as well as household lending norms and the marginal consumption propensities, suggesting the relevance of both income and wealth channels for inequality determination. Moreover, the multivariate sensitivity analysis reproduced the empirical finding of increasing wealth inequality and decreasing income inequality immediately after the 2007 recession.

Overall, the macroeconomic model of inequality determination developed in this chapter demonstrated that household balance sheet heterogeneity contributed to higher income and wealth inequality through uneven returns on assets held by different household groups and differences in the degrees of leverage related to securitisation of housing and the relative consumption concerns among the middle class. Thus, the model provided a formal support to the research hypothesis, showing that theories of inequality which did not account for wealth distribution could not fully explain the observed levels of income and wealth inequality in the USA and the high levels of macroeconomic fragility. We noted that the caveat of the stock-flow consistent model developed in this chapter was its inability to explicitly consider the social dimension of inequality across gender, race, and generations due to the high level of analytical aggregation.

Chapter 4

Chapter 4 undertook a formal empirical test of the implications of the stock-flow consistent model, namely that household balance sheet heterogeneity increased inequality. Specifically, the empirical analysis in this chapter intended to answer the third research question and quantitatively evaluate which types of wealth contributed the most to inequality in the USA since the 1980s.

Using data from the U.S. Survey of Consumer Finances between 1989 and 2013, the empirical analysis was conducted in two parts. Firstly, the linear regression analysis using the pooled OLS estimation was undertaken to test the statistical significance of the finding of the stock-flow consistent model regarding the impact of household wealth heterogeneity on inequality, measured in relative terms as the median income ratio. The robustness of this estimation was evaluated by comparing the pooled OLS results with the quantile regression estimates and the non-parametric correlation methods. To address the caveat of the stock-flow consistent model, the statistical significance of the relationship

between wealth composition and relative inequality was explicitly analysed across the social dimensions of gender, race, and generations. In addition, the relationship was estimated across subperiods to test the role of the processes of securitisation and subprime lending in generating the distributional effects of wealth composition.

Secondly, we applied the inequality decomposition analysis to evaluate the precise contribution of the individual asset and debt holdings to absolute inequality measures. A mix of the non-parametric method of Shorrocks (1982) and the parametric decomposition of Fields (2003) was chosen to provide a comprehensive and robust insight into the determination of income and wealth inequality in the period. In addition, we used the parametric Oaxaca-Blinder decomposition to decompose the gap in income and wealth across gender, race, generations, as well as between the top 10% and the bottom 90%, and the bottom 20% vs. the top 80% of the income distribution. This enabled us to explore the impact of balance sheet composition on the social dimension of inequality, and to test the validity of the proposed construction of balance sheets of the three classes of households in the stock-flow consistent model in Chapter 3.

We found that a greater contribution of high-yielding financial investment assets and business equity to total assets was significantly associated with the largest increases in the household position in the income distribution relative to the median, raising the median income ratio by approximately 3 percentage points for every one-percentage point rise in the relative holdings of these assets. Moreover, while all types of financial assets were significant and positively associated with the median income ratio, greater reliance on primary residence was significantly associated with lower position in the income distribution relative to the median. Among liabilities, higher relative holdings of secured debt, particularly mortgages backed by other real estate, were significantly associated with increases in the median income ratio, while reliance on unsecured debt was related to declines of approximately 1 percentage points for every one-percentage point increase in the share of instalment loans and credit card balances in total debt. Moreover, higher debt-service-to-income ratio was significantly associated with around 4 percentage point decline in the position of household income in the distribution relative to the median following a one-percentage point increase in this measure of leverage, and the median income ratio was particularly low for extremely indebted households for whom monthly debt payments exceeded 40% of monthly income. Among household characteristics, higher educational attainment and self-employment had the largest positive effect on the median income ratio, while female, Black/Hispanic, and single households were found to occupy a lower relative position in the income distribution compared to the estimated mean value. These results were compared to the estimates of a pooled OLS specification including only the socio-economic variables, finding that upon the inclusion of the balance sheet composition variables the magnitude of the socio-

economic estimates was lower. This suggested that analyses which did not explicitly account for wealth composition inflated the role of the socio-economic determinants of inequality.

To establish any statistically significant differences in the impact of balance sheet composition on relative inequality, the pooled OLS regression was estimated across gender, race, and age groups. We found that the positive effects of greater shares of business equity and financial investment assets in total holdings were significantly lower among women, Blacks, Hispanics, and households aged below 35. The relative position of these groups in the income distribution was found to rely more on debt composition rather than assets. Greater reliance on unsecured debt was observed to be positively associated with their median income ratios, although at varying levels of significance. Moreover, the lower estimates of extreme indebtedness showed that households headed by women, Blacks, Hispanics, and the young tended to be more indebted on average than their counterparts in the period studied. Moreover, the negative impact of higher debt-service-to-income ratio on relative income was higher for households headed by women and the young.

In addition, to evaluate the role of the process of securitisation and subprime lending on generating the impact of wealth distribution on inequality, the pooled OLS regression was estimated for three subperiods corresponding to the pre-subprime era between 1989 and 1998, the subprime lending boom between 2001 and 2007, and the post-crisis period between 2010 and 2013. While most of the estimates were consistent over time, the positive impact of the relative holdings of business equity, financial investment assets, and debt secured by other real estate on the median income ratio was found to be significantly higher in the sub-prime lending boom.

The robustness of the OLS results was tested using the quantile regression analysis and the non-parametric Theil-Sen median slope estimation. This type of sensitivity analysis was motivated by the greater resilience of both alternative methods to outliers. Moreover, the non-parametric estimation avoided making assumptions about the error term in a regression model, which we concluded were likely to be violated in the dataset due to non-spherical errors and endogeneity problems arising from potential mutual causality between wealth composition and income inequality. Overall, despite minor differences in sign and magnitude among certain estimates both the quantile regression and the non-parametric method supported the main findings of the pooled OLS analysis, namely that there were significant asymmetric effects of balance sheet composition on relative inequality across class, gender, race, and generations in the USA between 1989-2013.

The second part of the empirical analysis in Chapter 4 provided a comprehensive evaluation of the contribution of the individual assets and liabilities to overall inequality measures. We combined the non-parametric and the parametric inequality decomposition methods of Shorrocks (1982) and Fields (2003) for both wealth and income, considering the different types of assets and debt, as well as income flows from wealth ownership and household characteristics. Moreover, using the Oaxaca-

Blinder method we decomposed the wealth and income gap across gender, race, and generations, evaluating the social dimension of the finding of the stock-flow consistent model in Chapter 3. In addition, by decomposing the income and wealth gap between the top 10% and the bottom 90%, and between the bottom 20% and the top 80% of the income distribution, we gauged the validity of the proposed balance sheet classification of the three groups of households in the stock-flow consistent model.

The contribution of the differences in assets to wealth inequality was found to be greater than of disparities in debt, driven by large estimated differences in the ownership of business equity, financial investment assets, as well as primary residence and retirement assets. Debt holdings and repayments were found to play a comparatively small role in contributing to wealth and income inequality. This was paralleled by the finding that capital income, particularly business income and capital gains, contributed a large part to income inequality between 1989-2013, although the role of wage disparities increased over time. Among household characteristics, disparities in educational attainment emerged as the highest determinant of income and wealth inequality in the sample as well as across subgroups.

Furthermore, the Oaxaca-Blinder decomposition across the distributional groups validated the proposed balance sheet classification of households in the stock-flow consistent model in Chapter 3. The introduction of the middle class was supported by the high contribution of primary residence and capital gains to the wealth and income gap respectively between the bottom 20% and the top 80% of the income distribution, and by the growing disparities in wealth between these two groups compared to a decreasing income gap. Moreover, the inclusion of the rentier wage and debt was supported by the finding that wage inequality explained a large part of the income gap across the top 10% and the bottom 90% of the distribution, together with a negative contribution of debt to wealth inequality.

Overall, the empirical analysis showed the significance of the research hypothesis regarding the impact of wealth composition on income and wealth inequality formalised in the stock-flow consistent model. We also provided evidence for the intersectional dimension of wealth distribution in driving gender, racial, and intergenerational inequalities in the USA since the 1980s. Moreover, it supported the introduction of the middle class and the redefinition of the bottom and the top group of households in the Post-Keynesian macro-model in Chapter 3 based on their balance sheet composition. We concluded that analyses which do not consider wealth composition as an independent determinant of inequality could not fully explain the rise in income and wealth inequality across the analysed categories in the USA since the 1980s.

iv. Policy implications

Policy implications of our finding that greater heterogeneity of household wealth composition contributed to income and wealth inequality by influencing disparities in the returns to wealth and

leverage were analysed in Chapter 5. We evaluated policy measures proposed in the existing literature, analysing Piketty's (2014) proposition of the global wealth tax, Atkinson's (2015) proposals for reducing wealth inequality, Galbraith's (2016) three-step approach to inequality reduction extended to wealth, and Stiglitz's (2012) proposition of improving financial market transparency. We explicitly focused on the implications of these policies for alleviating the gender, racial, and intergenerational wealth inequality.

Given our research finding that wealth inequality emerged as the rates of returns to wealth were related to its absolute size, we argued in favour of Piketty's proposal to explicitly tax wealth holdings. However, given our findings regarding the heterogeneity of household wealth composition, we noted that taxation of wealth holdings alone created incentives for tax avoidance and evasion arising from the mobility of wealth, particularly liquid assets owned by the rich. Moreover, it risked targeting households towards the middle and the bottom of the income distribution who relied on illiquid property wealth. Consequently, we advocated that a comprehensive wealth taxation reform could be more effective in alleviating wealth inequality. In addition to the tax on holdings, such reform could include progressive taxes on capital gains and wealth transfers. Nevertheless, we appreciated that the other forms of wealth taxation suffered from their own problems. For this reason, we argued that policies directly affecting the distribution of market wealth proposed by Atkinson (2015) could complement the redistribution measures to effectively reduce wealth inequality. Policies such as the national savings bonds program or the payments of capital endowments had potential to boost the size and the returns to wealth of lower-income households. Furthermore, the accumulation of assets by the state could be effective in building up its net worth and improving the economic legacy passed down to the future generations. Moreover, we supported Atkinson's proposition of complementing the progressive income taxes with tax credits for wage income, arguing that they could promote a more appropriate targeting of taxation towards high earners at the top while simultaneously alleviating the racial and gender wealth inequality. We also highlighted Atkinson's idea of a progressive property tax and a progressive lifetime capital receipts tax, which could replace the inheritance tax and boost the currently low tax revenues.

Furthermore, we supported Galbraith's (2016) criticism of the consumption and sales taxes, arguing that they placed the burden of taxation onto households with higher propensities to consume, which tended to be towards the bottom of the distribution. Furthermore, we argued that his proposition of a financial transactions tax could significantly reduce the high returns earned in the financial sector, which are passed on to the richest through profitable financial asset ownership. A similar insight regarding the role financial sector regulation in reducing inequality was put forward by Stiglitz (2012). We argued that his proposals of financial regulation through increasing transparency of the banking sector, reducing interconnectedness between financial institutions, discouraging risky speculative

behaviour through regulating predatory lending practices, and reforming the personal bankruptcy laws had an important role in reducing wealth inequality. This is because these policies would be able to limit the high returns generated by speculative financial activity, and to improve financial security of low-income households by restricting their leverage.

Moreover, we supported Stiglitz's emphasis on looking beyond personal taxes towards increasing corporate taxation and reducing corporate subsidies, arguing that this would reduce the rates of return earned on business equity holdings which were found to be concentrated at the top of the distribution. We also agreed with Stiglitz's and Galbraith's call for increasing investment in public services, affordable housing, and subsidising savings to the poor, arguing that these measures could have a positive role in improving wealth accumulation prospects of ethnic minorities, women, and the young, while simultaneously reducing their dependence on debt. For the same reasons, we argued that promoting more debtor-friendly bankruptcy laws, regulating unsecured lending standards, and designing regulated asset-based welfare programs could effectively reduce inequality among these groups by reigning in their leverage. However, we noted Piketty's (2014) argument regarding the distributional consequences of public debt accumulation, arguing that these policies should be complemented by progressive taxation to avoid wealth increases among the rich asset owners associated with the sales of government bonds.

Moreover, we noted that because the existing policy infrastructure in the USA was highly regressive, inequality-reducing policies would be the most effective if coordinated at the federal level. We highlighted the importance of the fiscal policy to be complemented by monetary policy focused on financial sector regulation and monitoring of lending standards. Moreover, we argued for the extension of the existing subsidised savings programs such as the Universal Savings Accounts, the Child Savings Accounts, and the Individual Development Accounts to a wider base of low income households, ethnic minorities, women, and the young.

In sum, the main policy implications of our research concern the need for distinct policy measures targeting wealth inequality. This is because in the context of our research findings income taxes only affect returns earned on wealth but not its absolute size. We highlight that due to the increased heterogeneity of household wealth composition, a mix of different wealth taxes, together with subsidised savings programs, personal debt relief, financial regulation, and coordinated fiscal-monetary policy could be particularly effective in achieving reducing wealth inequality in the USA across various social groups.

v. Limitations and further research

The scope of this thesis is to analyse the impact of financial sector transformation on household wealth composition and inequality in the USA since the 1980s. Its main argument can be extended to understand rising inequality in countries with similar institutional features, e.g. the UK. However, the

mechanisms behind the relationship between wealth heterogeneity and inequality need to be analysed separately for each country, considering their laws and institutional conditions for wealth accumulation. Securitisation based on subprime lending was largely a US phenomenon and cannot be readily applied in the European or the developing country context. For instance, while the US households at the bottom of the distribution have had incentives to accumulate housing wealth due to privatisation of public services, the average family in Germany or Austria rents their property due to the established social housing infrastructure (ECB 2013). Similarly, in the emerging economies channels of informal finance, remittances, and the colonial past are likely to be relevant in determining the wealth accumulation possibilities and inequality. Consequently, policy solutions proposed in this thesis are applicable mainly in the US context and need to be analysed carefully when considered in other countries.

The main limitations of the analysis in this thesis are related to the aggregate and complex nature of the stock-flow consistent model, and estimation problems arising due to the design of our dataset. Firstly, while the high aggregation of the analytical categories allows for an integrated balance sheet analysis of the interrelated economic sectors and the implications of wealth heterogeneity on macroeconomic stability, it limits the possibility to analyse the intersectional dimension of inequality. Moreover, its complex nature restricts its ability to examine the heterogeneity of household portfolio behaviour in more detail to incorporate the remaining tenets of the Post-Keynesian analyses of consumption, such as the satiation and hierarchy of consumption choices.

Secondly, the main caveat of the empirical analysis is that the results may be subject to a bias given that the problem of endogeneity cannot be properly addressed in the dataset of choice. Moreover, low goodness-of-fit in the pooled OLS regression signals potential omitted variables, which may introduce bias to our estimates. Moreover, the complex design of the U.S. Survey of Consumer Finances results in a likely violation of the assumption of non-spherical errors, and may lead to inefficiency of our parametric results.

Given its scope and limitations, this thesis offers a variety of directions to be developed in future research. Firstly, the theoretical model of inequality determination undertaken here could be extended to include securitisation of consumer debt, heterogeneity of marginal consumption propensities out of wealth, endogenous movements across household groups related to changes in wealth accumulation and leverage, and government redistribution policy. Moreover, the model could be extended into different modelling methodologies to provide a more refined depiction of the mechanism between wealth composition and distribution. This could be achieved through an analytical Post-Keynesian functional distribution model relating returns to wealth to its absolute size in a three-class setting. An advantage of such demand-led model would be the possibility to incorporate the gendered, racial, and intergenerational dimensions of economic behaviour, as highlighted by Onaran (2015). Moreover, the

theoretical framework developed in this thesis could be applied to analyse the consequences of wealth inequality on economic performance. Such research could be developed by integrating the heterogeneity of households and their wealth structures into a macroeconomic agent-based model (cf. Russo 2016).

Secondly, the empirical analysis presented here could be extended to other countries. This would allow to understand which institutional mechanisms in advanced and emerging economies generate inequality in the different legal and historical contexts. This strand of research would be particularly relevant given the increasing availability of good quality data on wealth distribution, such as the European Household and Consumption Survey and the Distributional National Accounts. Moreover, to understand the changing landscape of finance and its impact on household wealth, the results obtained in this work could be revised with the new data from the upcoming 2016 wave of the U.S. Survey of Consumer Finances.

Furthermore, focus on the social dimension of wealth inequality adopted in this thesis could be pursued in more detail. Not enough academic research has investigated the determinants of the racial, gender, and intergenerational wealth inequality in the context of financialised economies. Understanding the determinants of wealth inequality across these categories can be applied using the findings presented here. In addition, our insights can inform future work on the impact of the racial and gender inequalities on macroeconomic performance. Furthermore, the analysis could be extended using individual-level data to examine the role of intra-household wealth distribution in generating personal inequality.

Lastly, policy proposals put forward in this thesis could be formally assessed in the US context. Such comparative policy evaluation could analyse the potential quantitative impact of wealth taxation, asset-building programs, and debt relief measures on wealth inequality. Moreover, this analysis could guide the design of policy strategy to reduce inequality, indicating the most urgent areas for policy action and maximising the effectiveness of the long-term measures.

vi. Concluding remarks

This thesis presented a comprehensive research program for understanding the causes and consequences of rising wealth inequality in the USA since the 1980, which could be extended into other contexts using the latest data and methods. We conclude with an emphasis on the need to invest in improved public services, research into the determinants and consequences of inequality, and promoting global coordination to tackle inequality in order to promote shared values of social justice in the society, and achieve sustainable reductions in income and wealth inequality in the long run.

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Appendices

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Appendix I

Data analysis in Chapter 1

Appendix to Section 1.1. Trends in inequality (source for all tables: own calculations based on U.S. Survey of Consumer Finances 1989-2013)

Table A1.1 Decile boundaries for income percentiles

Wave	0-20		20-40		40-60		60-80		80-90		90-100	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1989	0	18,855.5	18,855.5	37,711.1	37,711.1	58,452.1	58,452.1	94,277.6	94,277.6	133,874.2	133,874.2	188,000,000.0
1992	0	18,325.5	18,325.5	33,319.1	33,319.1	54,976.6	54,976.6	88,295.7	88,295.7	126,612.7	126,612.7	109,000,000.0
1995	0	18,653.2	18,653.2	34,197.5	34,197.5	55,959.5	55,959.5	91,711.5	91,711.5	124,354.5	124,354.5	155,000,000.0
1998	0	20,292.7	20,292.7	37,686.4	37,686.4	60,878.0	60,878.0	97,115.0	97,115.0	134,801.4	134,801.4	256,000,000.0
2001	0	21,601.3	21,601.3	40,502.5	40,502.5	67,504.2	67,504.2	108,006.7	108,006.7	156,609.7	156,609.7	166,000,000.0
2004	0	22,796.5	22,796.5	41,793.5	41,793.5	65,856.5	65,856.5	110,182.9	110,182.9	159,575.2	159,575.2	130,000,000.0
2007	0	23,093.0	23,093.0	41,567.3	41,567.3	66,969.6	66,969.6	109,691.6	109,691.6	158,186.8	158,186.8	210,000,000.0
2010	0	21,787.7	21,787.7	38,128.6	38,128.6	62,095.1	62,095.1	101,313.0	101,313.0	152,514.2	152,514.2	387,000,000.0
2013	0	20,290.6	20,290.6	36,523.1	36,523.1	59,857.4	59,857.4	101,453.1	101,453.1	154,208.8	154,208.8	180,000,000.0

Note: All values in 2013 USD.

Table A1.2 Decile boundaries for net worth percentiles

Wave	0-20		20-40		40-60		60-80		80-90		90-100	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1989	-38,400,000.0	3,976.7	3,976.7	46,400.4	46,472.7	140,086.8	140,249.4	341,630.9	341,811.7	663,649.7	665,186.1	282,000,000.0
1992	-528,535.6	5,719.2	5,735.4	46,468.2	46,517.0	127,836.4	127,868.9	300,418.8	300,418.8	581,372.9	581,502.9	2,840,000,000.0
1995	-21,900,000.0	7,893.0	7,893.0	51,228.5	51,425.8	131,979.7	132,177.1	299,265.4	299,326.1	579,071.5	579,359.9	1,330,000,000.0
1998	-21,700,000.0	7,033.2	7,033.2	57,037.9	57,037.9	157,690.6	157,819.2	391,403.1	391,403.1	705,469.0	705,469.0	740,000,000.0
2001	-4,236,829.0	8,929.9	8,929.9	65,266.8	65,266.8	183,088.6	183,128.0	498,785.8	498,798.9	978,897.6	978,950.1	776,000,000.0
2004	-561,560.6	7,953.8	7,978.4	64,741.2	64,741.2	190,828.7	190,890.4	537,871.9	538,019.9	1,028,810.0	1,029,427.0	883,000,000.0
2007	-531,868.3	8,196.4	8,230.1	72,886.3	72,886.3	222,201.2	222,201.2	557,917.1	557,917.1	1,021,969.0	1,022,081.0	1,590,000,000.0
2010	-7,429,424.0	4,608.3	4,608.3	42,546.3	42,546.3	148,333.4	148,429.9	445,503.9	445,503.9	1,020,254.0	1,020,469.0	1,170,000,000.0
2013	-227,000,000.0	4,300.0	4,300.0	38,150.0	38,180.0	147,600.0	147,600.0	428,200.0	428,300.0	942,050.0	942,200.0	1,320,000,000.0

Note: All values in 2013 USD.

Appendix to Section 1.3. Balance sheet analysis (source for all tables: own calculations based on U.S. Survey of Consumer Finances 1989-2013)

Table A1.3 Asset and debt holdings, whole sample, USA 1989-2013

Wave	**Assets**			**Debt**		
	Holders	Conditional median	Conditional mean	Holders	Conditional median	Conditional mean
1989	94.7%	147,859.3	411,492.0	72.3%	27,113.6	65,321.5
1992	95.8%	137,536.2	370,759.1	73.2%	28,270.9	70,136.6
1995	96.4%	155,127.4	392,925.6	74.5%	33,089.8	74,031.3
1998	96.8%	177,117.8	488,003.5	74.1%	46,888.3	90,695.4
2001	96.7%	195,078.3	613,634.5	75.1%	51,215.4	95,284.8
2004	97.9%	214,628.4	665,152.9	76.4%	68,316.1	127,591.9
2007	97.7%	249,575.0	751,170.0	77%	75,732.6	141,503.0
2010	97.4%	201,157.3	651,688.6	74.9%	76,090.4	139,622.5
2013	97.9%	178,200.0	632,560.0	74.5%	60,700.0	122,268.0
Growth rate (percent)						
1989-2013	*3.4*	*20.5*	*53.7*	*3.0*	*123.9*	*87.2*
1989-2007	*3.2*	*68.8*	*82.5*	*6.5*	*179.3*	*116.6*
2007-2013	*0.2*	*-28.6*	*-15.8*	*-3.2*	*-19.8*	*-13.6*

	Non-financial assets								**Financial assets**					
	Primary residence		Other property		Business equity		Vehicles and other non-financial		Transaction accounts		Financial investment assets		Retirement and insurance assets	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	63.9%	129,548.5	20.3%	55,040.2	13.3%	76,833.3	84.5%	21,958.5	85.6%	23,699.7	52.8%	69,824.5	53.5%	34,587.2
1992	63.9%	119,031.7	19.4%	49,134.2	14.4%	66,814.2	86.4%	18,174.0	86.9%	20,365.1	50.5%	59,867.7	55.7%	37,372.1
1995	64.7%	117,289.4	18.0%	39,075.9	12.8%	68,570.1	84.9%	23,061.7	87.4%	20,109.0	50.5%	73,612.2	58.6%	51,207.3
1998	66.3%	135,598.0	18.6%	47,030.3	12.7%	82,554.2	83.5%	23,200.1	90.6%	22,496.2	51.9%	109,483.4	59.7%	67,641.3
2001	67.7%	166,489.2	16.8%	57,899.3	13.6%	101,399.2	85.5%	26,507.6	91.4%	30,218.7	51.7%	142,242.2	61.6%	88,878.3
2004	69.1%	214,661.2	18.1%	73,819.9	13.3%	110,033.5	87.0%	28,196.4	91.3%	31,268.0	49.9%	122,852.6	58.4%	84,321.3
2007	68.6%	238,572.0	19.0%	81,964.9	13.6%	146,287.8	87.7%	27,038.9	92.1%	28,051.6	47.5%	131,388.2	60.8%	97,866.7
2010	67.3%	193,185.9	18.6%	72,726.9	13.2%	113,705.2	87.2%	25,647.8	92.5%	32,809.1	39.8%	112,817.8	57.6%	100,795.9
2013	65.2%	174,658.3	17.5%	62,413.3	11.7%	112,348.7	86.7%	24,641.7	93.2%	34,390.7	35.9%	116,100.2	56.5%	108,007.2

	Secured debt				Unsecured debt						Other	
	By primary residence		By other property		Instalment debt		Credit card balances		Other unsecured lines of credit		Other debt	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	39.5%	44,827.6	5.2%	5,016.6	49.4%	10,878.6	39.7%	1,873.0	3.2%	1,209.7	6.7%	1,516.0
1992	39.1%	50,468.0	5.7%	7,181.3	46.0%	7,954.7	43.7%	2,242.5	2.4%	584.0	8.4%	1,706.1
1995	41.0%	53,949.1	4.8%	5,830.5	46.0%	8,838.7	47.3%	2,878.5	1.9%	422.7	8.5%	2,111.8
1998	43.1%	64,633.1	5.0%	6,840.6	43.8%	12,025.3	44.1%	3,508.3	2.3%	302.2	8.8%	3,385.9
2001	44.6%	71,679.9	4.6%	5,904.9	45.2%	11,781.0	44.4%	3,211.2	1.5%	483.3	7.2%	2,224.5
2004	47.9%	95,774.1	4.0%	11,086.3	46.0%	13,930.6	46.2%	3,826.5	1.6%	915.6	7.6%	2,058.8
2007	48.7%	105,610.6	5.5%	14,359.6	46.9%	14,478.1	46.1%	4,922.0	1.7%	606.6	6.8%	1,526.1
2010	47.0%	103,540.5	5.4%	13,651.4	46.4%	15,566.9	39.4%	3,991.7	2.1%	1,409.4	6.4%	1,462.6
2013	42.9%	90,180.1	5.3%	10,987.6	47.2%	15,999.4	38.1%	2,931.6	1.9%	880.9	6.6%	1,288.4

Note: All median and mean values in 2013 USD. Holders represents the proportion of all households holding asset or debt. All values are conditional on holding assets or debt.

Appendix to Section 1.3.1. Detailed balance sheet analysis by income group (source for all tables: own calculations based on U.S. Survey of Consumer Finances 1989-2013)

Table A1.4 Before-tax family income and net worth by income percentile, USA 1989-2013

Wave	Before-tax income											
	0-20		20-40		40-60		60-80		80-90		90-100	
	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean
1989	11,313.3	10,802.9	26,397.7	26,597.9	47,138.8	46,921.1	73,536.6	74,024.0	109,362.0	110,786.2	188,555.2	313,842.6
1992	10,995.3	10,658.9	26,655.3	25,818.1	43,314.9	44,171.7	68,304.2	70,315.6	103,289.3	104,428.6	174,925.5	244,407.6
1995	10,414.7	10,093.2	26,425.3	26,709.5	46,632.9	45,727.0	68,395.0	70,251.2	104,146.9	105,650.7	170,987.4	266,723.4
1998	11,740.8	11,247.3	28,989.5	28,803.7	47,832.7	48,529.6	76,822.3	77,600.0	113,059.2	113,680.0	186,982.5	312,472.4
2001	13,500.8	13,146.7	32,402.0	31,676.2	52,653.3	52,920.5	85,055.3	85,610.5	129,608.1	128,823.4	222,763.8	411,988.8
2004	13,931.2	13,330.2	31,661.8	32,162.2	53,191.8	53,549.7	84,093.6	85,307.1	129,180.0	131,410.1	227,964.6	371,243.7
2007	13,855.8	13,811.3	32,330.1	31,777.4	53,113.8	53,088.5	84,289.3	85,970.2	128,165.9	130,275.9	232,084.2	445,044.1
2010	14,162.0	13,820.1	30,502.8	29,921.7	49,022.4	49,538.4	76,257.1	78,759.3	120,922.0	122,671.4	220,056.2	372,686.7
2013	14,203.4	13,318.6	28,406.9	28,566.7	46,668.5	47,243.1	76,191.3	78,544.1	121,743.8	124,292.7	229,284.1	406,234.0
Growth rate (percent)												
1989-2013	*25.5*	*23.3*	*7.6*	*7.4*	*-1.0*	*0.7*	*3.6*	*6.1*	*11.3*	*12.2*	*21.6*	*29.4*
1989-2007	*22.5*	*27.8*	*22.5*	*19.5*	*12.7*	*13.1*	*14.6*	*16.1*	*17.2*	*17.6*	*23.1*	*41.8*
2007-2013	*2.5*	*-3.6*	*-12.1*	*-10.1*	*-12.1*	*-11.0*	*-9.6*	*-8.6*	*-5.0*	*-4.6*	*-1.2*	*-8.7*

Net worth

	0-20		20-40		40-60		60-80		80-90		90-100	
	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean
1989	3,470.5	44,642.5	44,827.8	123,026.6	76,134.9	185,522.8	122,011.0	246,891.9	243,262.9	404,257.6	715,382.4	1,818,168.0
1992	6,499.1	54,144.6	45,330.9	105,324.3	64,308.2	164,787.5	123,027.1	227,019.1	195,134.1	370,360.7	595,150.9	1,565,693.0
1995	9,107.3	67,756.4	52,974.0	121,867.0	70,080.6	154,088.5	115,510.7	242,495.6	194,744.1	392,560.4	542,338.8	1,669,558.0
1998	8,291.2	70,852.6	50,033.3	139,656.9	76,336.5	179,745.9	160,320.9	291,764.9	271,180.3	471,217.6	646,858.6	2,218,943.0
2001	10,571.4	69,995.5	50,690.2	155,162.5	84,177.2	214,458.2	186,476.7	387,539.3	345,244.5	594,930.5	1,097,192.0	2,968,968.0
2004	9,334.9	88,244.3	42,666.7	151,954.6	89,649.4	241,354.3	197,672.7	418,269.2	389,302.9	607,967.7	1,145,096.0	3,130,447.0
2007	9,998.5	118,863.1	42,441.7	151,002.1	99,300.0	236,525.1	230,622.2	417,509.4	402,219.1	689,524.9	1,257,643.0	3,712,543.0
2010	6,537.3	125,244.2	29,846.7	139,272.3	69,874.6	211,242.1	136,748.4	313,353.5	309,880.8	610,394.3	1,279,101.0	3,114,946.0
2013	6,200.0	87,530.3	21,700.0	111,350.1	62,000.0	170,066.2	159,000.0	333,843.7	300,000.0	629,917.6	1,137,300.0	3,248,013.0
Growth rate (percent)												
1989-2013	*78.6*	*96.1*	*-51.6*	*-9.5*	*-18.6*	*-8.3*	*30.3*	*35.2*	*23.3*	*55.8*	*59.0*	*78.6*
1989-2007	*188.1*	*166.3*	*-5.3*	*22.7*	*30.4*	*27.5*	*89.0*	*69.1*	*65.3*	*70.6*	*75.8*	*104.2*
2007-2013	*-38.0*	*-26.4*	*-48.9*	*-26.3*	*-37.6*	*-28.1*	*-31.1*	*-20.0*	*-25.4*	*-8.6*	*-9.6*	*-12.5*

Note: All figures in 2013 USD.

Table A1.5 Asset holdings by income group, USA 1989-2013

Total assets

Wave	0-20			20-40			40-60		
	Holders	Median	Mean	Holders	Median	Mean	Holders	Median	Mean
1989	78.8%	14,099.1	62,283.8	95.1%	75,918.0	143,727.7	99.9%	122,318.3	216,825.8
1992	82.6%	24,533.9	75,195.5	97.1%	68,678.8	125,894.1	99.7%	100,897.8	199,948.7
1995	84.4%	23,071.8	91,203.1	97.9%	86,671.0	145,200.3	99.9%	126,712.7	192,139.0
1998	87.1%	21,014.0	92,817.1	98.1%	90,345.8	166,077.6	99.2%	151,986.8	227,615.9
2001	85.6%	33,487.0	94,328.1	98.3%	89,167.4	183,301.0	99.8%	152,464.4	266,345.3
2004	92.2%	20,963.4	113,358.1	97.8%	96,561.2	192,640.1	99.8%	190,964.4	314,373.4
2007	89.8%	26,610.3	152,382.7	98.9%	94,314.8	187,664.2	100%	207,211.9	313,075.4
2010	89.9%	16,075.4	170,463.9	98%	81,877.6	179,771.5	99.5%	170,935.5	289,067.4
2013	92.2%	15,010.0	116,383.7	97.9%	62,300.0	146,292.7	99.7%	141,860.0	228,745.9
Growth rate (percent)									
1989-2013	*17.0*	*6.5*	*86.9*	*2.9*	*-17.9*	*1.8*	*-0.2*	*16.0*	*5.5*
1989-2007	*14.0*	*88.7*	*144.7*	*4.0*	*24.2*	*30.6*	*0.1*	*69.4*	*44.4*
2007-2013	*2.7*	*-43.6*	*-23.6*	*-1.0*	*-33.9*	*-22.0*	*-0.3*	*-31.5*	*-26.9*

(Table A1.5 continued)

Wave	60-80			80-90			90-100		
	Holders	Median	Mean	Holders	Median	Mean	Holders	Median	Mean
1989	99.5%	195,219.5	309,461.2	100%	349,584.2	491,641.3	100%	854,981.1	1,983,370.0
1992	100%	200,008.4	287,337.7	100%	297,981.7	458,955.5	99.6%	793,859.5	1,758,677.0
1995	99.7%	212,047.9	313,438.7	100%	314,626.3	494,925.6	100%	712,796.8	1,844,774.0
1998	99.8%	265,676.6	382,096.5	100%	390,116.5	586,753.1	100%	867,576.8	2,436,697.0
2001	100%	302,368.0	472,800.1	100%	495,279.5	727,750.0	100%	1,336,723.0	3,207,301.0
2004	100%	357,117.9	533,888.6	99.8%	572,461.5	786,508.8	100%	1,428,102.0	3,447,362.0
2007	100%	385,287.3	560,013.5	100%	636,232.1	896,497.6	100%	1,524,869.0	4,052,343.0
2010	99.9%	286,035.6	434,508.2	100%	481,191.4	792,404.8	100%	1,593,108.0	3,455,615.0
2013	100%	272,500.0	440,117.5	100%	493,600.0	806,878.6	100%	1,402,200.0	3,550,871.0
Growth rate (percent)									
1989-2013	*0.5*	*39.6*	*42.2*	*0.0*	*41.2*	*64.1*	*0.0*	*64.0*	*79.0*
1989-2007	*0.5*	*97.4*	*81.0*	*0.0*	*82.0*	*82.3*	*0.0*	*78.4*	*104.3*
2007-2013	*0.0*	*-29.3*	*-21.4*	*0.0*	*-22.4*	*-10.0*	*0.0*	*-8.0*	*-12.4*

Primary residence

	0-20		20-40		40-60		60-80		80-90		90-100	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	33.0%	28,971.7	55.3%	65,946.9	64.9%	92,260.0	76.1%	131,364.8	86.6%	198,841.1	93.6%	410,700.1
1992	39.2%	41,008.5	56.4%	64,026.2	61.4%	80,341.7	75.4%	124,191.2	84.3%	176,905.2	90.1%	364,558.5
1995	39.6%	40,009.6	55.9%	67,882.3	62.0%	83,613.1	77.4%	127,447.9	85.9%	180,718.5	91.3%	328,088.6
1998	38.2%	43,657.2	56.3%	71,684.5	66.9%	96,697.1	79.2%	147,837.3	88.2%	204,206.2	93.1%	405,142.8
2001	40.5%	46,864.1	57.5%	84,224.3	65.9%	106,478.1	82.3%	175,058.4	90.1%	247,234.7	94.4%	554,694.1
2004	40.4%	55,323.2	56.9%	95,599.8	71.6%	155,672.7	83.0%	228,590.2	91.7%	326,988.0	94.7%	718,907.6
2007	41.6%	72,285.5	55.1%	96,774.6	69.1%	151,161.7	83.9%	254,654.7	92.5%	395,969.1	94.3%	802,642.7
2010	37.3%	60,853.1	56.1%	90,368.4	70.8%	130,074.7	80.6%	184,953.0	91.1%	298,248.0	92.0%	669,364.8
2013	37.5%	50,710.6	52.9%	75,018.6	63.7%	99,541.0	80.6%	175,725.9	88.6%	279,731.6	93.7%	640,610.3

Other real estate

	0-20		20-40		40-60		60-80		80-90		90-100	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	6.1%	4,597.6	13.3%	8,860.8	18.0%	20,832.8	24.6%	30,127.0	28.2%	71,149.3	50.6%	324,234.1
1992	5.4%	6,725.0	12.8%	10,132.9	17.4%	26,929.2	21.6%	28,991.4	29.9%	56,736.6	49.4%	272,678.5
1995	7.4%	9,146.5	12.2%	9,429.8	14.3%	15,702.8	19.9%	29,990.9	26.4%	45,108.7	45.6%	206,408.2
1998	4.0%	8,764.3	12.1%	17,617.1	16.5%	19,124.4	23.1%	35,200.0	28.1%	47,660.1	46.4%	249,687.1
2001	5.0%	4,344.8	10.8%	15,218.5	13.1%	18,222.0	18.8%	35,368.9	26.7%	56,079.6	46.0%	359,308.2
2004	5.3%	10,129.5	9.7%	16,059.0	16.1%	28,458.0	22.2%	50,930.6	27.7%	67,112.9	46.7%	447,124.1
2007	7.5%	14,502.1	9.6%	17,416.8	15.6%	25,157.4	21.9%	55,617.7	29.9%	90,399.5	51.3%	488,423.6
2010	7.0%	31,108.0	11.0%	17,950.5	15.8%	29,342.1	20.7%	38,070.1	28.5%	79,594.2	48.8%	403,529.0
2013	4.4%	6,857.3	8.6%	10,450.9	14.0%	21,131.1	22.1%	41,343.3	30.3%	90,982.9	46.1%	362,340.6

Business equity

	0-20		20-40		40-60		60-80		80-90		90-100	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	3.1%	6,160.9	9.0%	18,955.2	10.6%	33,688.9	14.6%	30,591.9	21.3%	58,676.0	37.5%	494,788.2
1992	4.4%	8,100.2	8.5%	9,349.0	11.2%	24,150.4	16.4%	31,629.3	22.1%	52,421.7	40.5%	446,585.2
1995	4.9%	15,184.6	7.5%	9,218.4	10.6%	14,239.4	15.4%	26,532.0	19.5%	51,141.4	31.4%	484,616.1
1998	4.3%	8,185.2	6.0%	7,547.1	10.8%	20,182.0	14.8%	37,065.1	20.6%	57,116.4	34.4%	599,164.0
2001	2.6%	7,317.3	8.6%	11,859.9	10.1%	16,889.4	14.4%	38,257.4	22.5%	78,245.5	41.7%	755,990.1
2004	4.0%	15,463.5	8.1%	18,705.4	10.8%	18,481.3	15.1%	43,361.6	18.8%	53,284.4	38.5%	835,522.7
2007	3.5%	28,776.3	5.1%	7,772.7	10.6%	29,157.5	18.1%	37,628.7	20.1%	101,846.0	40.8%	1,126,669.0
2010	5.1%	33,261.5	6.5%	13,810.2	10.8%	20,937.4	15.4%	34,581.8	19.2%	63,503.5	37.7%	846,805.2
2013	4.1%	23,204.8	5.4%	7,605.3	8.7%	11,656.4	13.6%	34,555.2	17.9%	74,866.3	35.5%	875,357.6

Vehicles and other non-financial assets

	0-20		20-40		40-60		60-80		80-90		90-100	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	53.3%	5,524.4	82.1%	10,437.1	95.1%	14,537.1	95.0%	22,489.8	97.4%	30,107.1	96.3%	75,409.7
1992	56.7%	5,031.9	86.6%	9,211.0	94.2%	14,159.3	96.7%	19,735.1	98.0%	27,571.1	97.7%	52,897.8
1995	59.1%	6,645.7	86.0%	11,228.1	91.6%	16,958.9	93.6%	26,210.6	94.7%	34,256.0	93.9%	68,672.3
1998	58.5%	6,439.0	83.3%	11,738.7	89.7%	18,519.0	94.0%	25,449.6	93.0%	31,361.6	91.2%	71,492.7
2001	57.6%	7,421.2	87.6%	14,509.4	91.7%	18,743.1	95.5%	27,914.8	96.8%	36,871.0	93.9%	85,061.6
2004	65.8%	7,579.6	86.1%	13,058.0	92.2%	21,990.5	96.0%	32,386.2	96.5%	38,408.2	93.9%	89,613.9
2007	65.0%	7,969.0	87.3%	13,523.5	94.5%	21,181.6	95.5%	30,349.5	96.5%	37,166.3	95.8%	82,965.5
2010	65.0%	9,075.9	86.4%	13,000.2	92.0%	21,533.1	96.0%	27,500.4	96.3%	37,772.5	96.3%	72,567.6
2013	63.1%	7,450.4	85.9%	12,627.6	92.8%	17,717.2	95.8%	27,019.5	96.5%	35,013.1	95.6%	78,512.4

Transaction accounts

	0-20		20-40		40-60		60-80		80-90		90-100	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	55.3%	4,405.2	83.0%	12,569.6	92.9%	13,231.3	97.8%	18,592.8	98.2%	25,107.5	99.4%	104,977.4
1992	62.1%	3,956.8	84.7%	7,473.3	91.3%	13,780.9	97.7%	14,688.1	98.8%	26,340.6	98.7%	91,261.9
1995	63.1%	4,634.0	85.3%	7,250.1	92.0%	11,514.4	97.3%	14,861.1	98.7%	21,784.1	99.8%	97,365.3
1998	68.6%	4,387.6	90.4%	11,804.1	95.6%	11,735.1	98.9%	17,304.3	99.6%	27,556.1	100.0%	101,638.3
2001	71.8%	5,586.9	90.4%	11,013.6	96.5%	14,869.1	99.0%	22,932.6	99.7%	32,997.6	99.2%	152,476.4
2004	75.6%	5,362.5	87.4%	10,060.6	95.6%	15,753.8	98.5%	33,892.1	99.1%	34,190.4	100.0%	143,274.8
2007	75.1%	5,108.5	90.2%	8,519.2	96.1%	11,258.2	99.3%	20,842.0	100.0%	33,846.8	100.0%	150,033.7
2010	76.1%	6,878.7	91.2%	9,727.8	96.3%	14,155.6	99.0%	19,933.3	99.8%	47,092.2	99.9%	173,176.4
2013	78.9%	5,144.4	90.8%	9,441.1	97.2%	12,436.2	99.1%	23,584.8	99.8%	43,612.2	100.0%	193,261.0

Financial investment assets

	0-20		20-40		40-60		60-80		80-90		90-100	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	19.9%	9,493.3	45.5%	17,641.1	52.9%	28,683.4	61.8%	50,992.3	79.3%	52,046.1	88.4%	401,712.9
1992	25.2%	7,564.2	40.1%	17,671.0	46.4%	25,512.8	62.5%	36,034.9	73.3%	58,892.0	82.9%	346,376.8
1995	22.6%	9,629.5	40.2%	24,698.4	52.1%	27,496.8	61.1%	45,537.2	71.9%	86,719.9	81.4%	412,331.6
1998	26.8%	16,052.4	40.8%	29,980.4	51.7%	30,889.9	62.0%	59,128.1	70.8%	95,048.1	85.5%	698,965.5
2001	22.0%	16,023.6	41.0%	27,701.1	52.7%	48,365.9	62.2%	86,903.3	73.7%	131,760.3	87.1%	891,369.5
2004	22.4%	13,594.3	37.1%	27,361.6	48.1%	41,046.5	62.5%	74,657.3	75.8%	107,263.8	83.3%	786,091.4
2007	24.8%	19,624.8	33.3%	24,952.6	45.6%	35,202.0	59.4%	70,470.3	67.6%	84,596.9	80.7%	903,162.9
2010	19.3%	18,638.0	28.7%	19,410.5	38.3%	31,317.6	47.0%	52,364.4	57.6%	99,666.0	74.4%	761,116.7
2013	18.3%	17,989.9	23.8%	17,543.7	32.9%	26,492.6	40.9%	46,865.1	55.1%	91,434.6	71.7%	831,496.4

Retirement and insurance assets

	0-20		20-40		40-60		60-80		80-90		90-100	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	15.3%	3,130.7	36.6%	9,317.0	56.7%	13,592.4	73.3%	25,302.6	81.6%	55,714.2	89.4%	171,547.6
1992	19.7%	2,808.8	41.8%	8,030.8	56.5%	15,074.3	72.6%	32,067.8	85.9%	60,088.5	90.3%	184,318.3
1995	22.1%	5,953.1	46.2%	15,493.4	61.6%	22,613.6	76.1%	42,859.1	84.2%	75,196.9	89.5%	247,292.0
1998	24.1%	5,331.3	43.5%	15,705.9	64.2%	30,468.4	78.9%	60,112.1	83.6%	123,804.6	91.9%	310,606.9
2001	24.3%	6,770.1	46.5%	18,774.3	64.2%	42,777.8	82.1%	86,364.7	90.0%	144,561.2	92.0%	408,401.2
2004	21.4%	5,905.6	41.7%	11,795.8	63.6%	32,970.6	77.4%	70,070.7	85.2%	159,261.0	90.6%	426,827.8
2007	20.9%	4,116.5	45.7%	18,704.9	63.8%	39,957.1	82.2%	90,450.6	90.8%	152,673.1	92.5%	498,445.1
2010	19.5%	10,648.7	43.0%	15,504.0	59.3%	41,706.9	76.1%	77,105.3	87.8%	166,528.4	92.5%	529,055.0
2013	18.1%	5,026.2	38.7%	13,605.6	59.5%	39,771.5	75.8%	91,023.8	86.3%	191,238.1	94.4%	569,292.7

Note: All median and mean figures in 2013 USD. Holders represents the proportion of all households holding assets. All values are conditional on holding assets.

Table A1.6 Debt holdings by income group, USA 1989-2013

Total debt

Wave	0-20			20-40			40-60		
	Holders	Median	Mean	Holders	Median	Mean	Holders	Median	Mean
1989	47.1%	3,072.9	9,522.7	59.5%	9,037.9	22,739.8	78.1%	21,690.9	39,998.6
1992	48.9%	3,574.5	16,288.6	65.8%	9,261.2	25,547.2	79.1%	18,538.6	43,880.8
1995	49.2%	4,735.8	18,721.8	68.6%	13,327.0	30,010.1	79.4%	22,813.8	47,291.7
1998	47.3%	6,161.2	20,728.1	66.8%	14,724.1	35,304.5	79.9%	36,881.7	57,713.3
2001	49.3%	6,960.0	22,108.8	70.2%	14,445.4	35,405.5	82.1%	39,107.6	62,598.1
2004	52.6%	8,632.0	30,837.9	69.8%	20,346.8	52,433.5	84%	54,628.2	85,846.9
2007	51.7%	9,768.3	35,302.2	70.2%	20,210.3	48,761.0	83.8%	62,820.4	91,406.8
2010	52.5%	10,717.0	53,009.6	66.8%	21,734.0	55,399.5	81.8%	65,373.4	93,335.4
2013	52.1%	11,000.0	37,739.3	66.5%	21,000.0	47,820.8	81%	40,000.0	71,724.8
Growth rate (percent)									
1989-2013	*10.6*	*258.0*	*296.3*	*132.4*	*110.3*	*132.4*	*84.4*	*79.3*	*84.4*
1989-2007	*9.8*	*217.9*	*270.7*	*123.6*	*114.4*	*123.6*	*189.6*	*128.5*	*189.6*
2007-2013	*0.8*	*12.6*	*6.9*	*3.9*	*-1.9*	*3.9*	*-36.3*	*-21.5*	*-36.3*

(Table A1.6 continued)

Wave	60-80			80-90			90-100		
	Holders	Median	Mean	Holders	Median	Mean	Holders	Median	Mean
1989	86.2%	51,100.0	70,838.4	93.7%	72,302.8	93,438.6	87.6%	133,760.3	187,676.1
1992	84.8%	50,172.7	70,927.7	87.5%	88,874.6	101,562.2	87.4%	152,402.8	212,102.1
1995	87.4%	63,751.0	80,061.7	90.2%	96,006.0	113,604.0	86.1%	149,663.0	202,722.6
1998	87.3%	82,912.3	102,487.4	89.6%	121,866.7	129,176.8	88.1%	180,391.4	247,269.8
2001	85.6%	83,888.3	99,547.9	91.4%	126,856.7	144,520.5	85.3%	192,399.3	279,502.0
2004	86.6%	114,361.6	133,332.2	91.9%	167,707.3	193,085.6	86.3%	257,726.7	366,913.2
2007	90.9%	125,304.0	156,732.1	89.6%	204,236.5	231,164.5	87.6%	265,428.9	387,699.7
2010	86.9%	114,671.4	138,768.0	88.9%	175,758.1	204,508.1	84.5%	286,357.1	403,304.6
2013	87.2%	99,900.0	122,107.5	87.2%	180,000.0	202,151.7	84.5%	271,000.0	358,224.8
Growth rate (percent)									
1989-2013	*1.2*	*95.5*	*72.4*	*-6.9*	*149.0*	*116.3*	*-3.5*	*102.6*	*90.9*
1989-2007	*5.5*	*145.2*	*121.3*	*-4.4*	*182.5*	*147.4*	*0.0*	*98.4*	*106.6*
2007-13	*-4.1*	*-20.3*	*-22.1*	*-2.7*	*-11.9*	*-12.6*	*-3.5*	*2.1*	*-7.6*

(Table A1.6 continued)

Mortgages secured by primary residence

	0-20		20-40		40-60		60-80		80-90		90-100	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	7.5%	3,716.8	23.3%	14,042.3	37.9%	24,930.0	56.3%	50,706.3	70.4%	67,780.4	74.1%	130,426.7
1992	10.3%	9,380.0	22.0%	16,311.3	35.3%	27,925.0	56.5%	54,267.6	68.2%	79,934.2	74.8%	151,833.9
1995	10.6%	9,941.2	26.0%	19,918.1	37.6%	32,383.7	59.3%	61,815.6	69.8%	88,737.2	72.9%	145,626.3
1998	11.0%	10,989.9	24.1%	22,760.5	43.7%	39,658.1	63.4%	73,807.5	73.5%	100,423.6	73.0%	176,563.2
2001	13.8%	13,714.9	26.7%	22,542.5	44.4%	45,185.2	62.1%	77,270.7	76.9%	114,425.5	75.4%	213,098.2
2004	15.7%	18,462.3	29.9%	36,161.9	51.6%	66,036.8	65.7%	105,521.4	76.9%	156,552.5	76.2%	259,919.6
2007	14.6%	21,388.3	29.9%	32,463.5	50.4%	69,909.8	69.8%	118,950.0	80.8%	185,126.0	76.4%	281,318.4
2010	14.7%	27,331.5	29.8%	38,503.5	51.5%	71,336.7	65.4%	109,331.9	74.9%	159,848.1	72.6%	292,072.9
2013	13.6%	18,402.3	25.8%	32,374.4	40.1%	50,624.9	62.9%	93,517.6	71.9%	158,804.5	72.6%	267,612.0

Mortgages secured by other real estate

	0-20		20-40		40-60		60-80		80-90		90-100	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	1.0%	366.5	0.9%	897.7	3.3%	1,772.7	5.6%	2,418.4	10.7%	7,498.4	19.4%	23,869.1
1992	0.5%	379.2	2.0%	505.7	4.0%	3,589.0	5.6%	4,118.5	10.0%	8,431.1	22.3%	36,040.7
1995	1.3%	1,022.6	1.6%	1,105.9	3.2%	2,405.6	5.2%	4,041.6	7.7%	6,696.4	17.3%	27,849.8
1998	0.7%	1,155.4	1.8%	1,811.4	4.1%	2,612.6	6.7%	6,863.5	7.7%	7,844.4	15.4%	27,182.4
2001	0.4%	171.9	1.7%	964.6	3.3%	2,563.8	5.7%	4,288.4	9.9%	8,121.7	14.2%	27,924.2
2004	0.3%	1,800.7	1.3%	1,949.6	2.7%	3,304.7	4.4%	5,624.4	7.6%	9,353.1	15.1%	65,090.8
2007	1.1%	2,496.1	2.0%	2,096.7	2.6%	3,088.0	6.9%	12,436.6	8.4%	18,045.0	21.9%	69,731.1
2010	1.2%	4,582.9	1.9%	3,547.7	3.4%	3,623.1	6.1%	7,675.6	9.2%	14,565.0	19.2%	71,636.5
2013	0.7%	1,536.5	2.1%	1,722.2	3.9%	4,618.1	5.6%	7,046.6	9.5%	13,019.5	18.7%	55,445.2

(Table A1.6 continued)

Instalment debt

	0-20		20-40		40-60		60-80		80-90		90-100	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	33.4%	4,193.7	40.2%	6,175.6	53.5%	10,967.0	64.0%	14,133.0	63.3%	11,900.8	48.3%	16,847.7
1992	31.1%	4,255.2	42.4%	6,266.0	54.5%	8,396.2	54.2%	8,514.0	54.4%	8,993.1	40.9%	11,724.9
1995	27.4%	4,853.9	40.3%	5,824.4	49.3%	8,447.1	60.4%	10,328.1	60.5%	13,091.7	44.3%	11,428.5
1998	27.3%	6,537.7	36.5%	7,299.5	51.6%	10,656.4	51.6%	14,743.1	58.3%	14,531.0	45.4%	19,629.7
2001	25.5%	5,990.7	43.0%	8,518.5	52.1%	10,836.7	56.8%	13,173.9	55.8%	14,620.9	41.7%	19,793.9
2004	27.1%	7,778.6	39.6%	10,387.9	52.3%	11,471.6	58.3%	16,700.5	59.3%	18,063.7	45.9%	21,977.0
2007	27.9%	8,631.7	42.4%	10,417.6	53.9%	13,259.2	59.3%	17,161.9	57.2%	17,139.3	45.1%	21,910.7
2010	34.1%	15,674.5	40.4%	9,862.0	50.3%	13,927.2	56.7%	15,741.6	58.5%	19,829.3	42.0%	22,771.8
2013	32.4%	15,944.8	41.3%	11,230.2	52.7%	12,966.2	56.4%	16,612.8	61.2%	23,291.7	45.0%	20,573.2

Credit card balances

	0-20		20-40		40-60		60-80		80-90		90-100	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	15.0%	304.5	28.2%	1,008.4	48.8%	1,848.3	57.4%	2,323.9	57.7%	2,473.5	40.3%	3,257.7
1992	23.4%	987.6	42.0%	1,669.8	51.8%	2,031.0	55.6%	2,882.4	53.1%	2,812.1	38.4%	3,080.4
1995	26.6%	1,458.1	42.9%	2,347.3	52.6%	2,756.5	60.0%	2,902.3	61.2%	3,667.8	47.3%	4,695.6
1998	24.4%	1,534.4	41.5%	2,684.0	49.3%	3,783.3	57.7%	4,286.7	53.0%	3,740.7	42.2%	4,606.6
2001	30.4%	1,691.6	44.2%	2,261.9	53.2%	3,198.3	52.2%	3,667.1	50.6%	5,369.0	33.2%	3,315.9
2004	29.1%	1,839.6	42.5%	2,883.1	55.0%	4,158.3	56.2%	4,400.6	57.5%	5,010.3	38.6%	4,714.1
2007	25.7%	1,897.3	39.4%	2,770.5	55.0%	4,152.2	62.0%	6,570.7	55.9%	8,026.6	40.5%	6,811.1
2010	23.2%	1,779.3	33.5%	2,394.7	44.7%	3,351.1	53.4%	4,495.7	51.0%	7,152.5	33.6%	6,136.2
2013	19.5%	1,120.2	34.2%	1,906.6	46.8%	2,922.6	49.8%	3,311.6	48.7%	4,642.7	32.2%	4,248.3

Other unsecured lines of credit

	0-20		20-40		40-60		60-80		80-90		90-100	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	0.9%	41.4	1.9%	106.3	1.7%	63.9	4.2%	273.9	8.5%	1,796.7	5.8%	7,224.0
1992	0.6%	16.8	1.2%	476.8	2.5%	185.2	2.9%	191.8	5.0%	335.8	4.3%	3,106.3
1995	0.1%	4.7	1.1%	47.3	2.2%	346.4	2.3%	169.6	3.4%	494.1	4.2%	2,075.3
1998	0.8%	25.9	1.7%	101.9	2.7%	202.5	3.1%	207.6	4.2%	334.2	2.5%	1,239.6
2001	1.3%	216.2	1.5%	189.2	1.5%	70.0	1.5%	406.7	2.6%	443.5	1.3%	2,265.4
2004	0.2%	113.2	1.5%	174.1	1.7%	78.1	1.8%	412.3	2.6%	1,184.2	2.5%	5,444.6
2007	1.2%	370.4	1.6%	151.2	1.4%	313.4	2.2%	513.8	2.4%	400.1	2.1%	2,578.3
2010	1.3%	2,854.2	2.1%	742.4	2.1%	335.5	1.9%	375.3	2.0%	1,376.7	3.7%	4,910.4
2013	0.7%	163.5	1.5%	145.3	1.6%	109.9	2.3%	576.8	3.6%	818.2	3.2%	5,090.3

(Table A1.6 continued)

Other debt

	0-20		20-40		40-60		60-80		80-90		90-100	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	5.9%	899.6	5.2%	509.4	4.8%	416.7	6.1%	982.9	7.9%	1,988.7	14.9%	6,050.9
1992	4.7%	1,269.8	6.0%	317.4	9.0%	1,754.4	9.6%	953.4	9.2%	1,055.8	16.0%	6,315.9
1995	6.7%	1,441.3	7.8%	767.2	8.0%	952.4	8.9%	804.5	8.6%	916.8	13.2%	11,047.2
1998	5.5%	484.7	6.6%	647.3	7.7%	800.4	10.8%	2,579.0	12.5%	2,303.0	13.7%	18,048.3
2001	5.7%	323.6	6.0%	928.7	7.5%	744.1	7.6%	741.2	9.6%	1,539.9	8.8%	13,104.4
2004	4.5%	843.5	5.8%	876.9	8.0%	797.4	8.2%	672.9	12.2%	2,921.8	10.9%	9,767.0
2007	3.8%	518.5	6.9%	861.4	6.5%	684.2	8.7%	1,099.0	9.4%	2,427.5	7.1%	5,350.2
2010	4.2%	787.2	4.2%	349.1	6.7%	761.8	7.9%	1,147.9	11.7%	1,736.6	6.7%	5,776.8
2013	4.2%	572.0	5.3%	442.1	5.3%	483.2	9.1%	1,042.1	10.5%	1,575.1	7.9%	5,255.8

Note: All median and mean figures in 2013 USD. Holders represents the proportion of all households holding debt. All values are conditional on holding debt.

Table A1.7 Mean of income sources by income group, USA 1989-2013

Wages

	0-20	20-40	40-60	60-80	80-90	90-100
1989	5,386.6	15,965.5	35,948.7	61,543.1	94,086.1	167,338.3
1992	4,642.9	16,743.6	34,345.7	60,609.1	92,859.7	159,272.0
1995	4,557.8	16,345.4	36,414.7	61,033.3	92,134.3	183,702.9
1998	6,294.2	20,083.0	39,648.7	67,228.3	94,965.7	185,506.4
2001	6,152.0	21,896.9	42,826.8	71,332.6	108,654.6	240,244.9
2004	5,978.5	20,970.1	39,959.9	67,720.2	109,534.8	226,978.1
2007	4,986.1	19,765.5	38,877.5	66,669.3	106,418.3	236,708.6
2010	5,471.1	16,537.4	34,231.1	59,431.8	96,366.6	236,683.3
2013	4,509.4	15,638.0	31,252.8	58,587.6	98,319.5	221,307.8

Business and farm income

	0-20	20-40	40-60	60-80	80-90	90-100
1989	121.3	1,411.1	2,795.4	7,064.5	9,007.5	52,418.0
1992	128.4	1,235.2	2,000.1	4,668.1	24,184.4	61,651.4
1995	-127.8	1,487.6	2,083.3	4,075.5	7,157.2	61,341.5
1998	16.0	1,110.5	3,830.9	3,960.2	8,185.4	76,435.8
2001	229.9	1,203.2	1,494.5	3,792.6	10,438.7	81,831.5
2004	363.1	1,020.1	2,230.2	3,606.2	8,560.3	73,393.7
2007	501.9	1,292.2	2,968.4	6,541.4	8,264.0	99,751.9
2010	488.6	1,214.1	2,611.5	5,510.2	9,149.9	79,960.8
2013	567.6	1,040.3	2,349.3	4,604.8	7,894.4	87,169.3

Interest and dividend income

	0-20	20-40	40-60	60-80	80-90	90-100
1989	255.5	1,445.0	2,082.9	3,665.6	4,655.9	29,440.8
1992	371.4	1,018.5	2,073.7	2,670.1	4,356.7	23,594.9
1995	390.4	1,209.2	1,281.8	1,713.3	3,474.1	26,841.6
1998	289.4	1,060.0	1,084.1	1,757.8	3,545.8	21,574.0
2001	405.2	644.5	1,580.5	2,282.6	3,126.2	25,446.9
2004	214.1	582.4	823.3	1,560.3	2,193.3	21,656.8
2007	258.7	395.0	634.3	1,764.6	2,426.6	25,730.2
2010	460.2	454.5	567.7	1,162.8	2,214.0	22,186.6
2013	278.4	229.8	449.4	791.7	2,376.4	23,739.9

Capital gains/losses

	0-20	20-40	40-60	60-80	80-90	90-100
1989	34.9	152.6	203.0	934.6	1,872.9	37,129.7
1992	-67.0	47.3	22.8	228.9	1,059.6	12,805.7
1995	183.3	376.4	409.6	759.8	2,047.5	13,213.5
1998	15.3	166.9	479.3	1,354.6	1,667.5	30,534.6
2001	-262.2	161.4	408.1	1,149.2	2,073.9	57,363.9
2004	-655.8	-17.8	105.7	184.8	1,870.7	26,153.5
2007	-590.0	143.9	342.9	652.5	2,409.1	58,344.0
2010	-1,566.7	-96.8	-32.3	194.0	355.8	13,140.1
2013	28.5	-120.3	129.0	452.9	1,156.8	37,462.4

(Table A1.7 continued)

	Social security and retirement income						Transfer and other income					
	0-20	20-40	40-60	60-80	80-90	90-100	0-20	20-40	40-60	60-80	80-90	90-100
1989	4,669.9	7,780.8	7,057.6	5,638.9	3,212.1	8,667.2	3,412.4	2,091.6	1,499.5	1,611.3	5,818.8	4,301.7
1992	4,658.8	7,320.7	6,770.7	4,993.0	6,102.3	5,988.4	4,414.5	6,331.1	8,707.7	4,309.9	6,341.4	15,532.9
1995	4,023.4	7,620.6	7,315.3	5,798.9	5,280.8	8,350.2	2,175.7	1,786.9	1,372.3	1,029.4	906.0	3,886.0
1998	4,713.9	7,687.0	6,734.1	5,887.9	6,894.2	7,805.7	1,646.7	1,009.4	943.3	1,021.0	1,374.2	4,037.1
2001	6,068.2	8,016.8	7,116.5	7,279.1	5,378.4	8,192.4	1,298.7	938.3	1,032.7	1,126.3	1,961.8	3,741.7
2004	5,695.8	8,569.0	9,565.4	11,463.7	8,071.7	15,830.7	1,955.6	1,384.8	1,268.4	1,073.5	1,395.8	2,762.4
2007	6,182.5	8,735.1	8,780.8	8,665.3	10,341.2	14,515.0	2,508.4	1,596.9	1,436.7	1,723.0	1,165.5	2,593.6
2010	5,398.6	9,418.9	10,368.1	10,710.2	12,544.8	14,680.7	3,638.2	2,661.8	2,159.9	1,833.2	2,113.5	4,405.3
2013	5,438.2	9,176.4	11,053.0	12,273.6	13,728.9	22,588.9	2,915.7	2,474.0	1,831.4	1,744.6	1,948.1	10,902.2

Note: All figures in 2013 USD.

Table A1.8 Mean debt payments by income group, USA 1989-2013

	Mortgages						Consumer debt					
	0-20	20-40	40-60	60-80	80-90	90-100	0-20	20-40	40-60	60-80	80-90	90-100
1989	525.4	1,543.9	3,453.9	6,893.4	11,524.1	19,415.8	1,066.2	1,585.2	3,715.2	4,811.8	5,186.0	4,559.9
1992	810.2	1,937.8	3,908.1	7,606.2	11,721.4	22,376.3	787.1	1,734.9	2,733.5	3,333.3	3,666.3	4,294.6
1995	891.3	2,442.7	3,752.4	8,075.9	11,798.7	20,013.6	801.0	1,679.0	2,558.0	3,748.2	4,663.6	3,984.6
1998	985.8	2,579.8	5,014.5	9,467.5	13,050.2	24,879.8	917.2	1,655.5	3,062.8	4,137.7	4,763.0	6,380.9
2001	1,027.1	2,378.3	5,255.6	9,107.2	15,090.0	25,646.2	819.8	1,995.8	3,106.1	4,232.7	4,875.3	5,237.5
2004	1,352.3	2,953.6	6,266.7	10,449.1	15,892.2	26,544.2	772.7	1,817.7	3,069.2	4,168.4	5,500.0	6,106.4
2007	1,348.5	2,980.4	6,473.8	12,479.8	18,662.1	30,542.8	765.0	1,871.7	3,012.2	4,392.9	4,798.0	5,246.2
2010	1,626.4	2,942.1	6,295.9	10,309.3	15,458.3	28,211.2	1,053.7	1,544.4	2,462.2	3,711.0	4,781.6	4,805.7
2013	1,152.6	2,324.5	4,499.6	8,607.0	14,350.5	23,637.4	736.0	1,459.5	2,418.7	3,426.9	4,975.0	4,892.1

	Revolving debt					
	0-20	20-40	40-60	60-80	80-90	90-100
1989	58.1	222.5	474.6	715.5	1,102.7	1,575.6
1992	150.0	385.7	557.0	806.0	874.2	1,136.3
1995	218.2	499.1	738.7	833.6	1,210.9	1,515.7
1998	235.5	574.5	970.2	1,297.8	1,147.8	1,403.7
2001	277.1	526.5	821.0	980.9	1,972.0	1,172.8
2004	293.4	624.8	1,084.7	1,243.2	1,483.9	2,492.6
2007	322.8	622.8	1,073.6	1,887.0	2,238.5	2,034.6
2010	568.4	551.4	883.1	1,230.2	2,014.8	1,903.5
2013	197.5	415.2	738.6	1,000.6	1,339.4	1,645.2

Note: All figures in 2013 USD. Values given for all households.

Table A1.9 Household characteristics of the bottom 20% and the top 10% of income distribution

Bottom 20%

Wave	Educational attainment	Female	*Ethnic group*				Married	Self-employed	Retired	Out of labour force	Aged below 35
			White	Black	Hispanic	Other					
1989	10th grade	60.5%	50.2%	29.9%	14.5%	5.4%	19.5%	5.2%	45.9%	58.4%	30.5%
1992	11th grade	57.7%	60.2%	23.1%	12.4%	4.3%	20.8%	5.3%	48.6%	59.0%	28.7%
1995	11th grade	61.2%	61.9%	25.8%	7.8%	4.6%	22.9%	7.1%	45.6%	54.4%	27.0%
1998	11th grade	57.2%	63.7%	23.5%	8.9%	3.9%	24.5%	5.9%	46.0%	51.9%	31.4%
2001	11th grade	56.9%	59.7%	23.6%	12.4%	4.3%	25.1%	5.1%	48.0%	54.1%	26.9%
2004	12th grade	58.4%	59.4%	23.5%	13.5%	3.7%	21.8%	7.5%	45.2%	49.8%	28.1%
2007	12th grade	56.0%	64.0%	21.2%	12.2%	2.6%	25.4%	5.7%	52.4%	56.0%	25.0%
2010	12th grade	51.2%	60.7%	22.2%	12.8%	4.4%	25.2%	8.3%	43.1%	46.8%	28.2%
2013	12th grade	53.5%	57.0%	24.3%	13.9%	4.8%	20.2%	5.8%	46.8%	50.8%	28.1%

Top 10%

Wave	Educational attainment	Female	*Ethnic group*				Married	Self-employed	Retired	Out of labour force	Aged below 35
			White	Black	Hispanic	Other					
1989	3 years of college	5.3%	91.5%	3.4%	2.1%	3.0%	88.9%	30.0%	11.0%	12.1%	10.9%
1992	3 years of college	4.2%	84.9%	6.7%	2.3%	6.1%	89.3%	31.0%	7.2%	7.8%	12.3%
1995	3 years of college	3.4%	90.0%	2.6%	2.7%	4.7%	91.4%	21.0%	10.8%	10.8%	7.9%
1998	3 years of college	3.4%	89.8%	3.6%	1.6%	5.0%	90.5%	28.9%	11.3%	11.9%	9.9%
2001	4 years of college	5.8%	89.7%	4.7%	2.3%	3.4%	90.9%	31.1%	10.4%	11.3%	9.1%
2004	4 years of college	4.8%	88.6%	2.9%	2.4%	6.1%	93.0%	29.5%	10.6%	10.9%	5.9%
2007	3 years of college	3.8%	88.1%	3.2%	2.9%	5.9%	89.0%	28.8%	11.0%	11.6%	8.5%
2010	4 years of college	4.4%	85.5%	3.5%	3.1%	7.9%	91.1%	26.2%	8.1%	8.3%	7.6%
2013	4 years of college	4.2%	87.7%	3.3%	2.5%	6.4%	91.0%	24.8%	10.8%	11.8%	5.3%

Appendix to Section 1.3.2. Detailed balance sheet analysis by gender (source for all tables: own calculations based on U.S. Survey of Consumer Finances 1989-2013)

Table A1.10 Distribution in sample by subgroups

Wave	**Gender**		**Race**				**Age groups**					
	Male	Female	White	Black	Hispanic	Other	<35	35-44	45-54	55-64	65-74	75+
1989	71.9%	28.1%	74.8%	12.7%	7.9%	4.5%	28.1%	21.5%	15.2%	13.9%	12.5%	8.9%
1992	72.3%	27.7%	75.3%	12.7%	7.5%	4.6%	25.8%	22.8%	16.2%	13.2%	12.6%	9.4%
1995	71.1%	28.9%	77.6%	12.8%	5.7%	3.9%	24.8%	23.0%	17.9%	12.5%	12.0%	9.8%
1998	72.0%	28.0%	77.7%	11.9%	7.2%	3.2%	23.3%	23.3%	19.2%	12.8%	11.2%	10.2%
2001	73.2%	26.8%	76.2%	13.0%	8.0%	2.8%	22.7%	22.3%	20.6%	13.2%	10.7%	10.4%
2004	72.0%	28.0%	73.6%	13.6%	9.2%	3.7%	22.2%	20.6%	20.8%	15.2%	10.5%	10.7%
2007	72.4%	27.6%	73.9%	12.6%	9.4%	4.1%	21.6%	19.6%	20.8%	16.8%	10.5%	10.6%
2010	72.9%	27.1%	70.8%	13.8%	10.8%	4.6%	21.0%	18.2%	21.1%	17.5%	11.5%	10.7%
2013	71.6%	28.4%	70.1%	14.6%	10.6%	4.7%	20.8%	17.3%	19.6%	18.7%	12.9%	10.7%

Table A1.11 Asset holdings by gender, USA 1989-2013

Total assets

	Male			Female		
	Holders	Median	Mean	Holders	Median	Mean
1989	97.6%	180,847.5	496,659.3	87.1%	59,649.8	167,625.8
1992	97.9%	170,762.7	438,760.1	90.4%	75,389.0	178,758.7
1995	98.6%	184,103.8	472,337.2	91.0%	79,157.5	181,513.6
1998	98.3%	221,704.5	584,137.2	93.2%	86,057.2	226,799.9
2001	98.4%	254,238.7	742,905.5	92.2%	87,263.2	237,659.5
2004	98.8%	283,622.7	816,594.0	95.6%	91,696.4	263,555.9
2007	98.5%	311,598.2	912,296.2	95.7%	122,609.3	316,570.2
2010	98.2%	241,990.0	788,507.5	95.5%	97,749.4	273,546.5
2013	98.8%	220,190.0	786,823.2	95.8%	72,000.0	232,033.4
Growth rate (percent)						
1989-2013	*1.2*	*21.8*	*58.4*	*10.0*	*20.7*	*38.4*
1989-2007	*0.9*	*72.3*	*83.7*	*9.8*	*105.6*	*88.9*
2007-2013	*0.3*	*-29.3*	*-13.8*	*0.2*	*-41.3*	*-26.7*

Primary residence

	Male		Female	
	Holders	Mean	Holders	Mean
1989	71.2%	148,512.7	45.1%	75,247.0
1992	68.4%	133,103.4	52.3%	79,300.5
1995	70.1%	133,209.8	51.5%	74,905.4
1998	72.0%	156,599.5	51.3%	78,535.1
2001	74.1%	194,705.1	50.3%	84,425.5
2004	74.8%	251,415.9	54.2%	117,193.8
2007	74.0%	274,056.7	54.7%	142,860.3
2010	71.6%	221,302.2	55.6%	115,477.5
2013	69.7%	204,834.5	53.6%	96,309.5

Other property

	Male		Female	
	Holders	Mean	Holders	Mean
1989	24.2%	67,137.3	10.3%	20,401.7
1992	22.7%	59,805.5	10.7%	19,004.1
1995	21.2%	47,101.2	10.1%	17,710.9
1998	22.4%	57,244.6	8.9%	19,277.0
2001	19.3%	70,603.7	10.0%	20,949.6
2004	21.1%	92,275.2	10.3%	24,879.4
2007	22.1%	101,558.1	10.9%	29,116.7
2010	21.1%	87,562.5	12.1%	31,723.9
2013	20.9%	80,856.4	8.8%	14,527.9

Business equity

	Male		Female	
	Holders	Mean	Holders	Mean
1989	16.8%	100,606.3	4.5%	8,762.3
1992	18.1%	86,826.3	4.6%	10,310.0
1995	16.1%	91,670.0	4.5%	7,072.9
1998	16.3%	109,040.0	3.4%	10,590.1
2001	17.0%	131,522.9	4.2%	13,786.8
2004	16.7%	146,446.1	4.7%	13,473.2
2007	17.0%	189,249.6	4.5%	30,408.5
2010	16.4%	149,966.3	4.7%	13,486.2
2013	14.3%	150,896.2	5.1%	12,264.6

Vehicles and other non-financial assets

	Male		Female	
	Holders	Mean	Holders	Mean
1989	92.5%	26,268.7	64.1%	9,616.8
1992	93.1%	21,822.5	68.9%	7,872.6
1995	90.9%	27,740.2	70.3%	10,606.5
1998	89.7%	28,118.3	67.7%	9,837.0
2001	91.1%	31,658.1	70.5%	11,527.5
2004	91.9%	33,925.0	74.7%	13,005.1
2007	92.3%	33,039.0	75.6%	10,855.2
2010	91.5%	29,873.3	75.6%	13,969.6
2013	91.7%	30,064.2	74.3%	10,562.8

Transaction accounts

	Male		Female	
	Holders	Mean	Holders	Mean
1989	89.5%	27,811.8	75.6%	11,925.3
1992	90.0%	22,209.1	78.8%	15,158.6
1995	90.4%	22,813.3	80.1%	12,909.5
1998	92.7%	25,745.3	85.3%	13,668.1
2001	93.6%	36,194.8	85.6%	12,837.5
2004	92.7%	37,911.9	87.8%	13,649.6
2007	93.3%	33,621.0	88.9%	13,029.4
2010	93.6%	39,762.5	89.4%	13,591.1
2013	94.5%	41,876.9	89.9%	14,953.6

Financial investment assets

	Male		Female	
	Holders	Mean	Holders	Mean
1989	58.1%	83,155.0	39.2%	31,654.5
1992	53.2%	67,830.5	43.2%	37,384.9
1995	54.7%	85,933.3	40.3%	40,810.6
1998	54.6%	124,101.9	45.0%	69,763.5
2001	56.2%	169,856.8	39.2%	61,927.1
2004	54.0%	146,527.1	39.4%	60,071.8
2007	50.3%	159,822.6	40.1%	54,693.0
2010	42.9%	133,816.8	31.7%	54,780.5
2013	39.2%	143,861.0	27.5%	44,022.4

(Table A1.11 continued)

	Retirement and insurance assets			
	Male		Female	
	Holders	Mean	Holders	Mean
1989	61.2%	43,167.6	33.7%	10,018.3
1992	61.0%	47,162.8	42.1%	9,728.0
1995	65.0%	63,869.4	42.8%	17,497.9
1998	65.6%	83,287.5	44.5%	25,129.1
2001	67.8%	108,364.0	44.9%	32,205.5
2004	64.1%	108,092.9	43.7%	21,283.1
2007	65.5%	120,949.3	48.6%	35,607.0
2010	62.8%	126,223.9	43.6%	30,517.7
2013	60.6%	134,434.2	46.1%	39,392.6

Note: All median and mean figures in 2013 USD. Asset components given in means. Holders represents the proportion of all households holding assets. All values are conditional on holding assets.

Table A1.12 Debt holdings by gender, USA 1989-2013

	Total debt					
	Male			Female		
	Holders	Median	Mean	Holders	Median	Mean
1989	78.0%	37,217.9	75,770.1	57.5%	7,953.3	29,118.3
1992	77.9%	36,882.1	80,361.5	61.1%	9,358.6	36,134.8
1995	79.2%	44,777.5	85,887.5	62.9%	12,325.2	37,321.5
1998	79.7%	61,326.5	103,291.4	59.6%	14,238.0	47,287.9
2001	79.5%	65,660.8	108,803.0	63.2%	17,781.0	48,913.0
2004	80.1%	92,485.7	147,617.5	66.9%	25,649.4	66,051.9
2007	81.2%	94,314.8	163,210.8	66.0%	29,192.7	71,510.8
2010	77.8%	91,683.6	159,001.4	67.2%	32,150.9	79,291.8
2013	77.8%	82,200.0	141,211.8	66.2%	25,000.0	66,189.8
Growth rate (percent)						
1989-2013	*-0.3*	*120.9*	*86.4*	*15.1*	*214.3*	*127.3*
1989-2007	*4.1*	*153.4*	*115.4*	*14.7*	*267.1*	*145.6*
2007-2013	*-4.2*	*-12.9*	*-13.5*	*0.4*	*-14.4*	*-7.4*

	Mortgages secured by primary residence				Mortgages secured by other property				Instalment debt			
	Male		Female		Male		Female		Male		Female	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	47.0%	52,518.5	20.2%	18,179.4	6.6%	5,871.1	1.6%	2,056.1	53.6%	12,033.9	38.6%	6,875.5
1992	45.1%	57,667.5	23.7%	26,527.1	7.1%	8,622.6	2.0%	2,388.7	49.6%	8,753.9	36.5%	5,297.0
1995	48.0%	62,458.6	23.6%	27,601.5	5.9%	7,265.5	1.9%	1,387.2	50.6%	10,003.2	34.5%	5,232.8
1998	50.7%	73,973.8	23.4%	32,444.0	6.2%	8,022.3	1.9%	2,768.3	48.6%	13,316.9	31.4%	7,574.2
2001	51.8%	82,818.0	25.0%	33,472.7	5.5%	6,850.3	2.2%	2,661.9	48.9%	12,471.0	35.2%	9,414.1
2004	54.2%	110,522.7	31.8%	50,450.8	4.9%	13,815.3	1.8%	2,699.8	49.7%	15,484.7	36.5%	9,154.5
2007	55.5%	121,384.5	30.6%	54,751.1	6.9%	17,789.4	1.9%	3,300.8	50.7%	16,094.4	37.0%	9,266.7
2010	52.2%	118,251.3	33.2%	57,742.7	6.3%	16,268.6	2.8%	5,503.5	49.1%	16,618.4	39.1%	12,293.5
2013	48.4%	104,477.4	29.2%	47,856.8	6.4%	13,547.2	2.4%	3,410.4	49.9%	17,303.1	40.4%	12,140.2

	Credit card balances		Other unsecured lines of credit		Other debt	
	Male	Female	Male	Female	Male	Female

(Table A1.12 continued)

	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	43.1%	1,960.6	30.9%	1,569.4	3.5%	1,497.8	2.3%	211.7	7.8%	1,888.2	3.6%	226.3
1992	46.1%	2,436.3	37.4%	1,597.9	2.8%	736.1	1.3%	78.1	9.7%	2,145.1	5.0%	246.0
1995	50.5%	3,116.1	39.3%	2,143.0	2.1%	530.4	1.4%	89.2	8.8%	2,513.6	7.6%	867.8
1998	46.8%	3,774.1	37.2%	2,592.6	2.7%	321.7	1.3%	235.2	10.1%	3,882.7	5.2%	1,673.6
2001	45.3%	3,358.5	41.7%	2,706.0	1.5%	578.9	1.6%	155.5	7.8%	2,726.4	5.6%	502.8
2004	47.0%	4,025.2	44.1%	3,215.7	1.8%	1,186.3	1.0%	84.0	8.2%	2,583.3	6.1%	447.0
2007	47.7%	5,400.6	41.8%	3,378.9	1.8%	763.5	1.6%	100.8	7.2%	1,778.4	5.9%	712.5
2010	41.4%	4,375.9	34.2%	2,795.7	2.4%	1,734.5	1.1%	397.3	7.1%	1,752.8	4.7%	559.1
2013	39.7%	3,202.3	34.1%	2,130.1	2.0%	1,093.3	1.5%	252.2	7.2%	1,588.4	5.2%	400.2

Note: All median and mean figures in 2013 USD. Holders represent the proportion of all households holding debt. All values are conditional on holding debt.

Table A1.13 Mean of income sources receipts by gender, USA 1989-2013

	Wages		**Business income**		**Interest and dividend**		**Capital gains**		**Social security**		**Transfer and other**	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1989	62,165.8	18,630.1	9,984.0	4,431.9	5,759.5	2,704.3	5,555.3	615.7	5,555.3	615.7	1,399.1	6,148.9
1992	60,001.6	18,495.6	13,471.7	1,654.0	4,469.5	2,860.4	1,808.9	456.0	1,808.9	456.0	7,584.2	5,264.1
1995	64,003.9	19,918.0	10,954.3	1,964.9	4,582.5	2,399.1	2,120.0	1,263.1	2,120.0	1,263.1	1,484.0	2,411.3
1998	67,644.8	21,360.7	13,435.9	2,032.4	3,871.2	2,009.8	4,785.6	631.5	4,785.6	631.5	1,313.6	1,856.1
2001	77,568.2	24,600.8	13,477.0	2,679.7	4,541.9	1,935.3	8,127.0	1,099.7	8,127.0	1,099.7	1,247.5	2,001.1
2004	74,727.9	24,272.0	12,420.9	2,504.9	3,632.2	1,453.8	3,515.1	701.8	3,515.1	701.8	1,272.7	2,270.0
2007	74,728.5	22,814.5	16,661.5	3,655.6	4,252.8	1,266.4	8,269.4	738.1	8,269.4	738.1	1,514.5	2,652.6
2010	69,300.2	21,872.5	13,873.3	2,821.8	3,615.1	1,233.4	1,347.9	247.0	1,347.9	247.0	2,229.3	4,004.3
2013	66,997.1	21,140.4	14,846.5	2,087.6	3,717.1	1,060.0	5,294.4	601.5	5,294.4	601.5	2,947.5	3,407.8

Note: All figures in 2013 USD. Values given for all households.

Table A1.14 Debt payments by gender, USA 1989-2013

	Mortgage		**Consumer debt**		**Revolving debt**	
Wave	Male	Female	Male	Female	Male	Female
1989	7,008.6	1,924.0	3,770.1	1,780.9	645.9	347.8
1992	7,653.6	2,641.4	2,895.4	1,520.1	682.7	315.4
1995	7,675.5	2,620.6	3,131.7	1,369.2	850.3	436.3
1998	9,116.4	2,989.3	3,674.2	1,510.5	995.4	549.7
2001	9,324.3	3,008.9	3,539.1	1,688.6	940.7	549.0
2004	10,222.5	3,895.2	3,720.5	1,601.4	1,195.2	666.3
2007	11,661.1	4,123.7	3,553.7	1,596.8	1,405.5	693.1
2010	10,195.9	4,316.7	3,143.4	1,556.0	1,202.8	596.7
2013	8,604.2	3,367.7	3,029.3	1,501.2	892.9	456.6

Note: All figures in 2013 USD. Values given for all households.

Table A1.15 Socio-economic characteristics by gender

Wave	Out of labour force		Single		Number of children per 100 single families		Black or Hispanic	
	Male	Female	Male	Female	Male	Female	Male	Female
1989	22.6%	43.4%	19.0%	100.0%	12	64	15.9%	32.8%
1992	23.1%	45.0%	20.6%	99.2%	19	63	16.8%	28.9%
1995	22.2%	42.9%	18.5%	98.1%	19	62	14.9%	27.3%
1998	20.3%	40.8%	19.8%	97.2%	18	57	16.5%	25.6%
2001	21.1%	35.0%	18.6%	97.2%	17	66	16.8%	32.4%
2004	20.5%	36.8%	20.5%	97.4%	20	59	19.5%	30.9%
2007	21.1%	39.4%	19.4%	98.3%	22	64	19.7%	28.1%
2010	22.5%	37.7%	21.2%	97.8%	17	68	21.6%	32.7%
2013	24.7%	39.0%	21.2%	97.3%	17	63	21.4%	34.9%

Appendix to Section 1.3.3 Detailed balance sheet analysis by race (source for all tables: own calculations based on the U.S. Survey of Consumer Finances)

Table A1.16 Asset holdings by race, USA 1989-2013

	Total assets											
	White			Black			Hispanic			Other		
	Holders	Median	Mean	Holders	Median	Mean	Holders	Median	Mean	Holders	Median	Mean
1989	98.4%	179,726.8	477,933.6	76.7%	48,497.1	123,998.8	86.5%	29,282.7	137,535.0	97.4%	87,305.7	364,556.1
1992	98.9%	170,681.4	424,393.6	85.4%	49,392.8	119,179.5	84.1%	39,644.2	145,319.3	94.3%	97,485.8	405,749.3
1995	98.6%	180,779.6	449,655.8	86.6%	45,582.0	109,227.7	87.6%	83,787.0	151,483.2	96.7%	93,197.9	394,212.4
1998	98.8%	207,566.6	560,624.4	89.7%	51,591.4	142,461.1	88.4%	48,746.7	184,462.3	93.8%	160,177.9	496,284.3
2001	99.0%	242,551.0	723,789.2	89.7%	78,622.3	158,518.8	88.1%	42,403.8	184,739.3	93.3%	182,747.2	619,626.1
2004	99.3%	272,277.8	797,350.5	92.9%	67,082.9	203,588.3	94.0%	54,258.3	235,458.6	98.9%	288,801.9	627,117.8
2007	98.9%	295,744.4	881,188.7	92.5%	76,013.3	245,351.5	94.9%	79,303.1	322,496.0	100.0%	328,754.5	804,212.1
2010	98.9%	247,829.6	800,383.2	91.9%	63,230.1	174,449.8	94.2%	53,713.4	196,104.0	98.7%	204,050.9	710,311.7
2013	99.3%	231,500.0	786,532.3	93.0%	44,120.0	157,721.5	95.6%	39,870.0	175,513.4	98.9%	190,200.0	717,767.8
Percentage change												
1989-2013	*0.9*	*28.8*	*64.6*	*21.2*	*-9.0*	*27.2*	*10.6*	*36.2*	*27.6*	*1.6*	*117.9*	*96.9*
1989-2007	*0.5*	*64.6*	*84.4*	*20.6*	*56.7*	*97.9*	*9.7*	*170.8*	*134.5*	*2.7*	*276.6*	*120.6*
2007-2013	*0.4*	*-21.7*	*-10.7*	*0.5*	*-42.0*	*-35.7*	*0.8*	*-49.7*	*-45.6*	*-1.1*	*-42.2*	*-10.8*

(Table A1.16 continued)

Primary residence

	White		Black		Hispanic		Other	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	70.5%	143,956.5	42.4%	61,635.5	41.9%	72,629.8	53.9%	127,826.4
1992	70.3%	133,016.9	43.4%	54,366.1	39.9%	65,214.7	54.6%	118,516.4
1995	70.6%	129,226.1	42.7%	52,576.6	42.9%	72,236.5	51.8%	124,655.1
1998	71.8%	149,603.8	46.3%	62,211.5	44.2%	76,741.0	54.2%	161,657.0
2001	74.1%	188,112.6	47.4%	66,514.3	44.3%	79,810.4	53.0%	222,274.2
2004	75.8%	244,721.9	50.1%	92,991.8	47.7%	115,587.9	57.5%	267,322.5
2007	74.8%	263,464.6	48.6%	124,714.8	49.2%	159,945.3	63.4%	289,683.9
2010	74.7%	223,315.4	47.7%	84,847.0	47.3%	101,163.1	58.5%	236,872.2
2013	73.1%	202,565.6	44.0%	70,604.8	43.9%	86,779.1	60.0%	254,371.0

Other real estate

	White		Black		Hispanic		Other	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	22.8%	62,837.0	11.0%	17,790.3	9.7%	23,124.2	22.6%	56,936.9
1992	22.1%	54,236.8	10.2%	16,041.2	7.8%	20,415.3	18.2%	86,202.6
1995	20.1%	44,898.1	10.5%	10,467.4	7.2%	7,124.7	14.7%	47,086.7
1998	20.3%	51,906.7	12.6%	11,714.3	10.1%	24,574.0	17.9%	94,698.7
2001	19.3%	67,802.4	8.9%	19,368.1	7.7%	10,864.4	10.6%	70,582.2
2004	19.9%	85,721.4	12.3%	25,254.9	12.0%	31,584.3	19.6%	103,197.1
2007	21.0%	91,270.7	12.2%	29,492.4	12.9%	59,107.0	18.3%	115,013.5
2010	21.2%	89,291.6	13.2%	27,271.1	8.7%	16,592.1	18.3%	69,737.3
2013	20.7%	77,793.8	8.8%	13,429.0	8.0%	14,057.8	17.1%	81,477.5

Business equity

	White		Black		Hispanic		Other	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	15.5%	91,126.9	5.5%	5,069.6	4.8%	6,244.3	14.5%	106,673.4
1992	16.4%	77,001.6	5.3%	13,478.3	6.7%	28,151.3	18.4%	81,337.7
1995	14.7%	81,894.8	3.8%	5,559.7	8.1%	12,650.0	10.5%	57,307.4
1998	14.5%	99,529.3	5.6%	4,949.3	4.0%	17,311.9	13.3%	61,271.5
2001	16.1%	121,974.6	3.3%	4,334.7	5.3%	27,605.9	15.7%	139,753.3
2004	15.6%	136,188.4	6.0%	23,396.5	4.8%	26,489.4	15.6%	82,746.0
2007	15.6%	176,695.4	6.0%	18,819.6	7.8%	41,219.0	13.6%	195,359.7
2010	15.7%	145,946.2	5.6%	6,295.8	6.0%	24,174.9	15.5%	116,785.0
2013	13.7%	139,222.3	6.3%	22,449.2	6.1%	31,184.9	11.3%	151,040.3

Vehicles and other non-financial assets

	White		Black		Hispanic		Other	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	89.9%	24,282.3	57.6%	13,116.3	77.0%	11,329.9	83.3%	19,256.0
1992	91.2%	20,023.6	66.6%	10,422.9	72.9%	9,842.4	84.6%	17,870.4
1995	89.2%	25,306.3	62.0%	10,780.0	79.7%	13,852.6	82.9%	25,738.3
1998	88.0%	25,896.8	62.4%	10,196.1	71.7%	12,980.8	79.7%	21,896.9
2001	90.0%	29,688.3	70.4%	14,871.3	72.4%	14,014.5	71.3%	20,195.6
2004	91.0%	32,131.0	71.2%	12,688.4	80.6%	18,921.3	82.7%	24,859.2
2007	90.4%	30,037.8	73.5%	15,569.7	84.3%	17,973.6	90.9%	25,901.5
2010	91.1%	29,249.4	72.2%	13,286.7	80.6%	17,402.5	86.5%	23,095.2
2013	90.4%	28,477.3	73.7%	12,542.5	81.0%	14,949.1	84.6%	23,819.6

Transaction accounts

	White		Black		Hispanic		Other	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	92.6%	28,045.6	56.7%	6,534.3	63.5%	8,365.4	89.3%	13,008.2
1992	93.2%	24,280.7	68.6%	4,925.3	55.8%	3,599.1	85.8%	15,999.3
1995	92.8%	23,153.5	62.2%	4,900.9	69.7%	5,857.0	88.6%	21,817.9
1998	94.9%	25,538.5	73.5%	6,719.9	74.3%	13,321.3	87.4%	19,957.9
2001	95.3%	35,977.3	81.6%	7,507.3	72.2%	6,381.1	87.6%	29,486.7
2004	95.4%	38,776.6	78.6%	7,273.1	75.8%	5,916.0	95.3%	23,640.2
2007	95.4%	33,813.6	81.0%	7,515.8	79.1%	6,747.5	96.7%	30,088.3
2010	96.1%	40,805.2	80.9%	6,190.2	83.2%	6,945.2	93.3%	41,662.2
2013	96.4%	43,543.8	83.2%	6,558.4	85.4%	5,949.4	94.5%	41,099.3

Financial investment assets

	White		Black		Hispanic		Other	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	61.8%	86,848.1	23.0%	9,444.5	23.8%	5,414.3	38.8%	19,504.6
1992	58.3%	72,474.8	27.1%	6,210.0	16.0%	8,034.0	42.5%	52,599.9
1995	57.5%	88,016.5	25.7%	6,593.9	15.2%	5,432.7	45.4%	68,323.0
1998	58.3%	132,340.9	30.2%	17,170.5	20.6%	16,044.1	48.0%	49,631.0
2001	58.1%	175,933.5	30.7%	16,906.2	25.0%	21,150.1	49.2%	54,412.6
2004	58.1%	157,294.1	27.4%	12,104.7	19.6%	20,723.2	45.3%	56,575.3
2007	54.3%	167,845.5	25.8%	12,805.5	20.2%	12,631.5	53.5%	76,850.6
2010	47.0%	146,174.5	23.9%	13,285.4	13.9%	8,711.0	37.8%	109,219.4
2013	42.7%	155,004.5	17.8%	9,134.9	13.9%	9,072.6	40.1%	80,510.0

(Table A1.16 continued)

Retirement and insurance assets

	White		Black		Hispanic		Other	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	60.5%	40,837.2	33.0%	10,408.2	26.0%	10,427.1	43.9%	21,350.6
1992	61.6%	43,359.3	41.4%	13,735.7	27.4%	10,062.7	45.9%	33,223.0
1995	62.1%	57,160.7	46.1%	18,349.2	43.6%	34,329.8	50.5%	49,283.9
1998	64.5%	75,808.4	49.9%	29,499.5	28.1%	23,489.3	50.4%	87,171.3
2001	65.8%	104,300.6	53.7%	29,016.9	37.1%	24,913.1	54.6%	82,921.5
2004	64.3%	102,517.0	46.1%	29,878.8	29.6%	16,236.5	56.4%	68,777.5
2007	65.5%	118,061.1	50.5%	36,433.7	35.2%	24,872.1	67.1%	71,314.5
2010	64.3%	125,600.9	44.2%	23,273.5	30.5%	21,115.2	58.3%	112,940.5
2013	63.2%	139,924.9	44.4%	23,002.7	28.7%	13,520.5	56.6%	85,450.1

Note: All median and mean figures in 2013 USD. Holders represents the proportion of all households holding assets. All values are conditional on holding assets.

Table A1.17 Debt holdings by race, USA 1989-2013

Total debt

	White			Black			Hispanic			Other		
	Holders	Median	Mean	Holders	Median	Mean	Holders	Median	Mean	Holders	Median	Mean
1989	73.2%	34,036.6	71,274.6	65.1%	9,037.9	30,972.4	72.4%	15,942.8	51,347.1	76.6%	19,883.3	76,441.2
1992	74.3%	35,744.8	76,955.4	69.2%	9,098.7	33,960.4	69.3%	14,541.6	49,524.7	73.9%	23,039.2	82,841.7
1995	75.4%	40,208.7	79,902.0	71.1%	9,410.9	39,181.3	75.4%	23,678.9	52,042.1	67.7%	43,001.6	99,383.0
1998	74.9%	56,752.0	98,691.9	68.6%	18,154.9	52,300.6	72.3%	21,442.8	53,700.0	78.0%	42,885.7	106,355.4
2001	75.8%	58,569.4	104,570.5	74.0%	26,264.3	56,542.9	71.3%	20,354.9	59,518.0	72.2%	63,428.3	115,024.1
2004	77.9%	84,790.9	137,300.0	71.5%	36,131.1	73,815.2	70.2%	34,774.6	92,953.2	80.4%	59,745.7	191,276.7
2007	77.1%	83,266.5	146,625.0	77.2%	32,561.1	98,621.1	74.1%	58,834.5	131,970.5	82.6%	89,823.6	198,233.8
2010	76.2%	89,379.4	153,565.1	71.3%	32,579.6	77,495.2	72.1%	32,258.0	94,476.3	73.1%	109,313.0	202,026.9
2013	75.1%	80,000.0	135,830.5	75.4%	25,540.0	68,216.1	70.6%	25,000.0	78,705.5	72.5%	83,000.0	184,280.1
Growth rate (percent)												
1989-2013	*2.6*	*135.0*	*90.6*	*15.9*	*182.6*	*120.3*	*-2.50*	*56.8*	*53.28*	*-5.4*	*317.4*	*141.1*
1989-2007	*5.3*	*144.6*	*105.7*	*18.7*	*260.3*	*218.4*	*2.35*	*269.0*	*157.02*	*7.7*	*351.8*	*159.3*
2007-2013	*-2.6*	*-3.9*	*-7.4*	*-2.4*	*-21.6*	*-30.8*	*-4.73*	*-57.5*	*-40.36*	*-12.2*	*-7.6*	*-7.0*

(Table A1.17 continued)

Mortgages secured by primary residence

	White		Black		Hispanic		Other	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	43.0%	49,049.2	24.8%	18,785.0	31.0%	36,133.1	36.6%	54,723.4
1992	42.8%	55,314.6	27.4%	23,545.8	25.2%	36,529.2	33.2%	61,550.6
1995	44.1%	58,299.1	26.1%	25,817.3	33.9%	40,695.2	37.9%	75,728.7
1998	46.6%	70,211.5	30.2%	38,089.0	27.9%	36,879.3	39.1%	78,816.0
2001	47.6%	79,103.8	36.5%	39,735.5	31.9%	45,890.6	37.5%	84,191.9
2004	51.7%	103,732.7	36.0%	52,062.1	34.9%	71,339.6	48.2%	138,091.4
2007	51.7%	109,429.6	38.2%	73,884.6	37.0%	92,606.6	51.9%	159,397.5
2010	51.5%	114,437.6	32.2%	50,037.4	37.9%	73,269.6	43.7%	155,239.5
2013	47.9%	99,886.2	30.1%	45,820.3	29.1%	60,810.1	40.4%	149,088.6

Mortgages secured by other real estate

	White		Black		Hispanic		Other	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	5.8%	5,506.0	2.7%	1,144.2	3.3%	3,582.1	5.7%	8,899.5
1992	6.4%	8,145.6	2.4%	1,866.7	2.1%	3,342.4	7.9%	10,922.7
1995	5.1%	6,646.9	3.6%	2,920.5	2.1%	682.4	5.3%	6,108.8
1998	5.3%	7,655.5	3.8%	3,125.2	3.2%	2,836.3	5.5%	8,280.5
2001	5.3%	6,672.2	2.3%	2,636.7	2.6%	2,575.9	2.9%	8,912.3
2004	4.4%	11,328.9	2.4%	4,553.2	3.0%	7,381.5	4.0%	35,952.3
2007	5.8%	14,517.1	3.1%	8,166.3	6.4%	18,567.8	5.8%	20,833.7
2010	5.9%	15,862.1	4.2%	6,770.9	2.9%	3,591.4	6.1%	21,539.7
2013	6.1%	13,169.3	3.5%	4,585.8	2.4%	3,368.6	5.7%	14,831.5

Instalment debt

	White		Black		Hispanic		Other	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	49.3%	11,634.5	47.4%	8,447.6	52.1%	7,879.1	51.6%	9,709.5
1992	46.2%	8,482.6	42.5%	6,186.2	49.6%	5,905.2	45.0%	6,949.0
1995	46.1%	8,902.8	46.4%	7,868.5	45.2%	7,713.9	41.7%	12,543.0
1998	44.4%	12,831.3	39.3%	7,326.6	44.8%	10,394.1	42.7%	11,939.0
2001	45.4%	12,199.9	47.2%	10,611.4	43.2%	7,700.7	36.5%	16,864.0
2004	46.8%	14,609.6	47.1%	13,398.8	38.1%	10,133.9	46.4%	10,767.5
2007	46.3%	15,079.2	51.2%	12,111.2	48.1%	13,948.1	42.8%	12,239.3
2010	46.6%	15,358.8	48.1%	16,861.0	45.3%	13,824.8	39.7%	19,113.5
2013	46.1%	16,701.1	55.7%	15,720.1	43.1%	11,278.2	45.5%	16,480.1

Credit card balances

	White		Black		Hispanic		Other	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	41.4%	1,864.1	33.4%	1,966.8	34.7%	1,585.1	36.9%	2,262.7
1992	44.2%	2,366.2	43.3%	1,730.4	39.8%	2,149.8	42.9%	1,663.2
1995	47.1%	3,042.7	45.3%	1,970.3	56.1%	2,195.3	44.8%	3,471.4
1998	44.3%	3,824.4	42.3%	2,175.1	46.3%	2,646.9	40.2%	2,284.1
2001	43.3%	3,287.7	52.1%	2,864.5	43.5%	2,942.0	39.8%	3,433.4
2004	46.0%	4,047.4	47.0%	2,720.0	46.9%	3,090.5	43.9%	4,775.4
2007	45.5%	5,248.5	49.8%	3,666.3	46.6%	4,342.8	42.6%	4,222.7
2010	39.6%	4,333.6	39.0%	2,866.7	42.1%	3,019.1	31.6%	4,050.1
2013	38.6%	3,323.4	36.0%	1,666.9	41.8%	2,511.9	29.0%	1,884.4

Other unsecured lines of credit

	White		Black		Hispanic		Other	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	3.0%	1,527.1	2.8%	114.3	3.8%	178.0	5.2%	279.2
1992	2.6%	710.6	1.5%	119.9	1.4%	311.9	1.9%	107.5
1995	2.1%	522.3	0.8%	40.2	1.2%	54.4	3.2%	135.8
1998	2.4%	348.1	1.5%	64.7	2.4%	247.1	1.9%	120.5
2001	1.7%	581.4	1.0%	233.6	1.2%	72.1	1.4%	21.8
2004	1.7%	1,121.4	1.2%	32.4	0.8%	477.4	1.3%	775.6
2007	1.7%	691.2	1.5%	51.6	2.5%	709.7	0.9%	563.7
2010	2.5%	1,885.1	0.9%	230.5	0.8%	47.7	1.9%	380.4
2013	2.0%	1,152.1	1.7%	65.3	1.3%	45.1	2.4%	1,176.3

Other debt

	White		Black		Hispanic		Other	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	7.2%	1,693.7	3.4%	412.3	6.8%	1,989.7	7.1%	567.1
1992	8.2%	1,935.7	9.5%	511.4	7.2%	1,286.2	11.2%	1,648.7
1995	8.5%	2,488.3	8.7%	564.5	8.2%	700.8	8.4%	1,395.4
1998	8.8%	3,821.1	9.8%	1,520.1	6.8%	696.4	9.5%	4,915.3
2001	7.4%	2,725.6	4.9%	461.1	7.6%	336.6	10.8%	1,600.6
2004	7.8%	2,460.1	8.6%	1,048.8	6.1%	530.3	4.7%	914.6
2007	6.8%	1,659.4	7.8%	741.2	6.5%	1,795.5	4.3%	977.0
2010	6.3%	1,687.9	8.3%	728.7	5.7%	723.7	5.0%	1,703.6
2013	6.6%	1,598.5	7.7%	357.8	5.6%	691.7	5.6%	819.2

Note: All median and mean figures in 2013 USD. Holders represents the proportion of all households holding debt. All values are conditional on holding debt.

Table A1.18 Mean of income source receipts by race, USA 1989-2013

	Wages				Business income				Interest and dividends			
	White	Black	Hispanic	Other	White	Black	Hispanic	Other	White	Black	Hispanic	Other
1989	55,448.7	28,705.5	34,886.6	44,486.2	10,238.4	688.8	2,911.1	9,786.6	6,231.8	434.9	1,298.1	1,756.0
1992	52,690.9	32,657.8	30,243.4	53,085.5	12,304.2	1,351.8	2,316.9	12,862.0	5,049.3	338.0	325.8	3,392.1
1995	54,901.3	29,832.6	42,644.1	61,487.5	10,078.4	820.8	2,692.9	7,046.0	4,967.7	99.9	119.8	1,960.9
1998	58,152.1	35,164.3	41,632.1	72,627.1	12,257.6	2,302.9	1,908.4	9,597.7	4,161.7	290.3	333.8	1,779.5
2001	69,485.1	40,989.5	42,966.2	58,302.8	12,552.9	756.6	5,779.5	16,218.2	4,875.6	418.8	227.7	1,904.4
2004	66,286.0	39,047.3	39,687.9	77,993.8	11,696.1	2,178.1	4,158.9	9,697.9	3,974.7	187.3	181.0	1,474.1
2007	65,071.5	38,973.7	43,698.0	79,931.2	15,820.3	3,758.7	4,809.4	10,955.3	4,484.3	306.4	238.2	1,267.4
2010	61,229.2	33,720.4	44,769.0	78,287.6	13,627.3	1,668.9	3,515.9	13,437.9	3,981.3	269.7	193.7	2,007.1
2013	60,837.6	29,032.9	35,258.6	71,540.3	14,156.3	2,096.2	4,693.7	10,584.8	4,003.6	318.9	58.1	2,214.6

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	Capital gains or losses				Social security and retirement income				Transfer and other income			
	White	Black	Hispanic	Other	White	Black	Hispanic	Other	White	Black	Hispanic	Other
1989	5,456.4	185.4	586.9	298.4	7,147.0	4,479.0	1,924.8	3,250.2	2,733.6	2,973.2	1,445.0	4,345.2
1992	1,822.8	12.7	-47.1	1,388.3	6,851.5	4,080.0	1,910.3	3,063.8	6,637.9	8,443.1	7,854.0	6,265.2
1995	2,399.4	97.5	43.5	-109.7	7,130.4	3,515.5	3,045.5	4,053.7	1,599.7	1,974.8	3,462.4	1,566.8
1998	4,436.1	62.2	1,621.7	1,604.2	7,368.7	4,928.3	1,576.6	1,516.3	1,468.0	1,636.2	1,278.3	1,187.1
2001	7,984.9	270.2	579.0	2,612.2	8,138.7	4,509.0	2,181.5	3,172.5	1,438.4	1,620.7	1,204.7	1,661.5
2004	3,626.2	46.3	171.6	966.5	11,274.8	5,490.4	3,003.9	3,573.0	1,424.9	1,750.7	2,321.5	1,451.4
2007	8,117.5	1,003.0	795.7	-325.8	10,645.5	5,201.2	2,757.8	4,297.3	1,721.9	2,584.0	1,806.2	1,493.8
2010	1,481.5	-6.8	-520.4	1,246.3	11,826.7	7,062.3	2,634.4	5,825.0	2,686.3	2,804.6	2,881.6	2,401.9
2013	5,524.6	140.9	52.5	1,340.0	13,649.2	7,446.4	3,384.3	4,409.9	3,253.6	2,835.0	2,115.6	3,404.3

Note: All figures in 2013 USD.

Table A1.19 Mean of debt payments receipts by race, USA 1989-2013

	Mortgages				Consumer debt				Revolving debt			
	White	Black	Hispanic	Other	White	Black	Hispanic	Other	White	Black	Hispanic	Other
1989	6,220.3	2,513.4	3,962.9	6,410.2	3,320.9	3,047.3	2,712.9	2,717.0	587.6	462.7	435.7	640.2
1992	6,988.2	2,981.5	3,802.2	7,458.8	2,617.9	2,231.2	2,080.3	2,295.7	623.4	416.1	529.8	419.3
1995	6,714.3	3,222.9	4,909.3	7,955.1	2,702.2	2,098.4	2,297.0	3,212.9	791.7	437.2	534.3	763.1
1998	8,024.4	4,311.3	4,068.3	11,251.6	3,212.8	2,136.0	3,024.5	3,139.1	957.2	490.5	671.0	629.5
2001	8,409.3	4,597.1	4,640.9	9,001.3	3,172.7	2,737.8	2,339.5	2,909.4	884.1	683.0	650.0	751.7
2004	9,214.8	4,779.1	5,909.0	12,991.2	3,288.9	2,609.6	2,553.2	3,209.4	1,158.2	608.9	727.2	1,232.7
2007	9,971.3	6,833.4	8,274.7	13,925.2	3,083.5	2,557.2	3,135.1	2,859.0	1,288.7	872.6	1,079.5	1,091.9
2010	9,591.8	4,518.6	6,057.0	11,584.2	2,865.9	2,272.1	2,522.6	2,133.1	1,175.7	639.4	677.9	969.1
2013	7,983.4	3,970.2	4,421.4	10,095.9	2,713.8	2,253.8	2,287.8	2,580.4	894.7	413.6	551.7	485.7

Note: All figures in 2013 USD. Values given for all households.

Appendix to Section 1.3.4. Detailed balance sheet analysis by age group (source for all tables: own calculations based on U.S. Survey of Consumer Finances 1989-2013)

Table A1.20 Asset holdings by age group, USA 1989-2013

Total assets

Wave	<35			35-44			45-54		
	Holders	Median	Mean	Holders	Median	Mean	Holders	Median	Mean
1989	92.3%	36,512.9	147,260.2	95.0%	191,060.3	364,209.0	94.9%	254,325.2	604,960.2
1992	92.9%	38,182.0	126,931.0	96.7%	159,226.8	306,668.7	96.8%	200,008.4	527,932.7
1995	94.4%	48,374.9	119,730.4	96.2%	167,816.9	306,654.0	97.3%	227,682.1	558,621.2
1998	94.8%	41,370.4	156,799.2	97.6%	183,121.7	383,590.5	96.7%	255,026.7	637,662.3
2001	93.2%	51,478.1	184,422.1	97.4%	207,356.8	452,396.3	98.1%	278,533.2	760,338.9
2004	96.5%	48,055.6	175,302.3	97.7%	213,888.5	511,473.1	98.3%	289,665.1	826,073.5
2007	97.1%	42,789.7	220,011.0	96.9%	249,597.5	526,187.2	97.6%	343,530.5	910,350.4
2010	95.5%	38,388.1	151,207.8	97.4%	167,592.9	380,563.9	98.3%	264,065.8	773,744.7
2013	92.2%	29,520.0	143,166.1	97.9%	162,900.0	488,723.7	99.7%	215,000.0	664,111.7
Percentage change									
1989-2013	*-0.1*	*-19.2*	*-2.8*	*3.1*	*-14.7*	*34.2*	*5.1*	*-15.5*	*9.8*
1989-2007	*5.2*	*17.2*	*49.4*	*2.0*	*30.6*	*44.5*	*2.9*	*35.1*	*50.5*
2007-13	*-5.1*	*-31.0*	*-34.9*	*1.0*	*-34.7*	*-7.1*	*2.2*	*-37.4*	*-27.1*

(Table A1.20 continued)

Wave	55-64			65-74			75+		
	Holders	Median	Mean	Holders	Median	Mean	Holders	Median	Mean
1989	95.0%	221,282.8	628,786.1	97.4%	153,282.0	557,853.6	96.4%	146.7	458
1992	96.9%	229,091.7	618,590.7	96.8%	173,606.0	505,076.4	97.5%	145.5	366.2
1995	96.4%	243,619.9	662,085.4	97.7%	190,038.7	566,606.0	98.4%	146.2	403.4
1998	98.2%	283,331.2	852,550.8	98.5%	234,584.5	711,594.8	96.4%	192.9	471.2
2001	98.4%	299,544.6	1,058,720.0	97.1%	282,341.5	955,240.9	97.8%	224.5	641.6
2004	97.5%	435,052.5	1,181,396.0	99.5%	287,445.4	904,332.7	99.6%	228.4	680.7
2007	99.1%	391,294.3	1,183,012.0	98.4%	340,117.2	1,236,515.0	98.1%	246.2	747.2
2010	98.3%	303,611.4	1,076,835.0	97.1%	298,467.3	1,008,400.0	98.7%	254.8	765.8
2013	100.0%	260,700.0	916,863.1	100.0%	303,600.0	1,132,184.0	100.0%	217	675.8
Percentage change									
1989-2013	*5.3*	*17.8*	*45.8*	*2.7*	*98.1*	*103.0*	*3.7*	*46.1*	*40.1*
1989-2007	*4.3*	*76.8*	*88.1*	*1.0*	*121.9*	*121.7*	*1.8*	*66.0*	*63.4*
2007-13	*0.9*	*-33.4*	*-22.5*	*1.6*	*-10.7*	*-8.4*	*1.9*	*-12.0*	*-14.2*

(Table A1.20 continued)

Primary residence

	<35		35-44		45-54		55-64		65-74		75+	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	39.3%	63,879.2	66.1%	145,459.4	76.4%	187,224.0	80.1%	173,065.0	77.8%	134,800.9	69.9%	119,714.2
1992	36.8%	58,423.6	64.5%	124,482.5	75.5%	161,246.2	77.5%	155,702.9	79.3%	135,551.7	77.2%	118,483.9
1995	37.9%	50,901.9	64.7%	120,275.8	75.3%	161,527.9	82.0%	162,902.0	79.5%	133,083.2	72.8%	115,401.4
1998	38.9%	59,742.9	67.1%	132,988.7	74.4%	173,424.8	80.3%	187,391.0	81.5%	164,311.1	77.0%	141,669.4
2001	39.9%	71,669.5	67.8%	164,116.3	76.3%	208,828.7	83.2%	221,836.4	82.5%	207,413.1	76.2%	171,999.8
2004	41.6%	91,372.4	68.3%	204,034.2	77.3%	265,297.0	79.1%	318,986.6	81.3%	230,869.4	85.2%	224,151.4
2007	40.6%	109,781.5	66.1%	220,920.3	77.3%	298,846.1	81.0%	293,914.1	85.5%	335,514.0	77.0%	228,116.4
2010	37.5%	71,677.7	63.8%	167,024.7	75.2%	241,164.4	78.1%	260,228.8	82.6%	246,961.6	81.9%	206,906.3
2013	35.6%	61,443.2	61.7%	172,742.6	69.1%	195,466.0	74.2%	224,916.2	85.8%	256,579.1	80.2%	169,778.1

Other real estate

	<35		35-44		45-54		55-64		65-74		75+	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	7.5%	8,861.9	20.5%	28,958.1	29.6%	104,468.3	31.6%	116,002.3	27.5%	77,134.2	16.7%	48,964.0
1992	8.2%	10,383.5	16.6%	24,695.4	25.3%	82,537.7	35.6%	91,392.5	25.4%	83,747.2	15.8%	46,485.9
1995	7.1%	6,514.7	14.6%	20,030.5	25.0%	52,411.7	27.1%	85,704.1	28.1%	75,391.5	16.2%	35,096.4
1998	5.6%	6,657.7	18.0%	26,442.7	24.3%	60,535.0	25.6%	93,210.7	28.3%	86,095.2	19.5%	56,470.6
2001	5.7%	10,099.0	15.1%	28,287.7	21.6%	59,038.0	24.3%	107,280.0	22.9%	154,636.7	19.4%	55,954.5
2004	7.7%	15,326.8	13.9%	50,555.3	23.8%	89,252.8	27.6%	139,603.0	26.2%	123,583.3	15.3%	65,364.9
2007	7.9%	15,533.1	17.2%	55,096.6	22.0%	90,656.7	28.0%	146,863.6	26.5%	136,876.7	17.5%	89,402.9
2010	6.4%	9,146.7	12.2%	24,300.8	21.1%	71,974.7	28.0%	139,048.8	28.1%	131,586.9	22.9%	105,409.4
2013	6.2%	9,168.8	13.1%	31,426.1	20.2%	62,680.0	22.9%	99,063.8	28.2%	125,863.0	18.9%	72,691.4

Business equity

	<35		35-44		45-54		55-64		65-74		75+	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	10.3%	27,587.8	19.4%	72,433.0	18.2%	116,623.5	13.4%	114,198.4	9.4%	112,423.5	5.4%	61,611.9
1992	10.6%	17,983.7	19.5%	66,265.2	18.2%	103,761.4	18.9%	127,298.8	10.4%	86,725.8	4.6%	21,222.4
1995	9.6%	11,677.5	16.7%	60,179.8	18.0%	115,073.9	13.3%	138,857.5	9.9%	87,157.0	5.0%	31,486.5
1998	7.8%	26,468.3	15.5%	67,098.8	19.2%	136,424.7	16.2%	161,485.5	10.6%	86,950.1	3.0%	36,165.7
2001	8.1%	22,646.8	15.5%	91,020.6	19.5%	144,566.5	18.7%	199,023.0	13.1%	137,131.9	3.4%	39,850.6
2004	8.5%	20,073.7	15.4%	95,332.7	18.2%	169,841.6	17.8%	209,398.7	10.3%	115,806.2	6.5%	59,866.0
2007	8.0%	42,730.7	18.2%	96,590.7	17.2%	191,870.0	18.1%	248,896.6	11.2%	230,795.5	4.5%	108,494.9
2010	8.4%	23,492.8	11.1%	53,564.1	16.8%	162,946.8	19.6%	194,954.6	15.8%	166,456.6	6.0%	100,493.5
2013	6.5%	21,276.6	15.6%	117,768.4	14.6%	140,359.7	15.5%	161,901.2	11.0%	159,472.7	4.4%	83,674.4

Vehicles and other non-financial assets

	<35		35-44		45-54		55-64		65-74		75+	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	82.1%	14,036.1	89.5%	28,126.2	91.0%	31,330.0	86.5%	27,419.4	82.9%	19,209.7	68.0%	11,104.0
1992	84.1%	13,287.7	89.3%	19,289.8	93.0%	23,976.1	87.2%	22,038.6	86.3%	19,109.6	73.3%	11,652.3
1995	84.6%	17,103.6	85.6%	21,919.3	88.6%	29,948.1	89.3%	29,486.9	83.7%	25,153.8	73.2%	17,148.0
1998	79.4%	14,708.8	86.2%	22,211.7	88.1%	30,487.5	88.9%	33,601.4	84.2%	25,442.5	70.5%	14,911.2
2001	79.6%	17,802.6	89.8%	24,785.6	90.8%	33,888.1	91.2%	37,179.3	82.5%	30,842.2	74.6%	15,493.9
2004	84.1%	16,065.4	89.9%	25,769.9	89.2%	32,910.7	89.3%	40,294.9	89.5%	32,760.6	77.9%	26,794.6
2007	86.1%	19,102.0	88.1%	24,330.8	91.1%	31,269.9	92.4%	34,633.6	90.7%	39,312.9	72.9%	15,364.7

(Table A1.20 continued)

Vehicles and other non-financial assets

2010	80.1%	16,117.8	89.0%	21,808.9	91.2%	29,843.0	90.8%	34,730.3	87.4%	34,336.5	83.7%	17,938.6
2013	83.1%	14,800.6	89.9%	24,836.0	88.2%	26,203.1	89.5%	29,381.1	90.3%	35,525.5	76.6%	18,925.2

Transaction accounts

	<35		35-44		45-54		55-64		65-74		75+	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	80.2%	6,363.6	86.1%	13,329.8	87.9%	29,147.8	85.6%	37,274.6	90.5%	38,832.4	90.3%	49,383.8
1992	81.3%	7,440.7	86.8%	13,295.0	88.9%	22,285.6	90.2%	31,404.2	88.9%	30,375.2	91.8%	39,016.8
1995	80.9%	4,699.0	87.6%	11,167.8	89.2%	24,567.6	88.8%	32,268.0	91.7%	35,655.6	93.2%	35,759.2
1998	84.7%	8,011.6	90.5%	14,668.5	94.1%	27,770.7	93.9%	36,008.9	94.1%	35,869.0	90.0%	30,733.3
2001	87.1%	8,035.9	91.1%	19,540.6	92.7%	35,660.7	93.8%	48,208.2	93.8%	53,006.2	93.7%	42,023.0
2004	86.4%	8,483.6	90.8%	24,024.0	91.8%	31,282.4	93.2%	50,864.5	93.9%	41,544.4	96.4%	53,312.1
2007	87.3%	7,948.1	91.2%	17,626.8	91.7%	35,589.8	96.4%	41,616.1	94.6%	44,577.8	95.3%	34,755.8
2010	89.0%	8,608.4	90.6%	19,477.0	92.5%	37,123.3	94.2%	53,782.3	95.8%	52,206.1	96.3%	37,832.0
2013	90.2%	9,365.1	91.8%	27,287.9	91.8%	29,008.8	94.6%	51,396.7	97.1%	53,834.9	96.7%	50,197.4

Financial investment assets

	<35		35-44		45-54		55-64		65-74		75+	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	43.6%	18,107.3	59.1%	38,556.5	56.5%	73,604.4	52.1%	92,781.4	56.4%	18,060.7	56.2%	157,527.8
1992	42.4%	8,598.6	50.3%	28,170.2	52.5%	65,226.7	55.5%	110,773.4	54.2%	111,901.0	57.1%	120,133.7
1995	44.3%	9,923.8	50.9%	33,068.9	53.7%	79,634.7	50.9%	126,582.7	52.8%	150,815.3	56.1%	149,655.8
1998	42.4%	20,836.6	52.7%	58,305.9	52.9%	113,366.1	53.5%	207,583.1	59.3%	226,940.7	59.6%	161,259.4
2001	42.0%	32,428.0	52.6%	58,949.7	55.0%	148,826.2	54.3%	271,062.4	53.6%	254,139.1	58.8%	256,261.9
2004	41.0%	9,507.5	46.7%	58,459.3	53.7%	126,154.0	55.6%	237,317.5	54.2%	235,705.4	55.3%	195,891.9
2007	36.8%	10,755.7	43.8%	53,066.8	48.6%	136,738.0	53.3%	216,145.3	54.0%	278,481.3	58.1%	224,988.1
2010	31.2%	8,502.4	32.6%	43,133.3	39.4%	110,443.0	46.1%	193,789.4	44.9%	201,402.6	54.0%	206,005.8
2013	28.3%	14,414.0	32.9%	46,122.0	36.2%	104,176.2	37.4%	167,832.7	43.5%	269,153.9	42.8%	168,772.7

Retirement and insurance assets

	<35		35-44		45-54		55-64		65-74		75+	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	38.5%	8,424.3	67.3%	37,346.0	67.3%	62,562.2	61.8%	68,045.2	52.4%	34,156.3	32.5%	9,588.4
1992	44.6%	10,813.2	62.8%	30,470.7	66.6%	68,899.0	66.1%	79,980.3	55.2%	37,665.9	36.2%	9,314.8
1995	51.6%	18,909.9	64.4%	40,012.0	68.4%	95,457.3	64.6%	86,284.2	54.9%	59,349.7	41.9%	21,752.4
1998	48.2%	20,373.4	66.2%	61,874.2	68.0%	95,653.6	69.8%	133,270.3	61.4%	85,986.3	41.1%	29,304.2
2001	50.4%	21,740.2	67.6%	65,695.7	71.8%	129,530.7	68.8%	174,130.7	60.0%	118,071.6	45.7%	58,143.9
2004	44.4%	14,473.0	61.8%	53,297.7	64.4%	111,334.9	71.9%	184,931.2	57.4%	124,063.4	50.9%	52,430.1
2007	46.4%	14,159.8	62.4%	58,555.2	69.2%	125,379.9	72.6%	200,942.3	64.5%	170,956.4	48.9%	46,883.8
2010	45.1%	13,662.1	56.0%	51,255.1	64.9%	120,249.4	68.0%	200,300.9	60.4%	175,450.2	50.2%	69,739.2
2013	42.6%	12,697.7	58.9%	68,540.6	61.6%	106,218.0	66.2%	182,371.4	60.2%	231,755.1	48.9%	77,662.5

Note: All median and mean figures in 2013 USD. Holders represents the proportion of all households holding assets. All values are conditional on holding assets.

Table A1.21 Debt holdings by income group, USA 1989-2013

Total debt

Wave	<35			35-44			45-54		
	Holders	Median	Mean	Holders	Median	Mean	Holders	Median	Mean
1989	80.0%	20,642.5	57,530.6	88.6%	54,769.4	87,383.0	85.3%	43,381.7	75,333.0
1992	81.5%	16,930.0	54,082.6	86.3%	58,491.5	92,575.3	85.4%	44,356.1	86,689.9
1995	83.5%	22,874.5	56,718.6	87.0%	56,541.1	87,739.9	86.3%	59,197.4	100,974.5
1998	81.2%	27,375.3	65,008.6	87.6%	79,510.0	107,030.7	87.0%	68,617.1	111,635.5
2001	82.7%	32,830.4	72,658.9	88.6%	81,156.8	112,182.8	84.6%	71,018.7	118,071.1
2004	79.8%	41,926.8	98,258.1	88.6%	107,530.0	146,748.4	88.4%	102,350.8	159,740.5
2007	83.6%	40,577.8	113,109.9	86.2%	119,016.3	165,910.1	86.8%	107,709.8	166,970.9
2010	77.8%	42,792.8	95,924.2	86.0%	115,743.1	160,847.2	84.1%	98,596.0	177,666.4
2013	77.1%	31,000.0	82,506.0	84.8%	96,500.0	152,371.4	82.3%	100,000.0	150,544.3
Growth rate (percent)									
1989-2013	*-3.6*	*50.2*	*43.4*	*-4.3*	*50.2*	*43.4*	*-3.5*	*130.5*	*99.8*
1989-2007	*4.5*	*96.6*	*96.6*	*-2.7*	*96.6*	*96.6*	*1.8*	*148.3*	*121.6*
2007-13	*-7.8*	*-23.6*	*-27.1*	*-1.6*	*-23.6*	*-27.1*	*-5.2*	*-7.2*	*-9.8*

(Table A1.21continued)

Wave	55-64			65-74			75+		
	Holders	Median	Mean	Holders	Median	Mean	Holders	Median	Mean
1989	70.8%	17,171.9	57,230.0	49.6%	9,037.9	30,950.8	21.0%	5,332.3	22,383.2
1992	70.1%	31,033.0	68,511.5	51.4%	7,961.3	40,043.3	31.6%	3,818.2	28,881.9
1995	73.7%	31,875.5	77,872.4	53.4%	10,670.7	41,425.8	28.4%	2,884.0	17,519.8
1998	76.4%	49,175.6	98,241.5	51.4%	17,154.3	65,830.5	24.6%	11,436.2	39,781.4
2001	75.4%	45,174.6	98,553.5	56.8%	17,203.1	68,908.3	29.2%	6,566.1	36,669.1
2004	76.3%	57,957.7	140,255.3	58.8%	30,828.6	79,168.0	40.3%	18,990.4	65,105.0
2007	81.8%	67,637.2	147,954.7	65.5%	45,057.8	120,822.2	31.4%	14,596.3	50,359.7
2010	77.7%	82,520.6	149,505.5	65.2%	47,797.6	117,176.8	38.5%	32,150.9	76,554.7
2013	78.7%	63,400.0	131,883.6	66.4%	44,000.0	108,718.7	41.4%	20,000.0	57,457.6
Growth rate (percent)									
1989-2013	*11.2*	*269.2*	*130.4*	*33.9*	*386.8*	*251.3*	*97.1*	*275.1*	*156.7*
1989-2007	*15.5*	*293.9*	*158.5*	*32.1*	*398.5*	*290.4*	*49.5*	*173.7*	*125.0*
2007-13	*-3.8*	*-6.3*	*-10.9*	*1.4*	*-2.3*	*-10.0*	*31.8*	*37.0*	*14.1*

(Table A1.21continued)

Mortgages secured by primary residence

	<35		35-44		45-54		55-64		65-74		75+	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	34.8%	42,606.5	57.9%	63,613.3	58.3%	48,585.4	37.0%	35,190.4	21.8%	13,103.4	6.3%	10,757.7
1992	30.9%	39,163.1	55.5%	72,657.5	61.4%	63,371.2	40.9%	42,585.2	18.5%	19,770.4	8.6%	15,152.7
1995	33.0%	39,825.3	54.3%	69,477.3	61.8%	73,657.2	45.2%	52,360.5	24.7%	25,649.8	6.8%	8,741.4
1998	33.2%	43,985.7	58.7%	82,592.0	58.8%	80,423.7	49.3%	66,814.5	26.0%	36,885.7	11.5%	24,448.9
2001	35.7%	51,583.0	59.6%	87,659.2	59.8%	93,913.8	49.0%	68,467.1	32.0%	48,207.1	9.5%	22,119.0
2004	37.7%	74,203.4	62.8%	118,915.1	64.6%	121,670.5	51.0%	97,241.1	32.1%	51,765.6	18.7%	35,070.4

(Table A1.21 continued)

Mortgages secured by primary residence

2007	37.3%	83,444.9	59.5%	127,479.0	65.5%	129,045.6	55.3%	103,867.6	42.9%	86,024.3	13.9%	36,105.9
2010	34.0%	67,269.7	57.6%	127,832.7	60.4%	132,291.8	53.6%	108,881.8	40.5%	81,668.9	24.2%	53,412.7
2013	28.6%	52,727.7	53.5%	117,194.7	56.1%	114,436.1	48.9%	96,416.4	42.2%	82,985.9	19.9%	40,867.3

Mortgages secured by other real estate

	<35		35-44		45-54		55-64		65-74		75+	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	1.6%	1,398.5	7.0%	6,115.8	10.6%	7,685.7	7.4%	9,428.8	4.1%	3,500.1	0.7%	789.6
1992	3.0%	2,808.8	7.1%	6,231.5	9.4%	11,122.4	9.8%	12,997.4	3.1%	7,454.0	0.7%	7,253.1
1995	2.1%	1,659.3	5.0%	4,597.4	8.4%	9,939.3	8.4%	11,578.8	3.5%	5,717.5	1.0%	4,167.1
1998	1.8%	1,806.7	6.6%	7,329.7	6.6%	7,853.1	7.8%	10,970.3	5.2%	12,350.2	1.8%	5,238.5
2001	2.7%	3,003.3	4.9%	5,162.3	6.4%	6,239.3	7.7%	10,458.0	3.4%	9,625.0	2.0%	4,297.1
2004	1.9%	3,252.3	4.0%	7,233.2	6.3%	18,742.8	6.1%	20,087.0	3.2%	10,203.5	1.5%	3,951.3
2007	3.3%	5,364.3	6.5%	16,573.2	8.0%	15,704.3	7.8%	22,699.8	5.0%	17,597.9	0.6%	3,540.4
2010	2.9%	4,028.0	5.1%	8,300.7	7.7%	21,561.5	7.6%	18,629.4	5.0%	20,318.3	2.8%	9,375.2
2013	2.4%	3,898.1	5.0%	10,550.8	7.9%	15,688.1	7.8%	15,046.4	4.8%	11,729.3	2.7%	5,975.2

Instalment debt

	<35		35-44		45-54		55-64		65-74		75+	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	60.7%	10,920.4	67.5%	13,545.3	59.2%	12,758.4	38.5%	8,226.5	21.4%	4,123.3	9.8%	6,716.7
1992	61.7%	9,601.3	57.8%	9,196.2	49.9%	6,708.2	38.8%	7,222.3	22.9%	5,000.9	8.3%	2,664.3
1995	62.5%	11,146.8	59.8%	8,895.8	53.3%	10,976.4	34.8%	5,483.7	16.5%	3,695.2	8.8%	2,437.6
1998	60.0%	15,536.1	53.3%	11,787.2	51.4%	12,771.4	37.9%	10,633.1	20.2%	5,866.7	4.2%	2,153.1
2001	63.8%	14,105.7	57.1%	14,486.9	45.9%	11,088.6	39.7%	10,115.2	21.1%	4,678.7	9.5%	3,481.7
2004	59.4%	16,846.7	55.7%	14,461.4	50.2%	11,876.3	42.8%	13,050.6	27.5%	8,038.4	13.9%	19,233.3
2007	65.2%	20,189.3	56.3%	14,944.7	51.9%	14,555.2	44.6%	12,700.2	26.1%	7,432.5	7.0%	2,628.7
2010	61.9%	21,822.9	60.0%	18,161.7	49.9%	14,913.6	40.8%	12,276.3	30.4%	8,211.5	12.3%	8,057.9
2013	63.5%	23,713.1	58.2%	19,673.7	52.8%	14,270.8	43.3%	14,371.0	29.3%	6,685.1	15.7%	5,683.8

Credit card balances

	<35		35-44		45-54		55-64		65-74		75+	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	44.5%	1,899.5	50.5%	2,095.8	49.3%	2,246.6	32.9%	1,534.5	27.1%	1,252.0	10.1%	169.6
1992	51.8%	1,979.9	50.9%	2,605.6	49.0%	2,780.5	37.1%	1,863.4	32.1%	1,505.0	20.1%	1,980.8
1995	54.6%	2,831.2	55.9%	3,160.4	56.4%	3,633.3	43.2%	2,570.0	30.5%	1,596.9	17.5%	1,007.1
1998	50.7%	2,899.5	51.3%	3,920.6	52.5%	3,634.4	45.6%	4,302.3	29.2%	3,138.3	11.2%	1,658.4
2001	49.6%	3,170.1	54.1%	3,464.4	50.4%	3,295.7	41.6%	2,942.2	30.0%	3,535.3	18.4%	1,564.7
2004	47.5%	2,712.7	58.8%	4,268.9	54.0%	4,693.4	42.1%	3,858.2	31.9%	3,584.2	23.5%	3,095.1
2007	48.5%	3,351.3	51.7%	5,094.8	53.6%	5,766.9	49.9%	6,002.6	37.0%	5,364.4	18.8%	2,622.0
2010	38.7%	2,277.2	45.7%	4,861.8	46.2%	5,263.0	41.4%	4,224.8	31.9%	3,162.4	21.7%	2,743.4
2013	36.8%	1,626.6	41.7%	3,010.4	44.3%	3,167.3	43.4%	3,718.7	32.8%	3,259.6	21.1%	3,275.6

(Table A1.21 continued)

Other unsecured lines of credit

	<35		35-44		45-54		55-64		65-74		75+	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	4.4%	199.5	4.7%	810.8	4.0%	1,423.8	1.5%	473.2	0.7%	6,911.0	0.1%	764.3
1992	2.8%	133.1	3.3%	125.1	2.7%	841.0	1.6%	1,391.8	1.0%	1,693.6	1.1%	661.1
1995	2.7%	325.1	2.1%	157.7	2.2%	693.7	1.7%	458.2	1.3%	907.9	0.0%	317.0
1998	2.4%	142.2	3.6%	267.4	3.6%	415.7	1.6%	313.9	0.3%	720.5	0.0%	26.1
2001	1.7%	125.1	1.7%	124.7	1.5%	372.2	3.1%	1,722.7	0.2%	1,119.2	0.4%	308.6
2004	2.2%	657.1	1.5%	357.2	2.9%	986.8	0.7%	1,352.5	0.4%	2,213.3	0.1%	1,007.1
2007	2.1%	148.2	2.2%	582.9	1.9%	448.4	1.2%	370.3	1.5%	2,336.4	0.8%	1,470.9
2010	1.8%	212.0	2.2%	435.0	2.7%	1,451.3	3.0%	2,908.3	1.2%	2,937.0	0.5%	1,930.8
2013	2.1%	125.8	2.6%	544.6	1.7%	1,423.7	1.7%	1,036.7	2.1%	1,333.6	0.7%	1,349.9

Other debt

	<35		35-44		45-54		55-64		65-74		75+	
	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean	Holders	Mean
1989	6.1%	506.3	8.5%	1,202.1	9.4%	2,633.2	8.1%	2,376.6	3.3%	2,061.1	1.9%	2,804.6
1992	6.4%	396.4	11.5%	1,759.4	10.4%	1,866.6	9.6%	2,451.3	6.0%	4,619.4	4.4%	1,169.7
1995	7.4%	931.0	10.5%	1,451.2	13.0%	2,074.7	7.8%	5,421.1	5.4%	3,858.5	2.9%	849.6
1998	9.6%	638.3	11.4%	1,133.8	11.1%	6,537.2	8.3%	5,207.4	4.1%	6,869.1	2.0%	6,256.4
2001	8.8%	671.6	8.0%	1,285.3	7.4%	3,161.5	7.4%	4,848.3	5.0%	1,742.9	3.6%	4,898.0
2004	6.2%	586.0	11.3%	1,512.5	9.4%	1,770.7	8.4%	4,665.9	4.0%	3,362.9	2.5%	2,747.9
2007	5.9%	611.8	7.5%	1,235.4	9.8%	1,450.5	8.7%	2,314.2	4.4%	2,066.8	1.3%	3,991.9
2010	5.5%	314.3	8.6%	1,255.4	9.7%	2,185.2	6.7%	2,584.9	2.3%	878.9	2.0%	1,034.8
2013	5.7%	414.6	7.7%	1,397.2	9.7%	1,558.2	7.7%	1,294.4	4.2%	2,725.2	2.0%	305.7

Note: All median and mean figures in 2013 USD. Holders represents the proportion of all households holding debt. All values are conditional on holding debt.

Table A1.22 Mean of income sources by age group, USA 1989-2013

	Wages						Business and farm income					
	<35	35-44	45-54	55-64	65-74	75+	<35	35-44	45-54	55-64	65-74	75+
1989	46,592.0	76,044.0	77,914.2	49,520.1	11,286.6	4,823.9	1,900.9	10,726.0	13,088.5	10,459.8	8,009.4	12,968.3
1992	46,942.4	64,927.0	76,339.2	58,078.5	10,753.1	2,050.5	3,408.9	18,193.9	12,567.6	13,645.2	7,509.0	4,081.6
1995	46,272.6	67,067.0	83,053.1	55,640.8	19,649.8	2,157.4	1,316.6	8,010.2	17,669.8	10,886.1	9,303.5	5,594.9
1998	48,303.1	73,628.1	81,365.0	65,249.0	18,957.1	2,062.2	3,165.7	10,555.9	14,613.8	22,298.6	9,705.4	2,911.8
2001	53,320.5	85,125.4	95,206.2	74,964.3	19,318.6	6,006.0	2,341.2	8,760.6	16,626.0	20,871.7	13,523.8	4,337.0
2004	50,809.6	76,747.6	90,728.0	79,217.4	20,050.1	4,398.1	2,511.8	8,172.0	15,274.4	18,175.9	9,907.3	3,909.5
2007	51,899.3	74,045.5	91,293.9	75,501.3	25,437.4	2,633.9	3,844.5	11,421.0	19,242.6	21,066.2	15,667.7	7,558.0
2010	45,345.9	72,607.7	83,547.3	71,736.2	27,249.4	3,733.2	3,018.6	8,615.9	17,330.5	18,018.3	11,499.0	5,030.3
2013	42,361.8	79,704.0	77,442.4	64,062.3	29,758.2	3,348.7	2,723.3	14,897.4	14,010.8	16,503.8	12,775.5	5,531.0

(Table A1.22 continued)

	Interest and dividend income						Capital gains/losses					
	<35	35-44	45-54	55-64	65-74	75+	<35	35-44	45-54	55-64	65-74	75+
1989	534.7	2,164.8	4,218.4	7,650.9	10,524.6	14,262.1	1,641.9	1,223.3	9,102.2	7,056.2	6,199.5	3,467.3
1992	588.9	1,864.2	3,971.6	7,250.8	7,247.3	9,887.8	277.1	1,244.4	3,099.9	2,680.7	1,145.7	818.0
1995	228.8	1,414.2	2,955.8	7,300.1	8,630.2	11,090.8	284.3	1,047.7	1,905.5	3,694.2	3,746.6	3,129.6
1998	390.2	1,715.7	3,171.3	5,043.4	8,284.2	6,610.7	1,016.7	2,426.1	2,905.1	8,086.2	7,613.9	3,649.8
2001	593.6	2,329.4	3,443.0	6,631.3	6,856.8	8,323.9	998.0	3,548.8	13,671.1	10,063.6	6,389.9	3,724.0
2004	216.3	1,314.8	2,683.4	6,331.8	5,401.1	5,734.6	183.4	2,488.8	4,189.7	5,243.3	1,745.8	2,992.1
2007	190.1	1,033.3	3,451.3	5,795.2	8,090.1	6,021.6	309.5	3,748.6	6,921.1	7,534.6	20,103.2	5,314.7
2010	164.7	1,005.7	2,580.1	5,361.0	5,568.7	5,848.9	118.1	991.2	41.3	3,254.7	1,143.0	1,253.0
2013	148.7	1,238.6	2,232.0	4,223.4	7,402.6	4,984.6	486.1	1,444.3	3,473.2	8,719.8	6,700.4	4,028.2

	Social security and retirement income						Transfer and other income					
	<35	35-44	45-54	55-64	65-74	75+	<35	35-44	45-54	55-64	65-74	75+
1989	262.3	877.3	2,265.7	8,183.1	22,469.6	18,676.8	2,031.1	2,571.6	4,232.5	3,026.6	971.2	4,852.5
1992	255.7	741.1	1,609.7	7,682.3	20,327.4	19,997.3	7,325.9	5,862.7	6,545.9	11,065.1	2,897.3	8,822.2
1995	274.7	744.2	2,630.6	8,613.2	20,899.8	20,486.7	1,813.6	2,211.1	2,047.8	1,768.1	1,434.7	352.8
1998	324.4	761.0	1,962.8	8,259.0	23,087.7	21,492.2	1,424.2	1,513.2	1,397.0	1,871.5	1,986.1	494.4
2001	250.7	703.8	1,887.8	8,379.6	26,519.2	24,024.1	1,264.5	1,644.2	1,405.7	1,902.2	1,651.6	738.6
2004	286.2	908.3	2,280.4	11,906.9	33,933.5	31,321.1	1,947.6	2,206.1	1,937.6	1,031.0	702.9	300.5
2007	200.6	1,226.4	2,325.6	11,420.2	32,369.9	26,952.3	1,987.2	2,370.0	1,759.3	2,476.3	1,034.6	404.0
2010	392.2	829.2	2,613.8	10,855.4	32,659.8	32,237.7	2,919.2	3,223.7	3,160.5	3,400.7	1,502.2	717.2
2013	357.3	1,105.9	3,226.1	11,684.6	36,732.2	31,746.0	3,145.8	3,170.7	3,350.5	3,819.3	3,445.7	561.0

Note: All figures in 2013 USD.

Table A1.23 Mean debt payments by age group, USA 1989-2013

	Mortgages						Consumer debt						Revolving debt					
	<35	35-44	45-54	55-64	65-74	75+	<35	35-44	45-54	55-64	65-74	75+	<35	35-44	45-54	55-64	65-74	75+
1989	5,074.4	9,214.5	8,278.4	4,827.3	1,652.0	505.0	3,438.5	4,743.2	4,255.3	2,585.3	1,457.7	455.8	582.0	819.2	838.1	390.8	306.2	35.3
1992	4,633.2	9,734.7	9,973.6	6,452.2	2,367.9	884.3	3,147.7	3,252.5	2,900.6	2,418.7	1,074.0	390.0	547.4	772.6	846.2	509.0	289.7	241.4
1995	4,302.8	8,601.6	10,580.4	7,097.0	2,756.8	616.4	3,344.4	3,315.0	3,551.0	1,991.8	969.3	317.6	804.7	866.9	1,119.7	637.4	357.4	93.4
1998	4,656.4	10,157.5	11,173.2	9,789.7	3,795.0	1,264.8	3,452.1	3,862.9	4,074.3	2,863.0	1,654.5	311.7	785.5	1,126.8	1,124.1	1,080.8	524.2	122.2
2001	5,432.1	10,286.2	11,185.9	8,592.2	5,031.8	1,126.7	3,748.1	4,073.0	3,570.8	2,751.3	1,197.4	512.6	832.7	943.2	958.3	1,131.5	686.0	144.0
2004	5,954.8	11,642.9	12,689.9	9,802.2	3,939.6	1,727.6	3,271.5	3,797.7	3,831.0	3,592.1	1,727.4	873.2	705.4	1,208.6	1,408.8	970.5	745.4	1,145.1
2007	6,983.9	12,350.6	13,700.2	11,231.2	7,088.5	1,532.3	3,599.2	3,722.9	3,717.3	3,005.6	1,701.4	441.1	886.9	1,415.4	1,561.5	1,525.6	1,208.3	290.0
2010	5,293.1	10,847.2	12,812.2	10,314.6	6,708.2	2,215.0	2,822.0	3,792.8	3,300.0	2,642.0	1,694.9	725.0	576.9	1,321.7	1,564.8	1,231.8	767.0	400.4
2013	3,915.3	9,625.2	10,312.8	8,656.2	6,235.3	1,776.6	2,920.8	3,432.3	3,098.1	2,623.9	1,618.6	814.9	427.9	846.7	993.1	950.6	854.4	472.5

Note: All figures in 2013 USD. Values given for all households.

Appendix II

Stock-flow consistent model in Chapter 3

Table A2.1 Exogenous parameter values in the stock-flow consistent model

Parameter		**Value**	**Source**
s_w	Wage share of output	0.57	AMECO Database, USA 2014
r_{cb}	Federal funds rate	0.0025	Federal Reserve, USA Dec 2008–Dec 2015
α_1	Premium on the central bank interest rate	0.0075	Interest rate on deposits in Dafermos/Papatheodorou 2015
α_2	Premium on the deposit interest rate	0.02	World Bank, USA 2014
c_1	Propensity to consume out of income of the working class	0.9	
c_3	Propensity to consume out of income of the middle class	0.75	
c_4	Propensity to consume out of wealth	0.1	
c_5	Propensity to consume out of income of the rentier class	0.6	
g_k	Growth rate of capital	0.025	
s_f	Profit retention rate of firms	0.32	Dividend payout ratio for S&P500 companies, 2014 (Factset)
β	Parameter in the loan function pf the middle class and rentiers	0.1	Setterfield/Kim 2013
β_w	Parameter in the loan function of the working class	0.05	
x	Proportion of investment financed by equity issuance	0.045	Dafermos/Papatheodorou 2015
$\lambda_{10}= \lambda_{20}=\lambda_{30}$	Parameters in the rentier portfolio equation	0.3333	Own calculations (cf. Godley/Lavoie 2005)
$\lambda_{11}= \lambda_{12}= \lambda_{21}$		0.1	
$\lambda_{13}= \lambda_{31}$		0.2	
λ_{14}		0.1	
λ_{15}		0.1	
λ_{22}		0.2	
$\lambda_{23}= \lambda_{32}$		0.1	
λ_{24}		0.1	
λ_{25}		0.1	
λ_{33}		0.1	
λ_{34}		0.2	
λ_{35}		0.2	

η	Emulation parameter	0.29	Setterfield/Kim 2013
π_0	Parameters in the risk premium function	0.03	Sawyer/Passarella 2015
π_1		0.8	
π_2	Parameters in the mortgage spread equation	0.1	
π_3		0.002	
s_0	Parameter in the securitisation function	0.6	FRB and SIFMA, USA 2006
$spread_{MBS}$	MBS spread	0.0121	Bloomberg, USA 2005-2006
h_1	Parameters in the housing functions	0.5	
h_3		0.5	
θ_{10}	Parameters in the price of MBS function	0.3	
θ_{11}		0.1	
m_w	Parameter in the wage premium function	1.6	
ρ	Parameter in the wage premium function	0.3	Dafermos/Papatheodorou 2015
h	Parameter in the wage premium function	$0.2/\rho + 0.3$	

Table A2.2 Initial values for endogenous variables

Variable		**Value**	**Additional information**
N_w	Number of working class households	128	US Census Bureau, millions, USA 2014
N_m	Number of middle class households	160	
N_r	Number of rentier households	32	
Y	Output	17000	BEA NIPA Data, bn USD, USA 2014
Capital-output ratio		3	BEA NIPA Data, USA 2014
u	Capacity utilisation rate	0.78	Federal Reserve, USA 2014
E	Value of equities outstanding	14000	Fed Z.1 Tables, bn USD, USA 2014
H_m	Housing demand by the middle class	1000	
H_r	Housing demand by the rentier class	1500	
H	Housing supply by firms	2500	
HU	Stock on unsold houses	0	
SH	Shares of institutional investors	6600	Fed Z.1 Tables, bn USD, USA 2014
p_e	Price of equity	1	
p_h	Price of housing	1	
p_{MBS}	Price of MBS	1	
r_{lm}	Interest rate on mortgages	0.06	Freddie Mac Data, 30-year fixed-rate mortgage annual average 2000-2008
γ	Parameter in the housing rent function	0.3	Zezza 2008

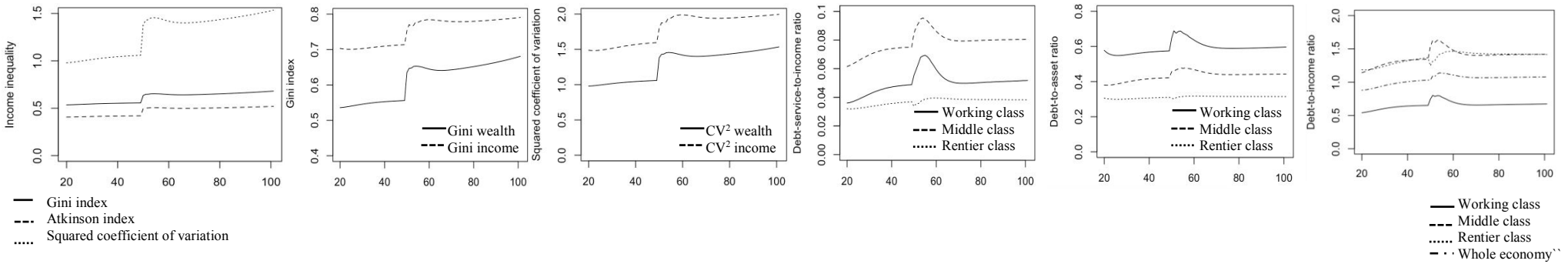
Table A2.3 Sensitivity analysis – key parameter values

Parameter		**Baseline value**	**Sensitivity analysis value**
s_w	Wage share of output	0.57	0.5
m_w	Parameter in the wage premium function	1.6	1.8
ρ	Parameter in the wage premium function	0.3	0.2
r_{cb}	Federal funds rate	0.0025	0.005
α_1	Premium on the central bank interest rate	0.0075	0.01
α_2	Premium on the deposit interest rate	0.02	0.04
$h_1=h_2$	Parameters in the housing functions	0.5	0.1
θ_{10}	Parameter in the price of MBS function	0.3	0.1
s_0	Parameter in the securitisation function	0.6	0.4
π_0	Parameter in the risk premium function	0.03	0.04
c_4	Propensity to consume out of wealth	0.1	0.05
c_1	Propensity to consume out of income of the working class	0.9	0.95
c_3	Propensity to consume out of income of the middle class	0.75	0.8
c_5	Propensity to consume out of income of the rentier class	0.6	0.5
λ_{30}	Parameters in the rentier portfolio equation	0.333	0.222
λ_{10}		0.333	0.444
s_f	Profit retention rate of firms	0.32	0.5
β	Parameter in the loan function of the middle class and rentiers	0.1	0.05
β_w	Parameter in the loan function of the working class	0.05	0.025

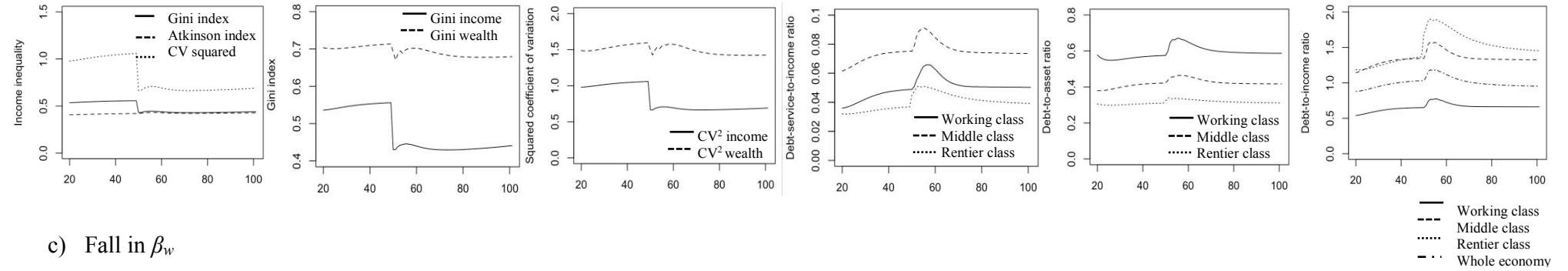
Note: The adding-up constraint requires that $\lambda_{10} + \lambda_{20} + \lambda_{30} = 1$. Therefore, change in the value of λ_{20} and λ_{30} in the univariate sensitivity analysis forces a change in the value of λ_{10} and λ_{30} as well as λ_{10} and λ_{20} respectively to 0.25. In the multivariate sensitivity analysis, only the value of λ_{30} is increased to 0.5.

Figure A2.1 Univariate sensitivity analysis results

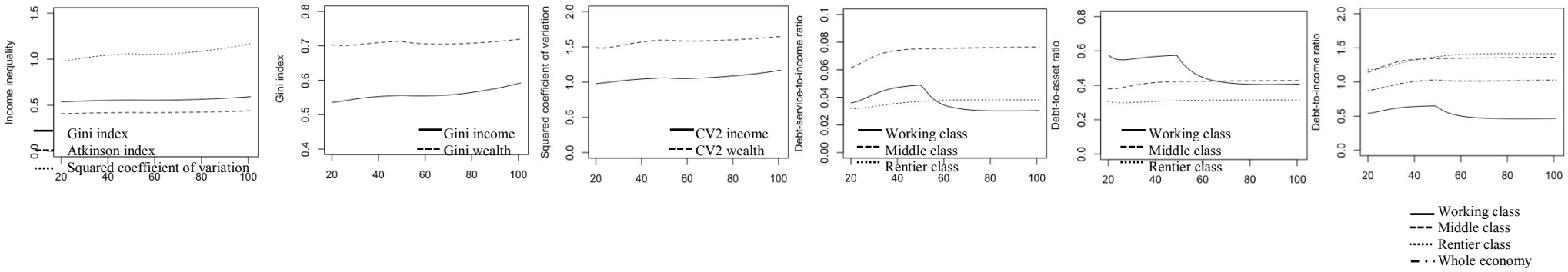
a) Fall in s_w



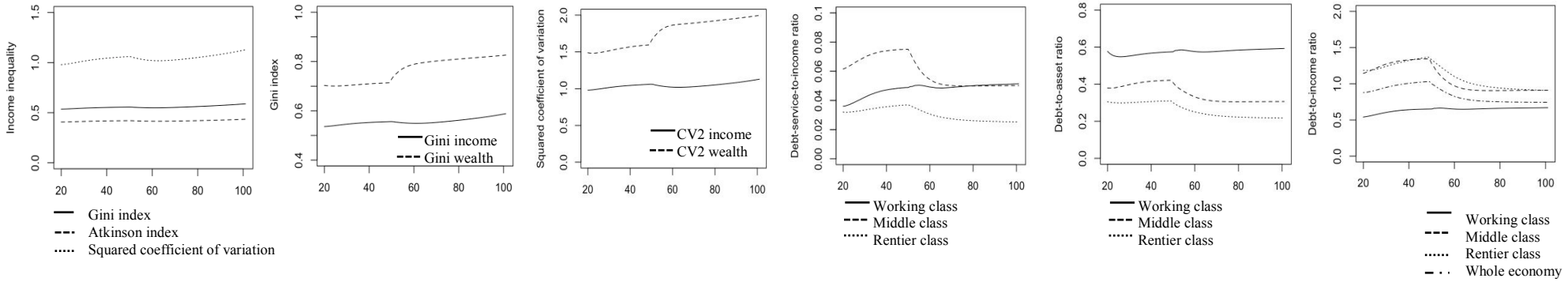
b) Rise in s_f



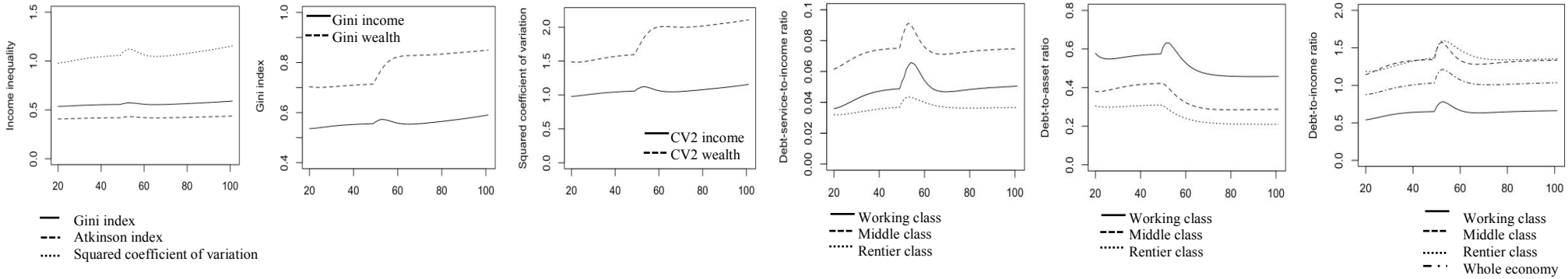
c) Fall in β_w



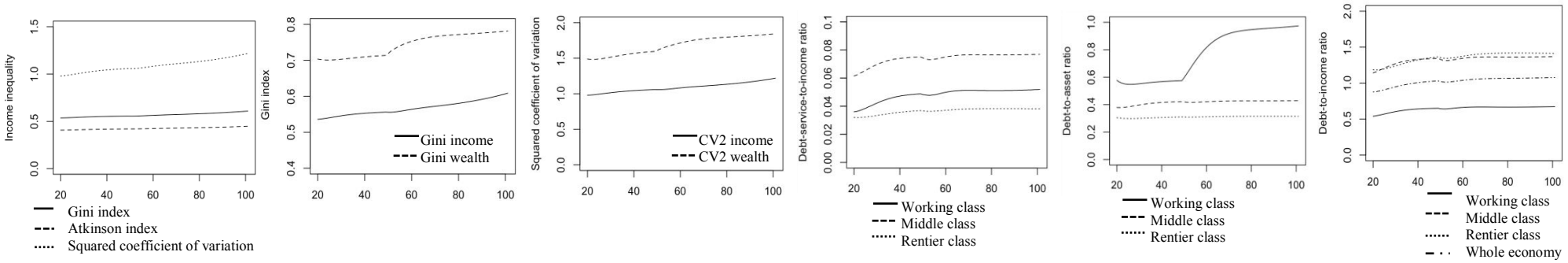
d) Fall in β



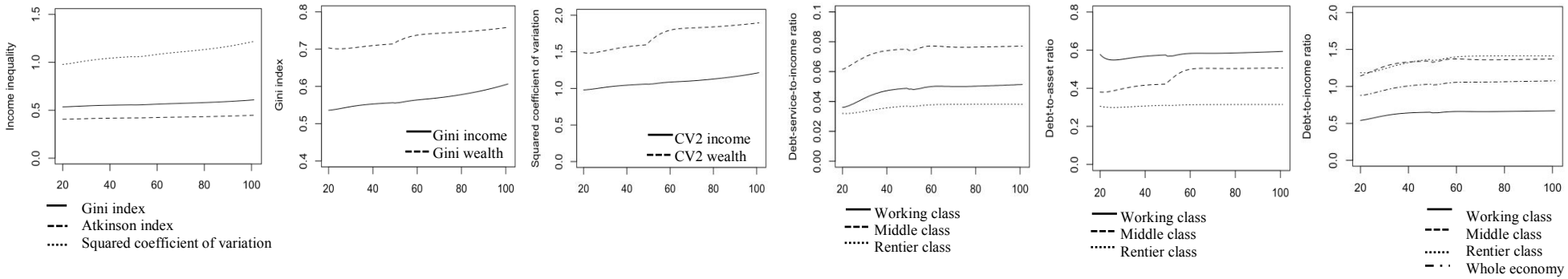
e) Fall in c_4



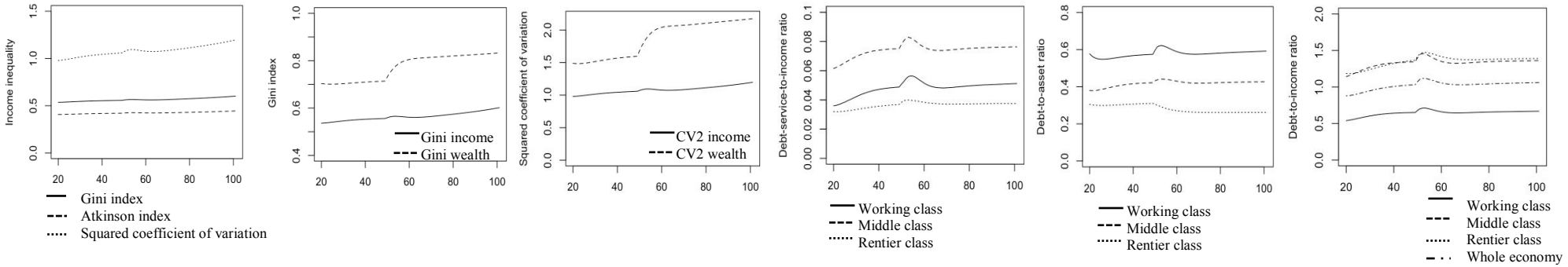
f) Rise in c_1



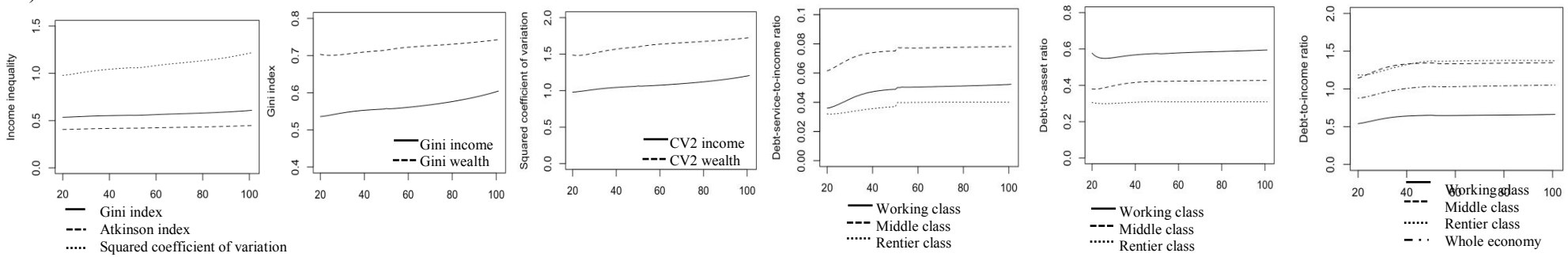
g) Rise in c_3



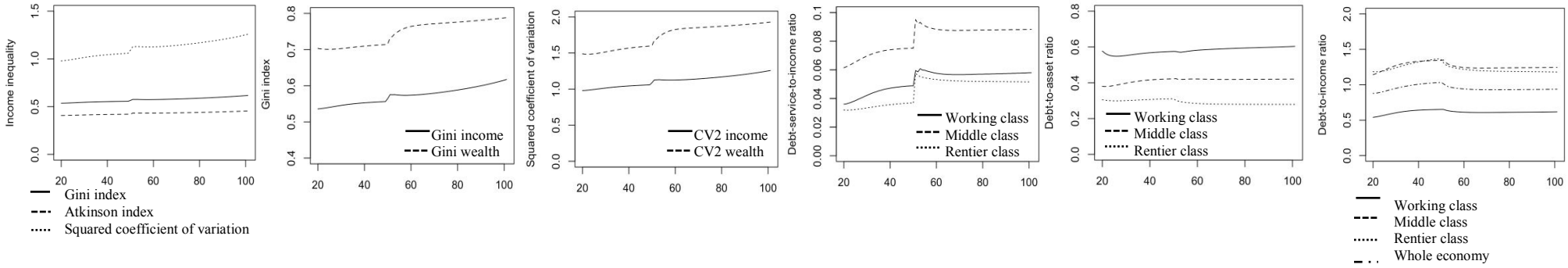
h) Fall in c_5



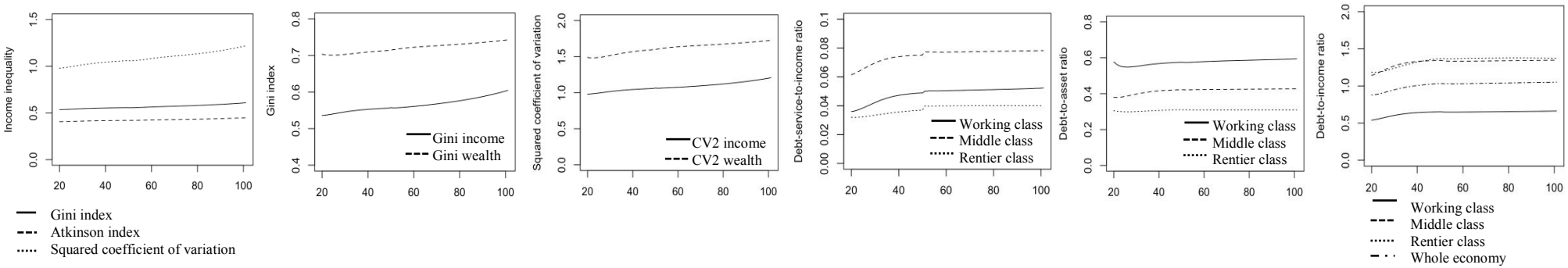
i) Rise in α_1



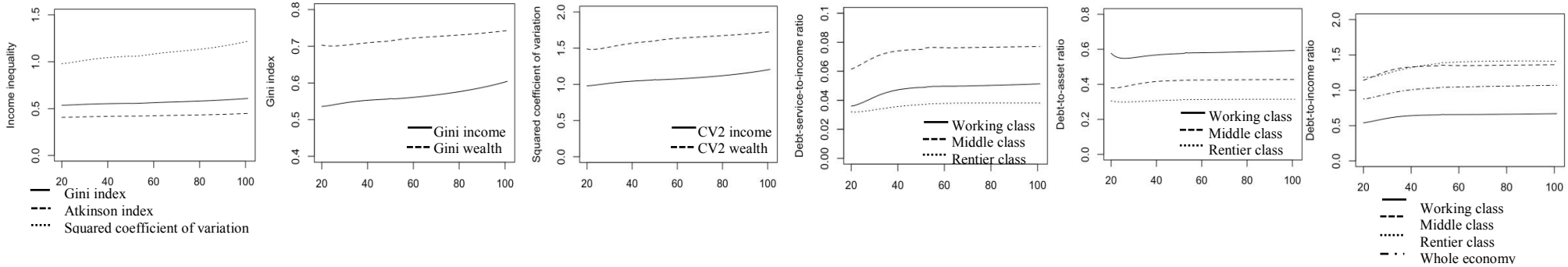
j) Rise in α_2



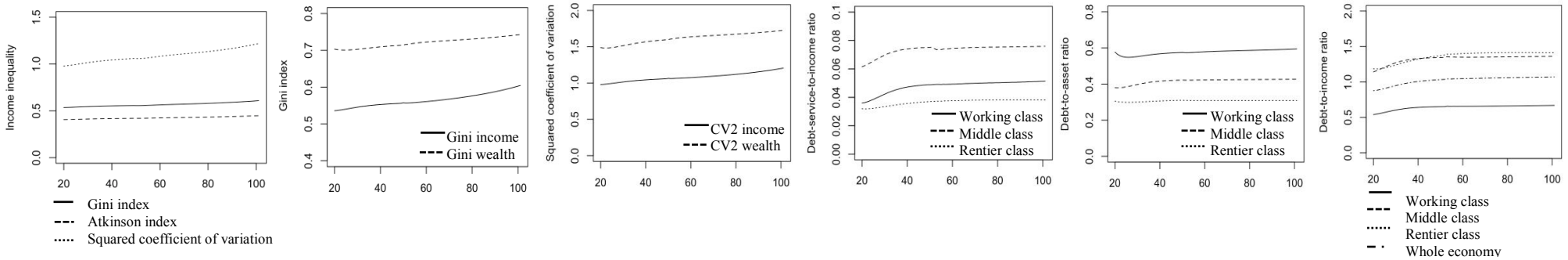
k) Rise in r_{cb}



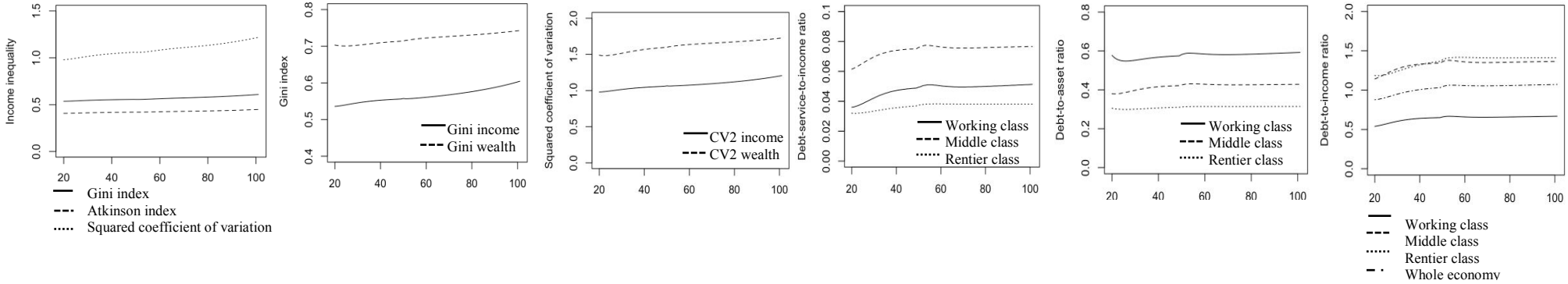
l) Fall in s_0



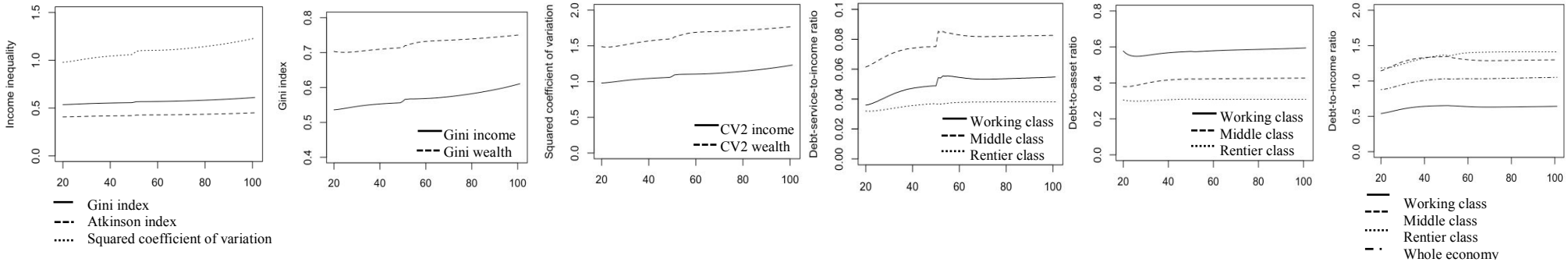
m) Fall in θ_{10}



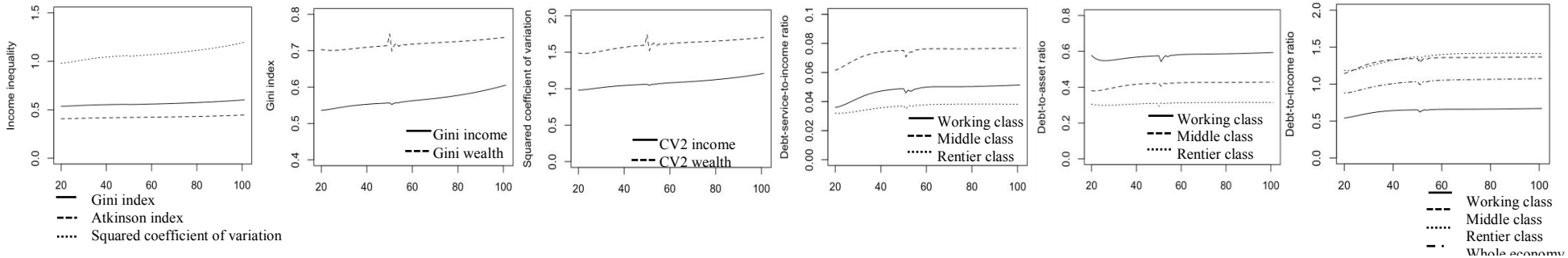
n) Fall in h_1 // Fall in h_2



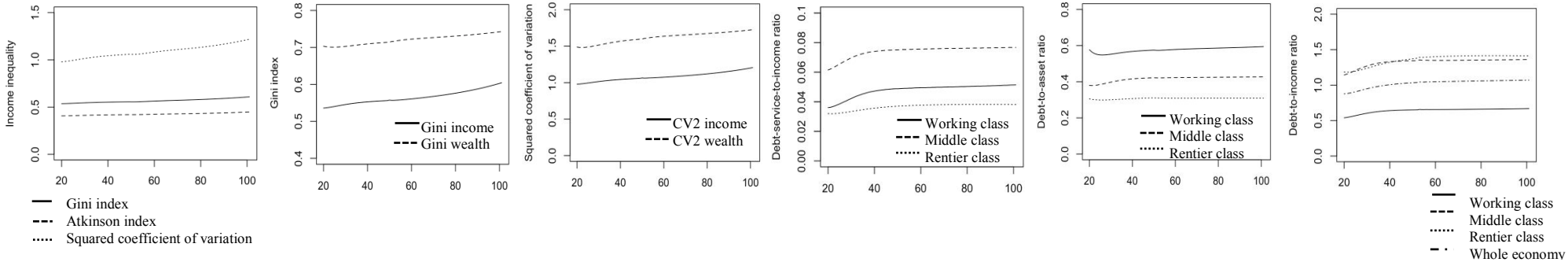
o) Rise in π_0



p) Fall in λ_{30} and rise in λ_{10}



q) Rise in m_w // Fall in ρ



r) Rise in η

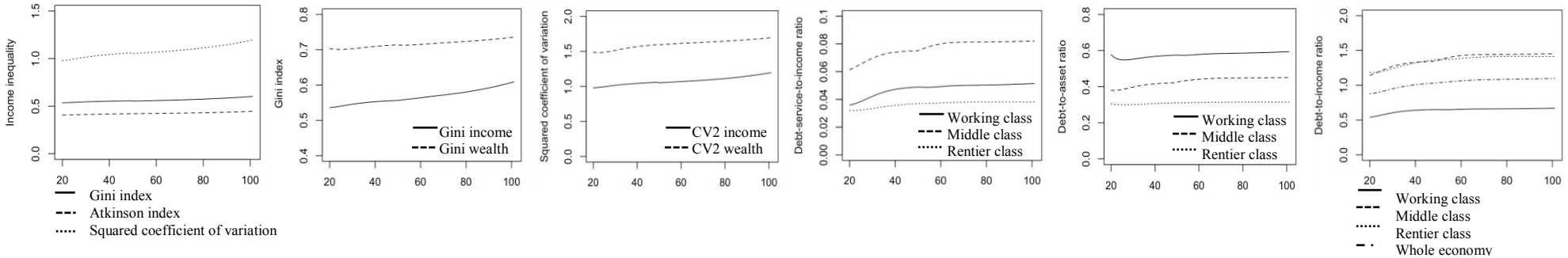
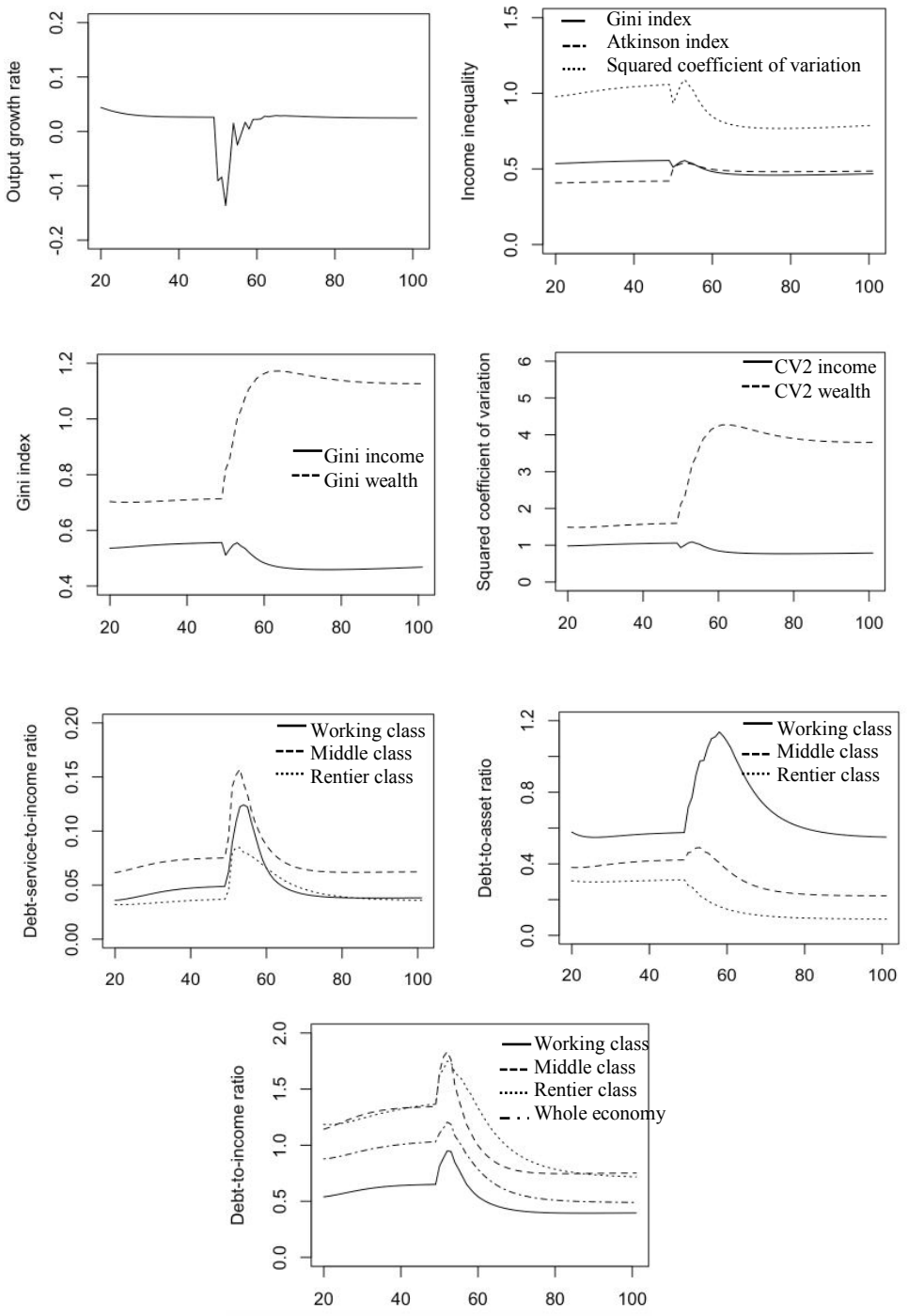


Figure A2.2 Multivariate sensitivity test



Appendix III

Empirical analysis in Chapter 4

Appendix to Section 4.3.1. Methodology

(source for all tables: own calculations based on the U.S. Survey of Consumer Finances)

Table A3.1 Descriptive statistics of the linear regression model variables

Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum
Median income ratio	38,078	165.99	633.437	0	790361.6
Age	41,523	49.40	17.300	17	95
Education	41,484	13.126	2.936	1	17
Female	41,528	0.279	0.448	0	1
Black or Hispanic	41,528	0.217	0.412	0	1
Single	41,528	0.417	0.493	0	1
Self-employed	41,528	0.109	0.312	0	1
Out of labour force	41,528	0.270	0.444	0	1
Number of children	41,528	0.835	1.159	0	10
Financial assets/Assets	35,205	31.180	30.785	-254.9	8839.2
Primary residence/Assets	35,205	39.826	34.640	-1111.8	2162.2
Vehicles and other/Assets	35,204	20.610	29.497	-222.9	213.7
Business Equity/Assets	35,204	3.617	13.561	-400.1	4331.5
Liquid assets/Assets	35,205	10.024	20.666	-28.6	129
Financial investment/Assets	35,205	8.523	17.773	-110.5	8308.5
Retirement accounts/Assets	35,205	12.633	19.954	-158.7	831.9
Unsecured debt/Debt	28,146	45.138	43.733	0	100
Secured Debt/Debt	28,146	51.997	44.153	0	100
Secured by primary residence/Debt	28,146	48.776	43.705	0	100
Secured by other real estate/Debt	28,147	3.221	14.533	0	100
Instalment Debt/Debt	28,147	29.524	38.705	0	100
Credit Card Balances/Debt	28,147	14.945	30.552	0	100
Debt-service-to-income ratio (DSY)	38,280	0.198	1.875	0	2152.6
DSY>40%	41,316	0.092	0.289	0	1

Note: Shares of balance sheet variables in total assets or total debt are calculated only for respondents with positive values of assets and debt. Balance sheet shares and the income median ratio are given in percentage terms.

Table A3.2 Correlation matrix

	Median income ratio	Age	Education	Female	Black/Hispanic	Single	Self-employed	Out of labour force
Median income ratio	1.000							
Age	0.0660	1.000						
Education	0.0891	-0.0024	1.000					
Female	-0.0522	-0.0002	-0.0928	1.000				
Black/Hispanic	-0.0459	-0.1166	-0.2372	0.1680	1.000			
Single	-0.0547	-0.0572	-0.0804	0.7053	0.1457	1.000		
Self-employed	0.1108	0.1303	0.2006	-0.1859	-0.1490	-0.1721	1.000	
Out of labour force	-0.0225	0.4321	-0.1756	0.1234	0.0102	0.1087	-0.2396	1.000
Number of children	0.0079	-0.2759	-0.0265	-0.1013	0.0841	-0.2428	0.019	-0.222
Financial assets/Assets	0.0254	0.0540	0.1567	0.0312	-0.0380	0.0506	-0.0689	0.0356
Primary residence/Assets	-0.0859	0.0765	-0.1248	0.0005	0.0010	-0.0600	-0.1667	0.0547
Vehicles and other/Assets	-0.0633	-0.3343	-0.2471	0.1401	0.1902	0.1751	-0.2270	-0.0227
Business Equity/assets	0.1351	0.0897	0.1373	-0.1426	-0.1152	-0.1357	0.4729	-0.1104
Liquid assets/Assets	-0.0230	-0.1188	-0.0178	0.1268	0.0918	0.1693	-0.0971	0.0539
Financial investment/Assets	0.0776	0.1138	0.1352	-0.0247	-0.0913	-0.0197	0.0509	0.0606
Retirement accounts/Assets	-0.0463	0.0310	0.1133	-0.0058	-0.0120	-0.0102	-0.1267	-0.0635
Unsecured debt/debt	-0.0544	-0.1849	-0.2496	0.2048	0.1928	0.2465	-0.2079	0.0841
Secured Debt/Debt	0.0277	0.1477	0.2393	-0.1926	-0.1830	-0.2435	0.1853	-0.0977
Secured by primary residence	-0.0149	0.0812	0.1726	-0.1535	-0.1475	-0.2050	0.1069	-0.0957
Secured by other real estate	0.0898	0.1432	0.1466	-0.0875	-0.0797	-0.0878	0.1693	-0.0071
Instalment Debt/Debt	-0.0443	-0.2519	-0.1821	0.1197	0.1543	0.1567	-0.1666	0.0077
Credit Card Balances/Debt	-0.0400	0.0369	-0.1483	0.1611	0.0967	0.1721	-0.1137	0.1183
Debt-service-to-income ratio (DSY)	-0.0045	0.0107	0.0116	-0.0101	-0.0066	-0.0102	0.0310	0.0043
DSY>40%	-0.0370	0.0003	-0.0552	0.0551	0.0407	0.0590	0.0522	0.0272

(Table A3.2 continued)

	Number of children	Financial assets/Assets	Primary residence /Assets	Vehicles and other /Assets	Business Equity/Assets	Liquid assets/Assets	Financial investment /Assets	Retirement accounts/Assets
Number of children	1.000							
Financial assets/Assets	-0.0986	1.000						
Primary residence/Assets	0.0892	-0.2383	1.000					
Vehicles and other/Assets	0.0153	-0.1752	-0.3716	1.000				
Business Equity/assets	0.0390	0.1470	-0.1901	-0.1938	1.000			
Liquid assets/Assets	-0.0815	0.3538	-0.2563	0.0027	-0.1089	1.000		
Financial investment/Assets	-0.0514	0.7581	-0.0563	-0.1168	0.3157	-0.0346	1.000	
Retirement accounts/Assets	-0.0466	0.5048	-0.164	-0.1629	-0.0943	-0.0751	0.0067	1.000
Unsecured debt/debt	-0.0920	0.1011	-0.4052	0.5537	-0.1249	0.2753	-0.0398	0.0301
Secured Debt/Debt	0.1072	-0.1408	0.4543	-0.5453	0.0998	-0.2738	-0.0031	-0.0440
Secured by primary residence	0.1296	-0.1400	0.5498	-0.4743	0.0400	-0.2478	-0.0321	-0.0211
Secured by other real estate	-0.0434	-0.0060	-0.1854	-0.1650	0.1279	-0.0627	0.0604	-0.0491
Instalment Debt/Debt	-0.0264	0.0285	-0.3269	0.5260	-0.1021	0.1576	-0.0525	0.0051
Credit Card Balances/Debt	-0.0976	0.1122	-0.1581	0.1501	-0.0778	0.2127	-0.0020	0.0457
DSY ratio	0.0000	-0.0084	-0.0139	-0.0148	0.0312	-0.0116	0.0061	-0.0155
DSY>40%	0.0194	-0.1480	0.1791	-0.0720	0.0127	-0.0918	-0.0543	-0.1275

	Unsecured debt/debt	Secured Debt/Debt	Secured by other real estate	Instalment Debt/Debt	Credit Card Balances/Debt	DSY ratio	DSY>40%
Unsecured debt/debt	1.000						
Secured Debt/Debt	-0.9258	1.000					
Secured by primary residence	-0.8186	0.8870					
Secured by other real estate	-0.2523	0.2666	1.000				
Instalment Debt/Debt	0.7463	-0.6900	-0.1923	1.000			
Credit Card Balances/Debt	0.5033	-0.4666	-0.1277	-0.1646	1.000		
DSY ratio	0.0014	-0.0031	0.0174	0.0007	-0.0138	1.000	
DSY>40%	-0.1162	0.1310	0.0446	-0.0682	-0.0872	0.0846	1.000

Note: Shares of balance sheet variables in total assets or total debt are calculated only for respondents with positive values of assets and debt.

Appendix to Section 4.3.3. Detailed non-parametric sensitivity analysis by subgroup

Table A3.3 Theil-Sen median slope by subgroups

Median income ratio	Gender		Race		Generations		Subperiod		
	Male	Female	White/Other	Black/Hispanic	Aged ≥ 35	Aged < 35	1989-1998	2001-2007	2010-2013
Socio-economic controls									
Age	0.26	-0.10	-0.36	-0.01	-1.39	5.80	-0.20	-0.10	0.04
Age squared	0.00	0.00	0.00	0.00	-0.01	0.11	0.00	0.00	0.00
Educational attainment	16.60	7.87	15.78	7.14	16.02	8.79	12.89	*15.23*	*15.21*
Female	*(omitted)*		-70.62	-37.91	-72.92	-48.07	*-66.71*	*-66.26*	-60.64
Black/Hispanic	-46.38	-14.12	*(omitted)*		-42.47	-31.86	-43.97	-38.75	-39.98
Single	-65.30	-33.36	-82.34	-45.76	-83.99	-55.58	*-75.81*	*-76.47*	*-77.72*
Number of children	15.18	0.09	21.65	5.17	19.24	3.32	14.77	12.68	11.59
Number of children squared	5.71	0.03	9.07	1.64	7.81	1.13	5.77	4.92	4.45
Self-employed	42.99	16.62	52.31	16.67	58.62	12.58	50.02	54.43	44.46
Out of labour force	-55.61	-28.70	-63.16	-37.32	-69.36	-48.91	-58.93	-54.62	-46.71
Share of total assets									
Primary residence	0.22	0.10	0.16	0.23	-0.05	0.73	*0.23*	*0.22*	0.26
Other property	2.98	1.05	2.95	1.99	2.95	1.47	2.46	3.33	3.46
Vehicles and other non-financial assets	-1.11	0.03	-0.68	-0.05	*-0.46*	*-0.47*	-0.33	-0.56	-0.59
Business equity	2.49	1.88	2.91	2.40	3.48	1.15	2.44	3.55	3.59
Financial investment assets	3.62	0.79	2.06	3.97	2.70	1.96	2.08	2.99	3.83
Transaction accounts	0.66	0.07	0.04	0.29	0.42	0.04	0.26	0.13	0.18
Retirement and insurance assets	2.99	1.36	3.00	1.58	2.86	2.55	*2.86*	*2.88*	*2.88*
Share of total debt									
Debt secured by primary residence	0.75	0.38	0.75	0.49	0.67	0.76	0.79	0.72	0.68
Debt secured by other property	2.41	0.97	2.39	1.79	2.35	1.46	2.14	*2.56*	*2.58*
Instalment debt	-0.56	-0.16	-0.48	-0.21	-0.31	-0.48	-0.46	-0.37	-0.47
Credit card balances	-0.50	-0.04	-0.59	0.11	-0.56	0.02	-0.37	-0.53	-0.21
Other unsecured lines of credit	1.55	0.37	1.23	0.59	2.10	0.32	2.37	0.26	0.80
Other debt	0.35	-0.05	0.34	0.09	0.46	-0.24	0.22	0.14	0.46
Leverage measures									
Debt-service-to-income ratio (DSY)	*74.90*	*73.97*	94.11	124.74	107.73	125.70	124.08	95.84	108.43
DSY > 40%	-44.79	-8.60	-39.29	-8.33	-36.49	-18.33	-33.35	-30.92	-29.40
Debt-to-asset ratio	19.30	14.51	28.61	27.72	54.22	8.43	41.52	24.13	14.14
Debt-to-income ratio	19.58	12.99	20.99	22.88	24.82	19.68	32.99	20.20	15.89

Note: Values in italics indicate overlapping confidence intervals across subgroups.

Appendix to Section 4.4.1. Detailed Shorrocks decomposition results

Table A3.4 Shorrocks decomposition for net wealth

	1989		1992		1995		1998		2001	
	Share of inequality	Mean share of income	Share of inequality	Mean share of income	Share of inequality	Mean share of income	Share of inequality	Mean share of income	Share of inequality	Mean share of income
Primary residence	4.74	36.39	3.62	37.87	3.89	34.74	3.65	33.08	5.43	30.83
Other property	21.99	14.96	32.99	15.96	9.07	11.60	6.53	11.36	10.98	10.51
Vehicles and other non-financial assets	2.36	6.29	1.03	5.86	2.70	6.79	1.33	5.65	1.47	4.95
Business equity	48.53	21.41	45.52	20.05	43.98	20.62	52.98	18.96	41.16	18.88
Transaction accounts	3.06	6.51	2.26	6.60	5.47	6.14	2.42	5.53	4.05	5.61
Financial investment assets	18.75	19.07	14.84	19.07	32.11	21.77	31.61	25.96	34.00	26.45
Retirement and insurance	2.29	9.33	1.95	11.69	4.51	15.23	3.64	16.35	4.47	16.50
Secured debt	-0.99	-10.63	-0.91	-13.99	-1.18	-13.66	-0.88	-13.28	-0.98	-11.21
Unsecured debt	-0.56	-3.01	-1.14	-2.72	-0.19	-2.78	-0.30	-2.94	-0.37	-2.20
Other debt	-0.17	-0.32	-0.16	-0.39	-0.36	-0.46	-0.96	-0.66	-0.20	-0.32

(Table A3.4 continued)

	2004		2007		2010		2013	
	Share of inequality	Mean share of income	Share of inequality	Mean share of income	Share of inequality	Mean share of income	Share of inequality	Mean share of income
Primary residence	6.06	38.36	5.51	37.22	5.28	35.73	4.34	32.19
Other property	16.17	13.09	6.99	12.86	10.59	13.34	6.55	11.55
Vehicles and other non-financial assets	3.32	5.07	1.36	4.23	1.58	4.73	2.29	4.52
Business equity	41.55	19.30	51.36	23.23	50.61	20.69	51.47	20.98
Transaction accounts	2.42	5.49	2.57	4.37	3.70	5.90	3.09	6.37
Financial investment assets	29.04	21.64	29.96	20.33	26.81	20.68	28.70	21.58
Retirement and insurance	3.25	14.84	3.62	15.19	4.01	18.78	4.25	19.94
Secured debt	-1.29	-14.88	-1.04	-14.78	-1.46	-16.66	-0.91	-14.18
Unsecured debt	-0.36	-2.63	-0.19	-2.47	-0.93	-2.98	0.29	-2.77
Other debt	-0.17	-0.28	-0.14	-0.18	-0.18	-0.20	-0.07	-0.18

Note: All values in percentages. Contribution of debt negative by definition.

Table A3.5 Shorrocks decomposition for income

	1989		1992		1995		1998		2001	
	Share of inequality	Mean share of income	Share of inequality	Mean share of income	Share of inequality	Mean share of income	Share of inequality	Mean share of income	Share of inequality	Mean share of income
Wage income	6.01	73.87	29.46	73.85	27.88	80.17	19.84	80.72	24.50	78.23
Business and farm income	58.73	11.98	38.24	13.22	27.72	13.11	26.95	14.08	30.25	13.17
Interest and dividend income	6.12	7.40	9.00	5.95	37.84	5.97	7.41	4.82	4.36	4.71
Capital gains	28.39	7.40	9.81	2.30	6.93	3.00	19.20	5.35	41.56	7.54
Social security and retirement	0.15	9.30	0.25	9.00	0.10	9.96	0.06	9.57	0.40	8.72
Transfer and other	0.91	4.01	16.41	9.94	0.54	2.79	26.71	2.13	0.25	1.77
Debt payments	-0.31	-13.97	-3.16	-14.26	-1.01	-15.00	-0.18	-16.67	-1.32	-14.14
Mortgages	-0.09	-8.33	-2.39	-9.56	-0.68	-9.69	-0.16	-10.92	-0.90	-9.39
Consumer debt	-0.03	-4.80	-0.43	-3.81	-0.26	-4.15	-0.02	-4.48	-0.33	-3.72
Revolving debt	-0.20	-0.84	-0.35	-0.89	-0.07	-1.16	0.00	-1.28	-0.09	-1.03

(Table A3.5 continued)

	2004		2007		2010		2013	
	Share of inequality	Mean share of income	Share of inequality	Mean share of income	Share of inequality	Mean share of income	Share of inequality	Mean share of income
Wage income	31.14	-9.39	19.92	75.57	32.35	78.78	22.09	71.17
Business and farm income	41.44	-3.72	36.91	16.25	36.78	15.15	34.55	14.84
Interest and dividend income	6.95	-1.03	7.22	4.26	10.17	4.12	7.62	3.88
Capital gains	19.20	-9.39	36.38	7.78	20.67	1.56	35.50	5.15
Social security and retirement	1.31	-3.72	0.51	11.15	0.29	13.88	0.59	14.70
Transfer and other	0.22	-1.03	0.06	2.30	0.75	3.79	0.44	4.04
Debt payments	-0.25	-9.39	-1.00	-17.31	-1.01	-17.28	-0.79	-13.78
Mortgages	-0.05	-11.35	-0.76	-12.03	-0.40	-12.04	-0.50	-9.37
Consumer debt	-0.06	-4.21	-0.17	-3.78	-0.53	-3.80	-0.21	-3.40
Revolving debt	-0.14	-1.35	-0.06	-1.50	-0.08	-1.44	-0.08	-1.01