

**An Alternative Framework of Central Banking from a Post Keynesian
Perspective**

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

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Abstract

This thesis investigates central banking theory and policy, by critically analysing, testing the existence mainstream approach and then provide an alternative framework for Central banking theory and policy from a post-Keynesian's perspective. My main contribution is to deliver a comprehensive understanding of the nature, roles, functions, and objectives of a modern central bank, to achieve economic stability and promote the well-being of our society.

Besides some theoretical chapters that provide a more in-depth understanding in central banking theories and policies, this thesis could mainly be divided into three main parts: the first part, investigating the role of central banking in the financialisation era, by discussing and analysing the impact of monetary policy on securitisation. Our finding indicates a weak role of the central bank as a bankers' bank, as banks' behaviour in term of increasing liquidity via securitisation is reducing the efficacy of central bank's intended policy. The second part investigates the crucial interrelationship between central banks and governments. I critically discuss the competing theories of monetary-fiscal policy relationship, and I apply a Stock-Flow Consistent modelling to provide an alternative framework in understanding the importance of monetary-fiscal policy interrelation within a post-Keynesian approach in order to achieve a sustainable financial and economic stability. The third part goes beyond the central bank role towards banks and the government, to critically shed the light and assess the role of a central bank as a social regulator. Investigating the relationship between central banking and inequality, and the role of policy rate of interest as a distributive macroeconomic variable within different economic paradigms, then applying a SFC modelling to provide an alternative fair rate of interest rule to reduce inequality and achieve sustainable economic growth.

Although other researchers have studied these issues, this study has the distinctive feature of providing a broader theoretical and empirical guideline to central banking. Furthermore, this study will be the first one to develop a holistic and comprehensive alternative framework, guideline and dynamics of central banking in a macroeconomic model in the advanced world economy.

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Abbreviation

ABS	Assets Backed Securities
BoE	Bank of England
BoF	Banque de France
BoJ	Bank of Japan
BR	Borrower's Risk
CB	Central Banks
CBI	Central Banks' Independence
CCC	Competition and Credit Control
CDO	Collateral Debt Obligation
DSGE	Dynamic stochastic general equilibrium
ECB	European Central Bank
EU	European Union
Fed	Federal Reserve
FTPL	Fiscal Theory of the Price Level
FTS	fiscal theory of seigniorage
GDP	Gross Domestic Product
GLBA	Gramm-Leach-Bliley Act
IT	Inflation Targeting
LLR	Lender of Last Resort
LR	Lender's Risk
MBS	Mortgage Backed Securities
MMT	Modern Money Theory
MTs	Monetary Targets
NAIRU	Nonaccelerating inflation rate of unemployment
NC	Neoclassical economics
NCM	New Consensus Macroeconomics
NK	New Keynesians
OECD	the Organisation for Economic Co-operation and Development
OMPs	Open Market Operations
PK	Post-Keynesians

QE	Quantitative Easing
QTM	Quantity Theory of Money
REH	Ricardian Equivalence Hypothesis
SEC	Securitisation
SFC	Stock Flow Consistent
SGP	Stability and Growth Pact
SPV	Special Purpose Vehicle
UK	United Kingdom
US	United States
VAR	Vector Autoregression
WID	World Income Inequality Database
ZIRB	Zero-Interest Rate boundary

Preface

A Ph.D. thesis is not only a good written specialized work in a certain field of study. As the title suggests, it is Doctor of Philosophy recognition, which is granting you with the very powerful profession 'Philosophy'. To be a philosopher, you must know history, sociology, psychology in addition to the science of arts of reasoning. Thus, you are able to reflect and possess a critical thinking open type of mind within a wide range of contexts. More importantly, a Ph.D. is not only a certificate; it is a long social process of deep and critical learning, thinking and teaching continuous training and development, acquiring in-depth knowledge, investigating ideas across the various research questions, going through numerous literature and methodological discussions.

A Ph.D. thesis is also a product of its time, which reflects and creates its own social reality, in the sense that a thesis's reflections of the social, economic and political background represent of when the thesis was written. That clearly means that it cannot but embrace the roots, motivations, and agonies of the author- as these unfold in real time- as well as the debates and "hot" questions of its era. To put simply, 'nothing is written on stone'. Especially when it comes to economics. And in particular, living in times of great economic recession, my thesis inevitably came to engage with the agenda of its day. The collapse of economic growth, the sky-rocketing of unemployment, the rise in income inequality, the shrinkage of space for public policy; these were all real issues seeking for real answers. It was such concerns that primarily acted as a navigator throughout my Ph.D. journey.

Somewhere along that journey I came across many pieces on the topic of the critical role of central banks in our economy. Being at the centre of debate and analysis of how modern capitalist economy works, it felt to me that there was something more to be said. What are those organizations? What is their relationship with banks and financial institutions, governments, and the society? Why can they play an essential role to promote the well-being of our economy? I took up the challenge, channelling my thoughts and energy in that direction.

The result is now materialized into five years of work and a few hundreds of pages aligned behind this one.

All in all, living in Canada and Europe at the times of the crisis, one cannot but still be angry at the social realities of today. Realities that kill democracy in the name of "solidarity", attack the welfare state in the name of "sound finances" and deplete peoples' incomes in the name of "fostering full employment". Realities that force disinvestment in the name of "investment", and that push economies into depression in the name of "growth". On what has to do with economics, one can think of those realities as reflecting nothing more but the voices of defunct economists, as Keynes would put it. While a Ph.D. thesis is certainly not enough to change the world, it can nevertheless make a step towards disturbing such voices.

The University of Leeds,
March 2018

Introduction

The 2007/08 severe financial crisis has put the role of the central bank in industrialised economies under scrutiny. What has occurred could be called a central banking crisis, as major central banks in advanced economies failed to foresee the financial crisis. Central banks' policy focus had been on a rule-based policy, using one tool (the nominal interest rate) to achieve one objective (price stability), disregarding other important objectives such as financial stability and economic stability. For this reason, in this thesis I investigate central banking theory and policy, analysing the role of the central bank in a modern, complex financialized capitalist economy in relation to the treasury, the banks, and other financial institutions. In a broader sense, I investigate central banks' responsibility to the economy as a whole. The main contribution of this thesis is to analyse central banking theory and policy critically and to provide an alternative framework from a post-Keynesian perspective to achieve a comprehensive understanding of the nature and functions of a modern central bank. I emphasize its unique role with respect to the government, the banks, and society: achieving sustainable economic stability.

This thesis has three main purposes. Firstly, it investigates the role of central banking in the financialisation era. Financialisation is characterised by the increasing power of finance and the expansion of financial innovations in advanced economies. That combined with deregulation has increased the inherent financial instability of the economy. Securitisation is one of the most complex and controversial financial innovations, and it has generated another dimension of instability in the financial sector. In addition to the instability, central banks' policies become less effective in the presence of such financial innovation. For these reasons, I have studied and analysed the impact of monetary policy on securitisation activities and the consequences of securitisation on the effectiveness of monetary policy. The main reasons for banks to securitize their loans are to increase their profitability and liquidity and to transfer risk. By transforming illiquid assets—long-term loans and mortgages—into liquid assets, the banks' traditional practice of originating and holding has changed to one of originating and distributing. To study the interaction between the policy interest rate and securitisation (measured as a

country's total securitized assets divided by total assets), I use a panel VAR econometric model using data from the UK and nine eurozone countries. My findings indicate that a contractionary monetary policy, with an increase in the policy interest rate, leads to a decrease in issuing banks' loans; however, banks' issuance of securitisation increases, which increases liquidity and banks' ability to issue new loans. That could suggest that banks' securitisation activities make central banks' policy rates ineffective. Secondly, the thesis investigates the crucial interrelationships between central banks and governments. I critically discuss competing theories concerning the relationship between monetary policy and fiscal policy, and I build a closed-economy stock-flow-consistent model that consists of a firm sector, a household sector, a bank sector, a government sector, and a central bank. I emphasise the behavioural equations and how the interaction of these public entities determines the state of the economy. The main objective here is to provide an alternative framework incorporating the importance of interrelations between monetary policy and fiscal policy within a post-Keynesian approach in order to foster financial and economic stability. The third goal of the thesis goes beyond the central bank's role in relation to banks and the government to shed light on the role of the central bank as a social regulator. That involves investigating, from different economic paradigms, first, the relationship between central banking and inequality, and second, the role of the policy rate of interest as a distributive macroeconomic variable in a financialized economy. I build a closed-economy stock-flow-consistent (SFC hereafter) model that consists of a firm sector, a worker households sector, a capitalist households sector, a bank sector, a government sector, and a central bank. The goal is to provide an alternative fair-rate-of-interest rule to reduce income inequality in order to promote an equitable and fairer society for sustainable economic growth.

Although other researchers have studied these issues, this study has the distinctive feature of providing a broader theoretical and empirical guide to central banking. Furthermore, this study develops an alternative framework, guideline, and dynamics of central banking in a macroeconomic model in the advanced world economy.

The thesis structure is as follows: Chapter 1 is an introductory history of central banking in the advanced economies, investigating the different stages of development in terms of functions, objectives, and roles. Particular attention will be given to the relationship of central banks to governments and banks and the economy. In the second chapter, the focus is on the main characteristics of New Consensus Macroeconomics (NCM) paradigm in the era before the recent financial crisis, and its main criticisms from post-Keynesians. The aim is to provide a clear understanding of the current issues on central banking and shed light on post-Keynesians' view on these matters. The first two chapters lay the foundations for the following chapters.

Chapter 3 investigates the impact of securitisation on the efficacy of monetary policy, particularly in European countries. To be able to answer this question, I explain the financialisation era and how financial innovations such as securitisation have changed the behaviour of banks, by increasing the ability of banks to create liquidity and increase risk-taking behaviour. Securitisation reduced the efficacy of monetary policy and diminished the role of central banks as the ultimate provider of liquidity. Thus, the role of central banks as the 'bankers' bank should be re-examined.

Chapter 4 investigates the theoretical background of the nature of the relationship between central banks and treasuries. It asks whether separation, cooperation, or interrelation between monetary and fiscal policies provides a better outcome for our economy. In order to understand this issue, this chapter sheds light on the main competing views and differences between New Consensus Macroeconomics (hereafter NCM), the fiscal theory of the price level (FTPL), and the post-Keynesian perspectives. It shows how in a monetary production economy post-Keynesians provide a more comprehensive and realistic view of the nature of the relationship between central banks and the governments.

Chapter 5 focuses on the existing macroeconomic modelling used in economic research, and mainly criticises the current dominant dynamic stochastic general equilibrium (DSGE) models, providing an alternative Stock-Flow Consistent (SFC) model from a post-Keynesian perspective. This alternative approach offers a

better understanding of the reality of interactions between economic agents and the stock-flow operations of our economy.

Chapters 4 and 5 build a background for chapter 6, where I investigate the cooperation of monetary and fiscal policies from a post-Keynesian perspective in an SFC model. As the relationships between central banks, the banks, and the government have been previously discussed and investigated, chapter 7 goes a step further to investigate the role of central banks in the society. The impact of central banking on inequality is studied, and a post-Keynesian perspective based on a 'fair rate of interest' to tackle this issue is put forward, also using an SFC model as well. Finally, chapter 8 delivers the main conclusions and policy recommendations.

Chapter 1: *History of Central Banks (Functions & Objectives)*

1.1 Introduction

This chapter focuses on the past and present of central banking practices and purposes. The origin of central banking goes back at least to the late seventeenth century with the creation of the Riksbank in Sweden. I investigate the evolution and history of central banking at different stages of development. In particular, I analyse the development of central banks' relationship with the government and the banks, mainly at the national level. I focus on the Bank of England, the Federal Reserve, the European Central Bank, and the Bank of Japan.

The main purpose of this chapter is to demonstrate that central banking history matters. That the Keynesian Era could be viewed as a ground floor or an anchor for today central banks, with respect to its functions and objectives, its relationship with governments and banks in addition to its role to the overall economy. The discussion is divided into five sections chronologically as follows: The first section reviews the period before the First World War. The second covers the interwar era. The third section is focused on the Keynesian era between 1945 and the 1970s, while the fourth part seeks to understand the status of central banking during the era of the 1970s to 2007. The fifth part discusses the era between the emergence of the crisis in 2007 and the current situation. Finally, I will critically assess the evolution of central banking and conclude.

1.2 Before the Second World War

Early central banks aimed in large part to finance their affiliated governments. The most important central bank, during the era before the First World War, was the Bank of England (BoE). BoE was established in 1694 with private ownership, to finance the war and purchase government debt mainly. And the Banque de France (BoF) was established by Napoleon in 1800 to stabilize the currency after the hyperinflation of paper money during the French Revolution, and to finance the government.

Early central banks also acted as a note issuer and as a government bank. The Reichsbank, for example, was created in 1876 as an entirely private institution as to ownership but it was guided by the public or imperial interest and it did not attempt to maximise returns to shareholders. Following the unification of Germany after 1870, one of the Reichsbank's primary objectives was to be the primary note issuer and to unify the currency. It also acted as a clearinghouse for German banks in the whole German economy. The Reichsbank also made loans directly to business (as well as to government and banks). Thus, the Reichsbank did not only contribute to the financial integration of Germany, but it also helped to foster the emergence of a new economic superpower (Goodhart 1988: 105–11). Not until 1901 did the Reichsbank act as a lender of last resort. That was when the Leipziger Bank and Dresdner Kreditanstalt collapsed, and it intervened to avert contagion. By 1900 the Reichsbank evolved into a genuine central bank, offering a wide range of services to government and the private sector (Lexis 1910, quoted in Singleton (2011)).

On the other side of the world, the BoJ was established in 1882 as the first central bank outside Europe. Mainly after the Japanese economy opened to the West, there was a period of financial experimentation and instability. BoJ was given the power of note issue and to offer a range of financial services to the government as well as to major banks. The BoJ became the lender of last resort during the crisis of 1890. The Bank made an important contribution to the development of the Japanese banking system. As in Germany, the BoJ was involved in the development of the payments and interregional transfer systems, and branches were opened in some cities (Ohnuki, 2007; Goodhart, 1988).

These early central banks were private entities that mainly helped to fund the government's debt in the time of war, and they also engaged in banking activities. Because they held the deposits of other banks, they came to serve as the bankers' banks, facilitating transactions between banks or providing other banking services. They became the depository for most banks in the banking system because of their large reserves and extensive networks of correspondent banks. These factors allowed them to be the lender of last resort in the face of a financial crisis. In other words, they were willing to provide emergency cash

to their correspondents in times of financial distress. Thus, a central bank can be defined as an institution that stands between the government and the banks. However, the role of central bank tends to change over time depending on economic and political factors.

Before the First World War, central banks' main objective was to sustain the gold standard's rule of maintaining gold convertibility above all other considerations (Goodhart, 1988). Gold convertibility served as the economy's nominal anchor. That is, the amount of money banks could supply was constrained by the value of the gold they held in reserve. Typically, the central bank adjusts the Bank Rate in order to manage the level of gold reserves and the ratio of reserves to liabilities, or to liquidity (Giovannini 1986).

Central banks also learned to act as lenders of last resort in times of financial stress since 1790. Earlier on, given that BoE's main concern was maintaining the convertibility to gold, it precipitated major world financial panics in 1825, 1837, 1847, and 1857, which led to severe criticism of the Bank (Singleton, 2011). In particular by Walter Bagehot, who criticised the bank for not taking responsibility for the public interest of the banking system as a whole. The Bank began to follow 'Bagehot's rule,' which was to lend freely on the basis of any sound collateral offered—but at a penalty rate (that is, above market rates) to prevent moral hazard (Singleton, 2011). Thanks to the application of 'Bagehot's rule' no banking crises occurred in England for nearly 150 years after 1866. There was a secondary banking crisis in 1973/75. Not until August 2007 did Britain experience its next banking crisis.

The BoE was by far the most sophisticated and experienced central bank at the beginning of the 20th century. By 1900 the Bank saw itself as a public agency and not as a commercial operation, and was committed to upholding the stability of the banking system (Goodhart, 1988). In other words, it had made the transition from a bank of issue to a central bank.

Even though the BoF was less experienced than the BoE due to the undeveloped financial market, it was the duty of the BoF to facilitate the provision of affordable credit to the French economy, to industrial firms as well as to banks.

To this end, the Banque focused on maintaining a low and stable rediscount rate (around 3%). In this sense, the BoF had much more of a developmental role than did the BoE. The Banque also acted as a lender of last resort to the Paris and Lyons stock exchanges in 1882, to prevent a crisis spilling over into the banking system. Advances were also made to several banks after the collapse of the Union Générale. In 1889 and 1891 the Banque stepped in again to support and restructure ailing banks (Goodhart 1988).

Elsewhere, in the United States, the experience during the nineteenth century was an era of considerable financial instability due to the domination of the free banking school of thought (the banking sector is a robust and self-adjusting system). Banks were free to enter and exit with minimal requirements, which led to frequent banking crises. Not until 1913 did this instability lead to the creation of the Federal Reserve (Fed), which was given the mandate of note issues and to serve as a lender of last resort.

Interwar Era

With the occurrence of the First World War and the Great Depression, central banks were faced with difficulties in performing their roles. They failed tremendously, especially during the recession of the early 1930s (Goodhart 1988).

During the First World War (1914-1918), central banks, such as BoE, BoF, BoJ, and Reichsbank, played an essential part in managing the war economy. Acting as lenders of last resort, they provided liquidity to financial markets during the initial panic in 1914. They were required to purchase increasing amounts of short- and long-term government securities. As Montagu Norman (1932), who was long-serving governor of BoE, put it: 'With the outbreak of war in 1914 the traditional practices of Central Banks were gradually abandoned under the pressure of political expediency'.

The dominant view of managing the trade-off between stabilizing the internal price level and the external exchange rate had central banks aim to maintain gold convertibility. The latter was a concern because a high inflation period after

the First World War led to the outflow of gold from Europe to the USA. Central banks tightened monetary policy to maintain gold convertibility. For instance, after the UK suspended the gold standard in 1914, it returned in 1925 at the pre-war nominal exchange rate which was widely regarded as an over-valued real exchange rate. It was forced to leave the gold standard in 1931. The upshot was that the UK had high inflation in 1919 followed by rapid deflation and a further tendency towards deflation during the 1920s. In contrast, the only central bank to face the trade-off differently and to opt to target price stability explicitly during the interwar period was the Riksbank following Sweden's forced withdrawal from the gold standard in 1931 (Berg and Jonung, 1999).

In *A Tract on Monetary Reform*, Keynes questioned why jobs should be sacrificed, and firms bankrupted merely for the sake of convertibility? He concluded that when 'stability of the internal price level and stability of the external exchanges are incompatible; the former is generally preferable.' The gold standard was a 'barbarous relic' and an 'outworn dogma' (Keynes 1923: 163– 4, 172, 173). Indeed, in the early 1930s major European countries were obliged to leave the gold standard.

Further, the gold standard era and the commitment to convertibility principle to promote price stability was under question by Keynes (1934). He doubted that price stability objective would be enough to smooth the business cycle or achieve full employment after a major shock (Singleton, 2011). In some circumstances, monetary policy could become impotent. For instance, if nominal interest rates were already close to zero, but the price level was falling, so that real interest rates were positive, the traditional tools of the central banker would lose their power to counteract deflation, this situation is similar to the famous liquidity trap. However, it is important to distinguish between Liquidity Trap and what's called the Zero Lower Bound Problem (ZLBP). In ZLBP, the central bank pulls down the interest rate to zero and the economy cannot be stimulated anymore, because the interest rate cannot go any lower. Whereas, Liquidity Trap differs from ZLBP owing to the fact that even after involvement of the central bank in both cases, in liquidity trap the interest rate doesn't get lowered at all. During the 1930s, Keynes put a strong emphasis on the role of fiscal policy in economic

management. In the same vein of Keynes ideas, in 1934 the Roosevelt administration appointed Marriner Eccles, as governor of the Fed Board. Eccles was a progressive economist who believed that reflationary fiscal policy was the key to recovery. He also doubted the ability of monetary policy to achieve recovery, and Eccles had wanted a mandate to stabilise 'production, trade, prices, and employment' (Meltzer, 2003). He was also of the view that the central bank should act in support of the general economic strategy of the government. In practice, this meant keeping interest rates moderately low.

To sum up, central banking evolved in the era between the world wars. It continued to do so in the Keynesian era.

1.3 The Keynesian Era (1945 to 1970s)

During and after the Second World War, the world of central banking witnessed an important transformation by a spate of nationalisations. For instance, the BoE and the BoF were state-owned in this period while the Fed was subject to government regulations (an analogous form of control). The period was characterised by the close cooperation between central banks and governments over monetary and banking policy. The noticeable effects include low interest rates, low inflation, low unemployment, and central banks' strong support for their respective governments (Dow, 2017).

What is crucial is the emergence of a new generation of central bankers with more tolerance for modern concepts of economic management, and more inclination to work with governments. The quality of the relationship with the government was crucial, and it could be viewed as a cooperative and active partnership.

The emergence of the Keynesian view on the macroeconomic policy encompassed an emphasis on the goal of full employment and a change towards fiscal policy. The 1950s macroeconomic policymakers, including central bankers, were aiming for the multiple objectives of full employment, low inflation, a stable balance of payments, and high economic growth. They performed well in this respect. In Europe and USA, the 1950s and early 1960s era experienced both

low inflation and unemployment, and more importantly, there were hardly any banking crises (Goodhart, Hofmann, and Segoviano 2004).

Fiscal policy was considered to be the strongest leg of macroeconomic policy in the 1940s and 1950s (Sawyer, 2003). With the support of central banks' desire for low and stable interest rates to reduce the burden of servicing a public debt, governments could stimulate the job market, encourage reconstruction and development, and help powerful interest groups including exporters, farmers, and home purchasers.

In monetary policy, in the post-war era major European central banks kept interest rates low (around 3%), directly regulated banks, and provided accommodating monetary policy. Low interest rates were likely to encourage spending, but also to fuel inflationary pressure, and weaken the balance of payments. Central banks also imposed administrative controls on bank lending and access to foreign exchange.

The nature of the partnership between government and central bank evolved in different ways in different countries. Sometimes it was close, sometimes distant. Ultimately, though, government–central bank relationships were based on cooperation in the mid-twentieth century (Fforde, 1992). As Keynes proposed, there was an equal status between the BoE and the treasury.

In the United States, the Fed did not only maintain a low interest rate, but full employment was added to its mandate, creating what is often referred to as the dual mandate, in 1977 (Fontana, 2006). Having a dual mandate objective means that the Fed has a relatively discretionary policy which could not be pursued or achieved without close cooperation with the treasury. Meltzer wrote, 'The Treasury and the Fed System have reached a full accord concerning debt-management and monetary policies to be pursued in furthering their common purpose of assuring the successful financing of the government's requirements and, at the same time, to minimize monetization of the public debt' (Meltzer 2003).

The Deutsche Bundesbank experience was not different. In legislation in 1957, 'the main duties of the Bundesbank were those of regulating the amount of money in circulation and of credit supplied to the economy with the aim of safeguarding the currency, as well as arranging for the execution of domestic and international payments' (Stern, 1999). The central bank was to support government economic policy in so far as this did not undermine the performance of its primary duties. The Stability and Growth Act 1967 outlined a group of macroeconomic objectives for the West German state, including price stability, high employment, external equilibrium, and economic growth.

In this period, the Deutsche Bundesbank was considered the most independent central bank. However, Stern (1999: 154) writes of a 'subtle and balanced regulation of the relationship between the Federal Government and the Bundesbank' and attempts 'to unite independence and cooperation'. The Bundesbank achieved its main goals and succeeded in building up a strong base of public support, or 'stability culture'. While the Bundesbank was not immune to political intrigue, it resisted most attempts by the central government to influence policy decisions (Neumann 1999).

Meanwhile, Article 1 of the BoJ Law 1942 stated that 'the purpose of the BoJ shall be to adjust currency, to regulate financing and to develop the credit system in conformity with policies of the state, to ensure appropriate application of the state's total economic power'. Article 2 reiterated that 'the BoJ shall be operated exclusively intending to accomplish the purposes of the state' (Werner 2003: 54). But according to Singleton (2011), the BoJ and the Ministry of Finance were rivals as well as partners, and they often seemed to be locked together like 'sumo wrestlers' while they vied for control over monetary policy. That active partnership resulted in good Macro-policies outcomes. That was evidenced by Japan's economic performance between the 1950s, and the late 1980s was impressive, and the BoJ won respect for its contribution to this record (Cargill, Hutchison, and Ito 1997).

Concerning the relationship between central banks and the banking sector, the former did not only act as a clearinghouse or as a lender of last resort, but also took responsibility for banking supervision in response to the increased burden

of regulating the financial system. This ultimate supervision role went beyond the role in monetary policy and regulation and added an important dimension to central banking in the mid-twentieth century, a role at which it proved reasonably effective.

An essential feature of the post-war decades was the emphasis on implementing monetary policy through the manipulation of quantities (including bank reserves, liquidity, and bank lending, but not the money supply) rather than by variations in interest rates. Bindseil (2004) regards this approach as part of a longer 'quantitative detour' in monetary policy implementation, lasting from the 1930s into the monetarist era of the 1970s and early 1980s. Central banking put more emphasis on instruments such as the 'control of credit', discount rate policy, open market operations, variable reserve requirements, 'other methods' including selective and quantitative controls on lending and 'moral suasion', and exchange controls (Bindseil, 2004).

Monetary authorities relied a great deal on regulatory controls. Credit controls were used especially in limiting lending for consumption purposes. Monetary authorities commonly issued guidelines or instructions concerning the permissible quantity and direction of bank lending (Singleton, 2009). Such guidelines had two purposes. First, they were used to restrain aggregate spending at a time of low real interest rates. Secondly, they were supposed to encourage desirable spending, such as capital formation in export industries and the housing sector, while limiting spending on luxuries such as holidays and consumer goods.

Other controls on commercial banks such as reserve ratio and liquidity ratio were imposed to create a system to be used for monetary control, even though it was based on powers assigned to the monetary authorities for banking supervision purposes. For instance, UK commercial banks were required to make non-interest-bearing 'special deposits' at the central bank when additional monetary strictness was required (Ross, 2004).

As a by-product of the distinctive post-war approaches to monetary and banking policy, central banks and commercial banks were brought into closer touch than

ever before. Relations of the central bank with the commercial banks were multifaceted. It is difficult to encapsulate the relationship between central banks and commercial banks, which was marked by elements of collusion and coercion as well as of cooperation (Singleton, 2011). Such tools as window guidance and moral suasion were a sort of administrative guidance as part of every central banker's toolbox, especially in states with highly concentrated banking sectors. The more concentrated the banking industry, the fewer the banks in need of swaying. Central banks sought to influence the lending of banks by lecturing them in public and chatting to them in private. In the UK the entire system of controls over reserves, liquidity, and lending was based on moral suasion. The BoE preferred to regulate by consent. However, British banks understood that outright refusal to cooperate would be punished (Capie, 1990).

Another dimension of the relationship between central banks and commercial banks concerned the former's stance on the industrial organization of the latter. In the UK, between 1918 and 1967 the BoE and the Treasury made it very clear that they would oppose any mergers between the 'Big Five' UK clearing banks (Cottrell, 2003). But that ended with the merger between National Provincial and Westminster in 1967 to form National Westminster.

In the USA, commercial banks with the membership of the Fed System had a say in the governance of the Reserve Banks. At the national level, there was consultation between the Fed Board and banking industry associations, but the relationship was not as close as it was in some countries. Woolley (1984: 69–87) saw little evidence to suggest that the Fed was captured by the banking industry. The Fed had to be sensitive to a number of constituencies, including Congress and the president, as well as the Treasury and other business groups, such as farmers and manufacturers, each with their own policy preferences (Kettl 1986). As a result, it was insulated from control by any one constituency, including the bankers.

In the USA, new regulations starting in the 1930s had a major impact on the structure of the banking industry. The separation of commercial from investment banking was achieved in the second Glass Steagall Act (officially the Banking Act 1933). The 1933 and 1935 Banking Acts empowered the Fed to place ceilings

on the interest paid on time and savings deposits (Regulation Q). No interest was permitted on demand deposits. One of the aims of the Congress, in establishing Regulation Q, was to encourage country banks to focus on lending to local communities by making it unprofitable for them to hold large balances at banks in financial centres. By restraining price competition for deposits, the Congress also hoped to reduce the temptation to engage in risky lending. Regulation Q was extended to thrift institutions in 1966, and at the same time interest rate ceilings were allowed to bite in order to ease the burden on certain classes of borrowers. Thrifts were permitted to offer slightly higher interest rates than commercial banks, so as to encourage the reallocation of deposits and an increase in mortgage lending (Gilbert 1986).

Though regulation held back the most innovative banks, it helped the banking system as a whole to achieve healthy profits at little or no risk. Low interest rates brought excess demand for credit, enabling banks to select only the best applicants for loans. Goodhart (2004) contends that because of regulation, 'banking was an extremely safe, and boring, occupation between 1945 and 1973'. According to Cobham (2012), this was possible because of the existence of the wide options of managerial and supervisory panels to which the banks had to adhere.

More generally, the regulatory policy, the main macroeconomic arguments in this duration were concentrated in the determinants of the entire demand in the economy and the factors that ensure financial stability. More interestingly, there was a consensus between central banks about the effectiveness of the interest rate as a tool of economic management, with the belief that interest rates should be kept low and stable to encourage investment and economic growth (Bindseil, 2004). The rediscount rate was an important signal of the monetary authorities' intentions. Market interest rates were also influenced by open market operations, changes in reserve requirements, moral suasion, and, finally, market conditions. In the mid-twentieth century, much weight was given to overall economic stability by major central banks, as an expression of the public's aversion to uncertainty and its fear of banking crises after the events of the 1930s, mainly in the USA.

The 1950s and 1960s constituted a golden age for the industrialised capitalist economies. Growth was strong throughout the developed world. Outcomes were satisfactory, despite the vast discrepancy between the objectives and techniques of policy then and best practice today. Inflation rates were moderate notwithstanding rapid economic growth, though they began to creep up in the late 1960s (Fischer et al. 2002). Furthermore, there were no serious banking crises. Nothing could have been more unlike the interwar period.

In the late 1960s, though, the global structure, in the Bretton Woods system of fixed exchange rates with restricted capital movements, was starting to collapse under the effect of global tensions. That was attached to the failures of monetary policies employed in the United States in the situation of its conflict of Vietnam and the Great Society expenditure plans of President Johnson. Consequently, by late 1960s, all major exchange rates in terms of the currency were fluctuating against each other and inflation apparently emerged as a significant issue. The Bank of International Settlement argues the mid-1970s saw cumbersome major shifts in strategy setting. From less or more of the Keynesian ideas on the causes of price rise and the duty of monetary in relation to the fiscal policy, to more or less of the monetarist perceptions on the increase in the general price level and the introduction of the monetary targets.

1.4 Monetary Targets and the New Consensus Era (the 1970s to 2007)

Inflation was one of the most serious economic challenges confronting the developed world between the late 1960s and the 1970s. Inflationary pressure was rising in many countries, partly for domestic reasons and partly as a result of monetary inflows from the USA. But it was not the only problem. Exchange rates fluctuated unpredictably after the collapse of Bretton Woods, while there were frequent banking and other financial crises. Economic growth decelerated after the early 1970s, unemployment rose to a post-war peak in the early 1980s, other reasons for the inflationary pressure are for global reasons such as commodity price boom in 1972; the quadrupling of oil prices in 1973, for example, led to confusion amongst policymakers. The macroeconomic theory was in flux as Keynesians fought it out with the monetarists. According to Meltzer

(2005), the turning point for the USA came in 1965, 'the last year of strong productivity growth and the first year of rising inflation'. Perhaps this was also a symbolic turning point for Keynesianism.

This era witnessed an aggressive struggle between Keynesians and monetarists; the struggle was known as 'the Matadors' (Singleton, 2011). In the Keynesian paradigm of the post-war era, inflation was either 'demand pull' or 'cost push' in origin. However, monetarists held that inflation could not occur unless the money stock were permitted to increase faster than productive capacity. This conclusion followed from the quantity theory of money, which entails that inflation is a monetary phenomenon (Friedman, M. 1956). Monetarists denied that fiscal stimulus could generate inflation unless financed by central bank purchases of government debt or printing money. The monetarist ideas came in addition to the neoclassical beliefs of rational expectations, perfect information, and the temporary trade-off between unemployment and inflation. For Keynesians, cost-push inflation should be fought with controls, either voluntary or statutory, over wages and prices. But monetarists were adamant that the only answer to inflation was control of the money supply. Milton Friedman (1960) recommended, in particular, a policy rule involving a fixed percentage annual growth of a selected monetary aggregate. He continued to argue that price stability could be achieved by setting the target monetary growth rate equal to the average rate of growth of real GDP. A monetary aggregate was an intermediate target, offering indirect control over spending and inflation. Monetarists opposed the fine-tuning of the monetary aggregates. Any sort of fine-tuning was destabilising in their eyes because of lags and uncertainties in measurement, policy formulation, and implementation.

Most central bankers strongly endorsed the view that money was important after all, money was their business. But they were reluctant to commit themselves to a rigid and exclusive theoretical perspective such as monetarism (Meek, 1983). Gordon Richardson, the governor of the BoE, indicated, in a speech in 1976, that control of the money supply, while desirable, was only part of the story. 'I think it must be right to aim publicly for a growth in money supply which will accommodate a realistic rate of economic growth but not accommodate, more

than in part, the rate of inflation. [But] Monetary and fiscal policy – and I would add incomes policy – each has their part to play and should form a coherent whole' (McClam 1978: 7).

Monetary targets were announced publicly in a number of countries in the mid-1970s, including the USA, Canada, UK, Australia, Japan, and several Continental European countries. West Germany and Switzerland led the way, proclaiming monetary targets in December 1974 (Fratianni and Salvatore 1993). By announcing a target, the authorities hoped to establish credibility. If the authorities' commitment to the target was believed, inflationary expectations and exuberance in the labour and product markets would recede. According to Friedman (1982: 102), Japan was the 'outstanding example' of a developed country following monetarist principles (West Germany also received some credit). BoJ used the M2 monetary aggregate as an indicator of demand pressure.

Monetary targeting was adopted using the standard tools of monetary policy, ranging from the rediscount rate to open market operations (OMOs) to reserve requirements and administrative controls. However, there was a growing emphasis on OMOs. Two strategies presented themselves. Under the first, the central bank focused on maintaining the short-term interest rate that was compatible with the money supply target given the position of the demand-for-money function. Under the second, the central bank determined the money supply independently and let the interest rate find its own level. Monetarists preferred the second approach and were inclined to recommend control of the narrowest aggregate, the monetary base. By contrast, most central bankers preferred to smooth interest rates for the convenience of financial market participants, including governments, and found monetarist proposals disconcerting (Capie et al. 1994: 85).

Monetary targeting gradually fell out of favour in the 1980s. Hitting the targets proved embarrassingly difficult. The velocity of circulation (or demand for money) became less predictable in the early 1980s than before (Capie, Goodhart, and Schnadt 1994:31). That is because of the development of new financial products including interest-bearing current accounts, the growing use and sophistication

of computer and communications technology, and the drive towards financial deregulation. Further, targeting's validity depended on the stability of the velocity of circulation and the demand for money (Laidler, 1969). According to Cobham (2012), the formal discussion in the Anglo-Saxon nations, such as that at the BoE in 1986, held that the framework shift in the financial system implied that the demand for money had become unstable for targeting the money supply. To be realistic, the essential problem with the monetarist view, it is not that central banks did not have the instruments to regulate the money supply adequately. However, it is that money is endogenously created by commercial banks consequently central banks basically cannot control money supply. Hence they gave up any attempt to control credit creation.

In the majority of the Anglo-Saxon countries, monetary targeting implementation led to a period of no clear structure to monetary policy. Meanwhile, Continental Europe, including the Bundesbank and BoF, maintained its monetary targets but resorted to a stricter exchange rate arrangement (Singleton, 2011). The latter arrangement—specifically, the Exchange Rate Mechanism (ERM), of the European Monetary system—became mandatory for members of the European Economic Community. However, the United Kingdom joined the ERM in 1990 at what was clearly an overvalued rate, which then generated pressures to devalue, which happened in September 1992.

Though the 1974–9 British Labour government introduced monetary targets, it was not until the election of the Conservatives, led by Margaret Thatcher, in 1979 that fighting inflation became the top priority and monetary targeting took centre-stage (Britton 1994). The Thatcher government accompanied monetary targeting (control of M3) in the first half of the 1980s, with the so-called 'big bang,' by 1986 which in effect broke the self-regulation of the London Stock Exchange. The era of monetarism in the UK was accompanied by the beginnings of the privatisation programme and anti-trade union legislation.

Together with financial innovation, the trend towards financial deregulation and increased competition made it harder for the authorities to manage £M3, and the early targets were overshoot. A debate ensued over whether £M3 was a good indicator of the tightness of monetary policy, as did a debate on whether control

of M3 was feasible. The link between money growth and inflation in practice was very imprecise. The monetarist framework was wound down, and in 1987 the UK government ceased to announce monetary targets.

In 1979, the Fed's Volcker implemented something approaching a monetary base target through an interest rate target. Interest rates rose sharply between August 1979 and April 1980. Reflecting on British and American experience with monetary targeting, Charles Goodhart (1989: 377) notes that whatever its theoretical and practical defects, this approach facilitated 'much tighter [monetary] policies. High interest rates (US) and a higher exchange rate (UK), that would have been adopted under more discretionary management. That did cause such severe deflation that inflation and inflationary expectations and psychology were tamed, if not broken.'

Around this time, in the 1980s and 1990s, the doctrine of central bank independence (CBI) acquired an almost mystical status. CBI is a difficult concept to define and measure; the associated concepts of accountability and transparency are no less slippery. Forder argues that 'those with the most to gain from central bank independence are central banks' (Forder 2002: 52). Yet, the most ardent proponents of CBI were academic economists and politicians. Central bankers themselves could not afford to participate in what was after all a political debate on the nature of the relationship between the central bank and the state.

As for cases relating to CBI, in England, though the BoE lacked formal independence, it retained considerable prestige and the capacity to influence events behind the scenes. When the bank gained independence in 1997 and the Monetary Policy Committee MPC was created, the context and significance of monetary targeting changed considerably (Singleton, 2009). Such targeting was initially introduced in 1992 following withdrawal from the exchange rate mechanism (ERM). In America, the Fed System was ultimately accountable to Congress. Critics said that the Fed was in reality either a tool of politicians or an unaccountable bureaucratic empire.

According to Goodhart, Capie, and Schnadt (1994: 48–9), central banking history has been marked by alternating periods of high and low independence. The pendulum swings in response to dissatisfaction with the status quo. The mid-twentieth century saw the repudiation of the brand of CBI associated with the gold standard. In the late twentieth century, however, a new type of CBI was forged in reaction to many years of political interference and inflation. CBI today is rather different from CBI before 1914. In many (but not all) cases, the relationship between the central bank, the government, and society is now set out with greater precision.

As for specific aspects of governance related to CBI, 'instrument independence' or operational autonomy is distinguished from 'goal independence' or the capacity of the central bank to set its own objectives. The distinction between goal and instrument independence was made by DeBelle and Fischer (1994): the state should set the objective (or objectives) of monetary policy while allowing the central bank freedom in operational matters. Further, it is now accepted that CBI should be combined with arrangements to ensure 'accountability', though there is no consensus as to the form of accountability. Transparency is often viewed as vital for accountability and for the smooth implementation of monetary policy (Siklos 2002). The contemporary focus on transparency is a genuine innovation (Geraats 2002).

Central bank reform coincided with a wider programme of public sector restructuring in the late twentieth century. Studies of the 'new public management' in the 1980s and 1990s discuss accountability and the concept of rules versus discretion in the context of the public sector as a whole (Hood 1995: 96). Advocates of public sector reform regarded civil servants and politicians as self-interested actors. In their view, civil servants spent taxpayers' funds on their own empires, while politicians manipulated public sector agencies to buy votes. Under the principles of the new public management, public sector entities were (if not privatised) to be run in a business-like manner (Singleton, 2011). Managers were given clear objectives, and ministers were expected to refrain from interfering in operational matters. Public sector managers were held to account for their performance in relation to targets.

Returning to CBI specifically, Rogoff (1985) suggested delegating monetary policy to an independent central banker (or central bank) with preferences that are more inflation averse than those of society in general to establish credibility. The benefits of CBI in terms of lowering inflation without causing serious damage to the real economy were demonstrated empirically, notably by Cukierman (1992: 347– 455), though not to universal satisfaction. However, according to Mervyn King (2004), whatever the current benefits of delegating monetary policy to an independent central bank, the institutional framework cannot be set in stone. Further, King not only found that it is impossible to tie the hands of later generations in the area of institutional design, but it is impossible to predict what arrangements and policies will be most effective and appropriate in the future.

During the 1990s, many nations amended their laws to promote CBI for their central bank. Central banks in the developed nations had no obligation to lend to their governments, but they had a statutory obligation to pursue price stability and formulate their policy rates. These freedoms of the central banks came as a result of the assessment of the central bank independence criterion (Goodhart 2010). There had often been an argument about the standards of CBI and the association between the CBI and economic performance. Specifically, CBI standards have some explanatory power in cross-section, but not in the time-series evaluation, which led to informal independence, which stressed factors such as social and political feelings regarding the apportioning of the duties between the government and the central banks.

In one outcome of the discussion over CBI, states that intended to participate in the European Economic and Monetary Union (EMU) were legally bound by the Treaty on European Union to grant their central banks more autonomy prior to the formation of the European Central Bank (ECB). For example, the Bank of Italy and the BoF achieved independence with respect to the conduct of monetary policy in 1992 and 1993 respectively (McNamara 2002). The ECB, created in 1998, became the world's most independent central bank as a result of political deals in the 1980s and 1990s. The weak accountability of the ECB (Forder 2002), which is the flipside of its independence, is reminiscent of the

situation at the Bundesbank, which should be no surprise because the ECB's 'role model' was the West German central bank (Baltensperger 1999: 513).

Elsewhere in Europe, following the 1992 sterling crisis, when the UK was forced to leave the European Exchange Rate Mechanism (ERM), the credibility of British monetary policy was in tatters. Norman Lamont, the chancellor, called for the adoption of CBI in order to restore confidence in British policy (Singleton, 2009). However, Independence of BoE was first economics announcement by incoming Labour Chancellor Gordon Brown: announcement in May 1997. The new BoE Act came into force in June 1998 (Rodgers 1998). Priority was accorded to price stability, but the central bank was also required to strive for other macroeconomic objectives, including growth and employment, provided that the primary objective was not undermined. The BoE was stripped of the banking supervision function, which passed to the new Financial Services Authority, but it continued to be responsible for systemic stability. In 1998 responsibility for the management of government debt was transferred to the Treasury.

In the USA, despite possessing substantial legal autonomy, the Fed appears to have been amenable to political pressure, especially in the late 1960s and 1970s. But this charge is harder to sustain for the 1980s and 1990s when Volcker and Greenspan were at the helm. To be sure, under the Fed Act as amended in 1977, the central bank has a dual mandate 'to promote the goals of maximum employment [and] stable price effectively.' But the Fed has been allowed to choose the weights to be given to the twin objectives of maximum employment and stable prices. Chairman Bernanke (2008) later stressed that the Fed independence and that the fed has to report to Congress semi-annually and being questioned by Congress for its policies promoted transparency. That made it easier for everyone to understand what the Fed was trying to do, enabling monetary policy to be implemented more smoothly and effectively.

CBI was not the only change in the latter half of the 20th century. As I have discussed previously, financial regulation was tightened after the global depression of the 1930s. But by the late 1960s, regulation was coming to be seen as a drag on efficiency. At the same time, instruments such as credit controls had come to be perceived, by New Consensus Macroeconomics

followers, as expensive and not efficient in advanced nations. However, there was a push to financial liberalisation in that era. That was based on the idea that financial repression is detrimental to economic growth since it retards financial development and intermediation leading to reduced levels of investment (Singleton, 2011). Then, the banks pushed for liberalisation where the financial system had extended to a greater scope of the economy. Most central bankers supported deregulation. Central banks (and other financial institutions) lacked the experience of coping with banking instability, which was rare between 1945 and 1970 (Goodhart, 2016). (Refer to table 1 in Appendix I).

Starting in the USA, Canada, West Germany, and the UK, financial liberalisation gradually spread through the developed, and then the developing, world. Liberalisation embraced the relaxation or abolition of controls over international capital flows, the domestic financial sector, and the stock market, as well as the lowering of barriers to entry into the banking and insurance sectors. The role of technology was significant. Equipped with computers and improved telecommunications, banks and other financial institutions proved nimbler than their regulators. The pace of deregulation varied between market segments, countries, and regions. West Germany was a pioneer, allowing interest rate controls to lapse in 1967 (Franke 1999: 257). And in 1971 the BoE unveiled a strategy entitled Competition and Credit Control (CCC). Leslie O'Brien, the governor, explained that CCC was intended 'to permit the price mechanism [i.e. interest rates] to function efficiently in the allocation of credit, and to free the banks from the rigidities and constraints which have for too long inhibited them' (Roberts, R. 1995: 180). CCC represented a major change of direction for the UK, and it was quickly followed by a massive credit boom which included house prices doubling in a year.

The USA was an early starter of deregulation but proceeded at a more sedate pace than West Germany, Canada, and the UK. For example, US banks were not allowed to combine investment (merchant) and commercial banking until as late as 1999, with the Gramm-Leach-Bliley Act (Barth, Brumbaugh, and Wilcox 2000). A little earlier, the Fed welcomed the landmark Depository Institutions Deregulation and Monetary Control Act 1980, noting that many of the scrapped

regulations had been 'obsolete', and pointing out that the Fed Board had expressed 'strong support' for key aspects of the new legislation (Brewer 1980: 3). The old regulations had also made it costly for banks to retain membership in the Fed System, inducing many to quit.

None of this is to say that central bankers were sanguine about the risks accompanying deregulation and the onset of genuine competition (West 1983). Steven Solomon (1995: 45) concluded that 'central bankers were uncomfortable with the added ... technical challenges being thrust upon them'. Nor did central bankers present a united front, as the Swedish Riksbank resisted deregulation in the early 1980s (Englund 1999: 83).

Liberalisation was accompanied by the return of a phenomenon rarely, if ever, seen since the 1930s, namely the banking crisis. Most financial crises between 1945 and 1971 were a result of unsustainable exchange rate parities (currency crisis) and did not involve the banking industry. After 1971, however, there were numerous banking crises and twin currency and banking crises, as well as more crises overall (Eichengreen and Bordo 2003). In fact, in 2001 a study by the World Bank shows that there were 112 systemic banking crises in ninety-three countries between the late 1970s and late 1990s (Singleton, 2011). (See table 1, list of banking and currency crisis, Appendix I).

The cost to the taxpayer could be severe when governments or central banks bailed out or recapitalised failing banks or had to meet generous guarantees to depositors. The fiscal cost of systemic banking crises was 13 percent of GDP on average, but much higher in some cases, reaching 50 percent of GDP in Argentina in the early 1980s and Indonesia in 1997–9. As for overall costs (fiscal costs, output losses, and increases in public debt), comparing the USA vs. Euro-zone, the recent crisis's outcomes and costs have been comparable in magnitude (Laeven and Valencia, 2012). (See table 5 in the Appendix I for further details)

Banking crises were frequent in the first few years after deregulation of the banking sector in advanced economies. Credit explosions often followed domestic financial liberalisation, as pent-up demand was released, and banks and other financial institutions fought to gain or defend market share. The lifting

of capital controls also encouraged cross-border financial flows. Sometimes these processes were linked – a credit boom might lead to a surge in equity and property prices, attracting capital from abroad. Rising interest rates after the lifting of financial repression also sucked in foreign capital, much of it 'hot' and capable of departing at short notice. Lacking experience of managing risk in a deregulated environment, banks and financial institutions often made unwise lending decisions to clients wishing to buy property and financial assets at inflated prices. In addition, Prudential policy was weak in this phase, as central banks and other supervisors struggled to develop and implement new procedures. When the asset price bubble burst, banks were left with non-performing loans on their balance sheets. Some banks failed and/or were bailed out. Short-term foreign investors might also take flight, bringing down the exchange rate.

Notwithstanding important local variations, the same basic pattern fits a range of countries, from the UK in the mid-1970s to the USA and New Zealand in the 1980s, to Scandinavia and Japan in the early 1990s, and Thailand, Indonesia, and South Korea in 1997–8. The boom-and-bust cycle was more dramatic in less developed countries (Singleton et al. 2006). Further, emphasising a more benign aspect of liberalisation, Kaminsky and Schmukler (2003) argue that after an initial period of instability could occur, the incidence of crises recedes and the net benefits of deregulation become more evident than before. In addition, approaches to the management and monitoring of risk and the supervision of financial institutions become more efficient. However, as we all know, crises can still happen.

With crises come central bank responses via prudential policy. Arguably, a central bank with prudential responsibilities could be diverted from its primary responsibility of securing price stability. Faced with serious problems in the banking industry the central bank might be tempted to inject large amounts of liquidity into the system, allowing the inflation target to slip out of sight. Indeed, a central bank with reason to believe that macroprudential stability is in jeopardy has little alternative but to provide emergency liquidity, even if it is not the banking supervisor. Continuing with the distinction between macroprudential

powers concerning liquidity on the one hand and supervisory powers on the other, developments in supervision often stimulate financial innovation, which in turn leads to new headaches for central bankers and other supervisors.

Consider one financial innovation in particular. In the late twentieth century, banks made increasing use of securitisation, or the packaging and sale of bundles of loans in order to reduce their exposure to capital requirements. In principle, there was nothing wrong with securitisation. Due to the complexity of the packaging, however, the purchasers of securitised debt often did not know how much risk was being traded, and neither did the supervisors.

Another role of central banking is to secure price stability. Central bankers have always been interested in price stability. Sweden adopted a price level target after leaving the gold standard in 1931. The objective of the Riksbank was price stability, though it was to reverse deflation and not to counter inflation (Berg and Jonung 1999). In 1951 it was proposed in West Germany for the 'central bank to be assigned – to put it in modern terms – a concrete, statutory inflation target, more precisely one of zero per cent'. A sort of inflation target was implicit in the monetary targeting apparatus of the Bundesbank and the Swiss National Bank from the mid-1970s. The Bundesbank employed a quantity theory equation to set the monetary target for the coming year. After 1984 the assumed inflation rate was zero. The Swiss followed a similar procedure (Bernanke et al. 1999: 57–8, 63–4).

Notwithstanding these early efforts at indirectly targeting inflation, New Zealand was the first country to introduce the direct targeting of inflation through monetary policy. After 1984, monetary policy in New Zealand was tightened by allowing interest rates to rise to market levels. Further, the exchange rate was floated in 1985. Rising interest rates and exchange rate appreciation started to exert downward pressure on inflation from 1986. Canada was the second country to announce an inflation target. In a speech in January 1988, John Crow, the governor of the Bank of Canada, argued that price stability was the appropriate goal for monetary policy, but he did not define this term precisely (Crow 2002: 16, 160–1).

Inflation targeting was contagious. The feature of Inflation targeting is the link with interest rate policy. Hence, it became the mainstream way of thinking about monetary policy. One study found that at least fifty-four countries were applying inflation targets by 1998 (Mahadeva and Sterne 2000: 38). Mervyn King (1994: 115) described the UK as one of several countries 'following the earlier lead of New Zealand and Canada' over inflation targeting. The UK had introduced a target of 1 to 4 per cent for underlying annual inflation in October 1992. From 1995, the BoE was required to 'aim consistently to achieve an inflation rate of 2.5% or less some two years ahead.' (King, Mervyn 1997: 91). Inflation targeting was intended to provide a new anchor for monetary policy after the forced departure of sterling from the ERM.

Under the Maastricht Treaty (the Treaty on European Union), price stability was declared to be the primary objective of the prospective ECB. To join the euro, the treaty required countries to meet various criteria. That is related to inflation, the long-term interest rate, exchange rate stability, the ratio of public debt to GDP, and the ratio of the fiscal deficit to GDP. Though not all countries allowed to join the euro actually met those criteria. The national central bank being independent was also a criterion, and the one which had to be met whereas the other criterion were often not met. The Bundesbank insisted on strict entry conditions on the grounds, which were not universally accepted, that strains on the single currency could be alleviated if member countries had similar rates of inflation and fiscal positions (Wyplosz 1997: 7). The treaty did not define price stability. The ECB's Governing Council determined in 1998 that price stability is its main objective and interpreted price stability as inflation between 0 and 2 % per annum. Following the Bundesbank's desire, the ECB must be committed to price stability. The ECB was to also be independent from political control because only thus could German interests, as perceived by the Bundesbank, be safeguarded. Monetary conservatism and institutional independence were principles the ECB pays close attention to the monetary aggregates because of their relationship to the underlying as opposed to the proximate causes of inflation. The framers of the ECB's approach monetary policy seem to have courted ambiguity, creating a mechanism that contains elements of monetary targeting as well as inflation targeting.

Inflation targeting has often failed to meet its target – e.g. in euro-area inflation exceeded 2 per cent limit during the 2000s though marginally, UK's inflation rate has often exceeded the 2 per cent limit; also following Angeriz and Arestis (2009) found that non IT countries as successful in reducing inflation as IT countries. Event that IT countries did achieve further reductions in inflation, and enjoyed better overall macroeconomic performance during the 1990s, but so too did other countries, including the USA, that did not target inflation explicitly (Ball and Sheridan 2003; Lin and Ye 2007). (In the USA, the Fed was unwilling to abandon some form of the dual mandate.) Angeriz and Arestis (2008) argued this particularly with respect to reduced inflation. Many other countries have also experienced low inflation in spite of never implementing inflation targeting.

A new policy consensus extended to all central banks in the developed world and many in the developing world at the end of the twentieth century, but this was a consensus designed for a particular environment. When that environment was undermined in the mid-2000s, the inflation targeting framework began to look rather inadequate. Central banks followed the Greenspan Standard, starting with 'keep your options open', and 'don't let yourself get trapped in doctrinal straightjackets' (Blinder and Reis 2005: 83–4).

In the late 20th century, central banks appeared to be moving towards a consensus on the conduct of monetary policy that has been dubbed 'flexible rules cum constrained discretion' (Arestis and Mihailov 2009). Studies based on the Taylor rule, for example, suggest that in practice central banks tried to smooth deviations in both inflation and output, whether or not they subscribed formally to inflation targeting. That was a fudge, but then so was the brand of monetarism applied in the Volcker and Thatcher era.

In articulating the problem with inflation targeting, Greenspan thought that an inflation target would merely introduce a spurious precision. Specifically, John Taylor (1993) argued that central banks in the developed world should follow a simple rule when setting the policy interest rate. In the refined form of the Taylor rule, the policy interest rate reacts with equal force to percentage deviations of actual from the potential output (the output gap) and percentage deviations of actual inflation from a point inflation target (Asso, Kahn, and Leeson, 2007).

This was comforting for central bankers who had never wanted to abandon discretion. They saw it as a useful benchmark or rule of thumb. But the Taylor rule was not adopted formally either in the USA or elsewhere (Nelson, E. 2008; Taylor 1999; Svensson 2003). Even in the 1980s central banks had adopted a 'just do it' approach.

Therefore, from the 1990s to the emergence of the crisis in 2007, monetary policy appeared to have achieved a new design, which laid much emphasis on the price stability instead of output stability and provided a comprehensive answer to all macroeconomic problems. The arrival of this design came as a result of both shifts in the macroeconomic theory (from the Keynesian era to the neo-classical era) and the shifts in the national and global environments (globalisation). New Consensus Macroeconomics followers believed that the monetary policy had attained the optimal point of its evolution.

In the late twentieth-century, major central banks were celebrating the new consensus era based on central bank independence (CBI) and inflation targeting. According to King (2000), in recent years central banks had achieved a 'position of power and responsibility unrivaled in their history'. Further, Issing (2000) said that people could have confidence in central banks (especially the ECB) because under the new dispensation of CBI, transparency, accountability, and credibility, they were more likely to deliver price stability than in the past.

1.5 From the Crisis of 2007 to Today

However, with the onset of the great financial crisis of the twenty-first century in 2007–8 the whole central banking profession was brought into question (Bordo, 2008). Banks were taking on more risk especially in the area of housing-related lending. Despite the collapse of LTCM in 1998, the problems in 2007–2008 in the UK with Northern Rock and RBS, and those in the USA with Bear Stearns, Lehman Brothers, and others, central banks continued to believe that underlying conditions were benign. It was commonly believed that these financial institutions were appropriately diversified, highly liquid, and well capitalised, but in fact they were none of these things (BIS, 2008). Further

Iceland has faced a severe outcome of such policies and it was hit the hardest in relative terms: the Icelandic banking system and currency collapsed in 2008.

Basically, the New Consensus Macroeconomics model and central banks failed to foresee the Great Financial Crisis. The distress or failure of so many banks is prima facie evidence of the failure of banking supervision and 'macroprudential' oversight of the system. The New Consensus paradigm of the 1990s and 2000s might prove to be no less vulnerable than the gold standard paradigm in the 1930s (Singleton, 2009). Further, Willem Buiter (2009) speculates that the current financial crisis has 'signalled the beginning of the end' for central bank independence. According to Cobham (2012), the economy reacted in manners that had not been anticipated, and stock cost became a major issue, fiscal policy re-surfaced as the major tool for the governments, and monetary policy had to devise new mechanisms and tools. Moreover, the interconnection between the independent central banks and the government was at stake in this period of the crisis.

Ultimately, there is nearly always 'joint central bank–government responsibility for monetary policy' and governments nearly always have the power to override central banks (Siklos 2002: 303). The exception to this rule may be the ECB, which operates under a law that cannot be changed without altering an EU treaty. The question of how best to structure the relationship between the government and the central bank is a recurring one. Governments might decide that a return to macroeconomic policy coordination is desirable, and seek to reduce the operational autonomy of central banks. Since there is no consensus as to the proper location of banking supervision—central banks or governments—there could be further changes in this area too. In 2009 the British Conservative Party proposed returning this function to the BoE, an approach confirmed by the new government in 2010.

Returning to the crisis, at the initial stages, central banks began to come up with the various ways to provide liquidity to the banks and the financial markets. Further, central banks also reacted to the crisis by engaging in 'unconventional' monetary policies. In employing these monetary strategies, the Fed, the BoE, and the ECB encountered big expansion in their balance sheets due to their

various liquidity strategies (Goodhart, 2012). (See table 2, 3, and 4 in Appendix I, for the reaction timeline of the Fed, BoE and ECB in response to the crisis)

The BoE in particular provided extra reserves to the banks via term selling beginning from September 2007. From December 2007, the BoE got involved in prolonged liquidity supports, not just of gilts but of housing mortgage-supported collaterals and later advanced to other forms of stocks (Cobham 2012). It later established a liquidity plan in April 2008. This scheme entailed the exchange of the Treasury bills for the high-quality, but momentarily illiquid, securities, for example, the mortgage-supported securities held by commercial banks for a duration not more than three years. This was not a permanent scheme, as the active participation period closed in January 2009, and it became valid until January 2012.

In addition, the BoE also launched the discount window facility from October 2008, under which the BoE could lend gilts to other banks in exchange of various securities (Goodhart, 2016). This scheme was formulated as a permanent facility with operations usually up to 30 days, but some were allowed to go for even one year starting in January 2009. This discount window facility obligated the banks to make modifications to the prevailing arrangements by which banks determined their own reserve targets.

Similarly, the Fed also applied appropriate standards relevant in the context of the United States. For example, it operated bi-weekly term selling for dollars in December 2007 and January 2008. It also formulated a Term Collateral Lending Facility and a Basic Dealer credit facility in March 2008. In July 2008, the Fed Launched an 84-day term selling facility. They issued dollars through exchange lines to other central banks, for instance, the BoE, the ECB, and the Swiss National Bank.

The ECB also embarked on similar undertakings. It formulated the Term Selling Facility from March 2008, which was later extended in size and terms. However, more of the facility provided in the euro area is carried out via the bank-based system instead of the financial markets as in the case of the Fed and the BoE (market-based system) (Arestis, 2017). This approach provided the ECB with

direct interconnections with a broader range of banks. It could issue liquidity reinforcement easily and directly via those agreements and did not need to be concerned with any particular financial market (see reaction timeline of the Fed, BoE, ECB in response to the crisis in the Appendix I).

Another 'unconventional' monetary policy is that of near-zero and negative interest rates. See timelines of sitting interest rate since the crisis (See figure 1, Appendix I)¹. For the Fed by December 2008 the interest rate cut went gradually from 4.25% to 0.25%, but, in December 2016 the Fed increased to 0.75%. By March 2009 BoE interest rate cut reached to 0.5% with a further cut to 0.25% on August 2016. On May 2009 the ECB cut interest rate from 4.25% to 1% and on June 2014 to 0.00% (negative interest rate). Thereby near-zero and negative interest rates become a new tool of monetary policy. The BoE and Fed have pushed their interest rates into near-zero. Meanwhile the ECB moved into negative territory, in an attempt to increase inflation expectations and raise inflation rates to the set targets, as well as enhance growth rates (Arestis, 2017). (See figure 1 of the Fed, BoE, ECB in the Appendix I)

In another realm of policy making, regulations and financial stability came back to life with Basel III requirements for macroprudential and microprudential measures. Notably, these included a leverage ratio limit, increased capital requirements, stress testing, and a proposal to deal with pro-cyclicality through dynamic provisioning based on expected losses. However, these measures are to be implemented only on 'too big to fail banks' (Haldane, 2017). After the crisis much more focus has been given to the latest suggestions that central banks are to be given regulating power over the banking sector, and toward achieving financial stability. In particular, BoE incorporated financial stability as one of its official mandates.

In term of fiscal policy and its relationship to monetary policy, according to Goodhart (2010) the majority of the developed countries, especially the United States, engaged in major fiscal policies from 2008 to 2009. Most of the

¹ Figure 1 shows interest rate decline since the crisis, and the explosion of central banks' balance sheets in response to the crisis. in addition, you can see unemployment graph as a result of the central banks' policies.

developed economies experienced a steady rise in the budget deficits. Those deficits reduced by a small margin in the year 2010. They were expected to fall further due to the fiscal consolidation strategies employed by various economies. However, this was not the case, given the slow growth of the economy, which makes fiscal consolidation impossible under the deteriorated demand and investment, and loss of confidence (Sawyer, 2017). Further, the central banks' support for government's fiscal stimulus declined because of the perception that the central banks and the governments failed to deal with the prevailing crisis. Consequently, there is an increasing pressure between central banks and the governments based on the view of central banks should retain its independency (Arestis, 2017).

To sum up, major central banks in advanced economies pursued 'unconventional' monetary policy, such as QE, and near-zero or negative interest rate. Further, an important objective has been reemphasised, namely financial stability, by restoring confidence in the financial system; also, central banks aim to contain the impact of crises on the real economy. Despite all this, inflation is still the main target.

1.6 Conclusion

In conclusion, central banks began as small organisations, but they have evolved over time. This was partly a reflection of the acquisition of new functions, especially in the regulatory arena after the Second World War. Governments and central banks partnered to achieve several economic objectives and goals. And banking regulation began to substitute for prudential supervision.

The late twentieth-century wave of reform addressed problems arising from high inflation, and the discredited Keynesianism (and later monetarism). Central bank independence and inflation targeting became the new orthodoxy in the 1990s. Many countries passed legislation to grant autonomy to their central banks, often reversing the decisions of the mid-twentieth century.

In the late twentieth century, central banking seemed to reach 'perfection' under the new dispensation of CBI, transparency, accountability, and credibility.

Central bankers seemed to know what they were doing. However, with the onset of the great financial crisis of the twenty-first century in 2007–8 the whole central banking profession was brought into question. Central banks reacted to the crisis by engaging in 'unconventional' monetary policies, lowering interest rates to zero, and acting as a lender of last resort to banks as well as to the government. The need developed for regulation and the objective of financial stability in the central banking field.

However, even though central banks have used the 'unconventional' measures to restore the economy, it seems that they were not successful for many reasons. Heterodox economists, in particular, post-Keynesians, have heavily criticised New Consensus Macroeconomics. The main critiques were not only because of the policy failure before and after the crisis but also, more importantly, the very theory and nature of NCM. That will be discussed thoroughly in the following chapter.

1.7 Appendix I

Table 1 Dating Crises: Narrative Schemes

Country	Global Financial Crises	Alternative Chronologies	
		Banking Crises	Currency Crises
DEU	1890-1891 1907-1908 1913-1914 1920-1921 1931-1932 2007-2008	1901-1902, 1931-1932, 2008	1893-1894, 1907-1910, 1914, 1931- 1932, 1934, 1949
FRA	1890-1891 1907-1908 1913-1914 1920-1921 1931-1932 2007-2008	1882, 1888, 1889, 1907- 1910, 1994- 1995, 2008	1888, 1914, 1923-1929, 1936-1937, 1948, 1957- 1959, 1968, 1992-1993
GBR	1890-1891 1907-1908 1913-1914 1920-1921 1931-1932 2007-2008	1890-1893, 1974-1976, 2007	1914, 1931- 1932, 1947, 1949, 1961- 1962, 1964- 1967, 1974- 1976, 1992
JPN	1890-1891 1907-1908 1913-1914 1920-1921	1900-1901, 1917, 1927- 1929, 1992- 1997	1900-1901, 1904-1908, 1917, 1921,
SWE	1890-1891 1907-1908 1913-1914 1920-1921 1931-1932 2007-2008	1897-1899, 1907-1909, 1921-1922, 1931-1932, 1991-1994, 2008	1914, 1931- 1933, 1949, 1971-1972, 1991-1994
USA	1890-1891 1907-1908 1913-1914 1920-1921 1931-1932 2007-2008	1884-1886, 1891-1893, 1907-1908, 1914, 1930- 1933, 2007- 2008	1891-1893, 1930-1933, 1960-1961, 1971

Note: Dates for global financial crises are from Bordo and Landon-Lane (2010). Dates for the other crises are from Bordo and Meissner (2016).

Table 2 Fed and treasury timeline intervention since 2008

March 2008	July 2008	September 2008	September 2008	October 2008	November 2008	by December 2008	by December 2008 to early 2009	November 2010	September 2012	October 2014	December 2015	December 2016	March 2017
The rescue of the investment bank, Bear Stearns	Bailing out and partially nationalizing Fannie Mae and Freddie Mac	allowed the investment bank Lehman Brothers to collapse	Bail out and nationalize the American International Group (AIG)	Initiation of the Troubled Asset Relief Programme (TARP) to buy 'toxic' securities	The bailout of Citigroup	reducing the federal funds rate from 5.24% to 0%–0.25%	Introduce Quantitative easing QE1 purchasing long-term Treasury securities, mortgage-backed securities, and swaps of short-term Treasuries for longer-term Treasuries	second round of quantitative easing QE2 buying \$600 billion of Treasury securities by the end of the second quarter of 2011	A third round of quantitative easing, QE3 amounted to a \$40 billion per month, then increasing to 85 billion open-ended bond purchasing programme of agency mortgage-backed securities	The QE ended accumulating \$4.5 trillion assets	The Fed also increased the federal funds rate from 0.20% to 0.50%	The Fed also increased the federal funds rate from 0.50% to 0.75%	The Fed also increased the federal funds rate from 0.75% to 1.0% with further rate increases would be gradual.
their exposure was so extensive to third parties that a worse crisis	they were crucial to the functioning of the mortgage market	an attempt to prevent moral hazard by discouraging the belief that all insolvent institutions would be saved	to avoid the impact on insurance-security contracts	to restore bank lending		to enhance the liquidity of the financial markets		To satisfy the non-growing economy	To restore recovery	Increasing facts of economic recovery			

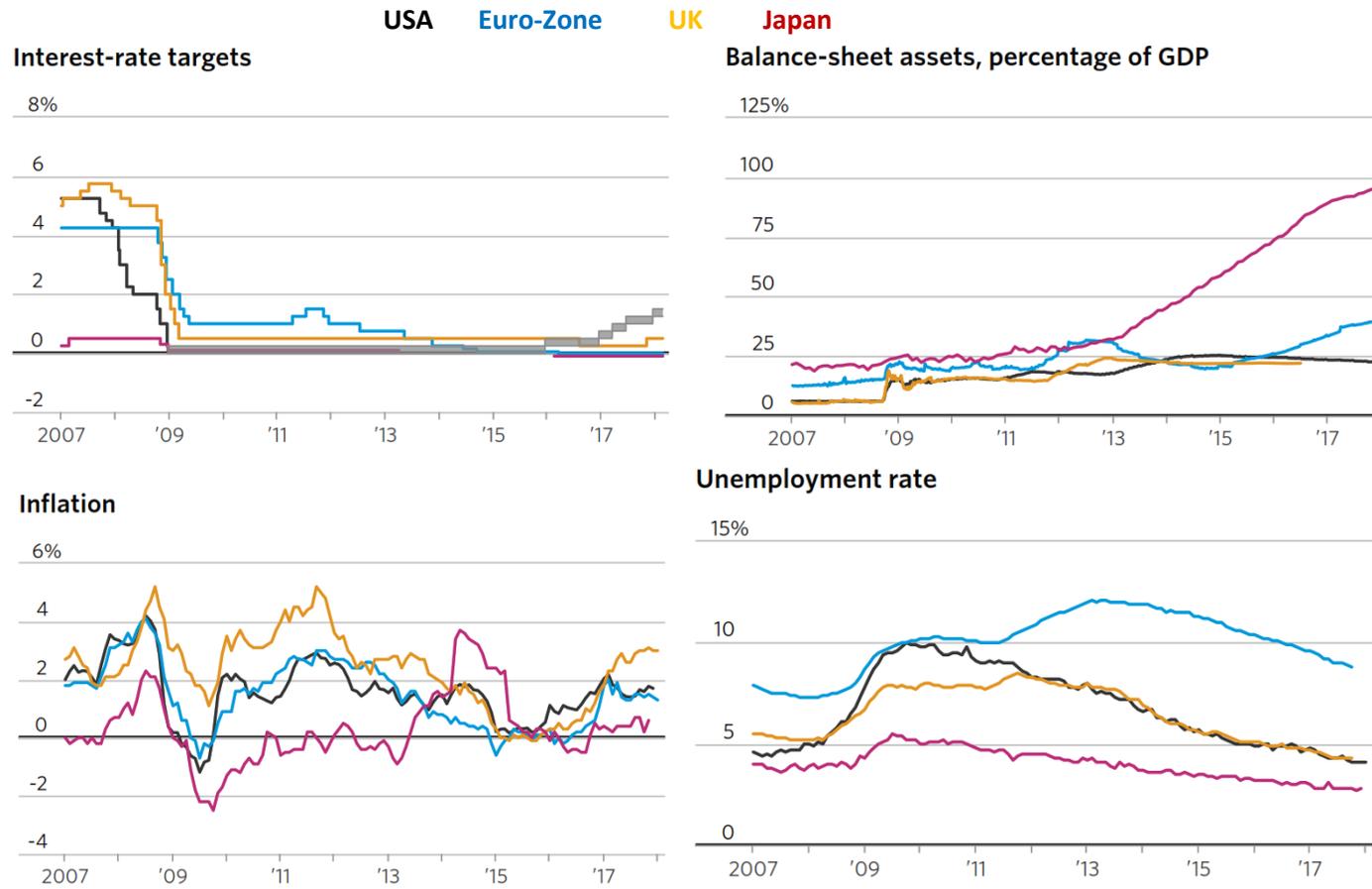
Table 3 BoE timeline intervention since 2008

early 2008	September 2008	October 2008	January 2009	February 2009	March 2009	March 2009	April-June 2009	August 2009	October 2011	July 2012	August 2016	August 2016	August 2016
Nationalizing the Northern Rock after its collapse on Sept 2007 And injecting massive liquidity into the system and guaranteed all interbank deposit	Set up of the UK financial Investment	Further injection of liquidity and reduction of Bank rate	introduced the Asset Purchase Facility (APF)	New Banking Act giving greater powers of intervention to the BoE 'Special Resolution Regime'	Reduction of the Bank rate to 0.50%	Initiating QE	buying government securities and commercial paper (£50bn on commercial paper)	QE increased to (£175bn)	QE increased By (£75bn)	QE increased By (£50bn) to a reach a total of £375bn overall	QE increased By (£70bn) reach a total of £445bn overall	a new £100bn 'Term Funding Scheme' for banks and building societies	Reduction of the Bank rate to 0.25%
It was considered a serious crisis to the UK banking system	to oversee the financial system			Statuary objective to promote financial stability	to restore bank lending	to achieve the set Inflation Targeting via the output gap					in view of financial stability risks of the vote to exit the EU	allow them to borrow at close to bank rate from official reserves, provided they lend it to consumers and businesses	

Table 4 ECB timeline intervention since 2008

mid-2008	May 2009	June 2009	2014	June 2014	January 2015	March 2015	March 2016	June 2016
Increase the official rate	Decrease the official rate from 4.25% to 1%	purchase euro-denominated covered bonds issued in the euro area, applying a fixed rate tender with full allotment	Introducing the Long-Term Refinancing Operation	the rate became 0.00%; negative rates on bank deposits	Initiation of QE; to purchase €60 billion of euro area bonds and other safe financial assets, every month between March (2015) and September (2016), or until inflation is back to the ECB's inflation target. implies total purchases worth around €1.1 trillion	Started the QE	introduced the Targeted Long-Term Refinancing Operation	buy euro-denominated corporate bonds as part of its QE
	To help banks of financing the real economy						aim is to allow borrowing by the banks up to 30% of their non-mortgage lending, provided they expand credit to the real economy. The ECB has also increased the range of assets to buy. The relevant range now includes corporate bonds alongside government bonds, asset-backed securities and covered bonds	

Figure 1 USA, Euro-zone, UK and Japan key macroeconomic indicators



Sources: National statistical agencies and central banks via the Federal Reserve Bank of St. Louis, Bank of England, U.K. Office of National Statistics, European Central Bank, Statistics Bureau of Japan (Ministry of Internal Affairs and Communications)

Table 5 Crises Outcomes and Resolution in the Euro Area and the United States

Country	Output loss	Increase in debt	Monetary expansion	Fiscal costs	Fiscal costs	Peak liquidity	Liquidity support	Peak NPLs
	In percent of GDP				In percent of financial system assets	In percent of deposits and foreign liabilities	In percent of total loans	
Euro area	23.0	19.9	8.3	3.9	1.7	19.3	13.3	3.8
United States	31.0	23.6	7.9	4.5	2.1	4.7	4.7	3.9

Source, IMF (Laeven and Valencia, 2012)

Chapter 2: *New Consensus Macroeconomics (NCM) and Post-Keynesians Critiques*

2.1 Introduction

The recent great financial crisis (2007-2008) has shown the inadequate theories and policies of what is called New Consensus Macroeconomics (NCM) (Arestis and Sawyer, 2011). In order to analyse the NCM, I critically analyse NCM theory and policy from a post-Keynesian perspective. NCM ideas pertaining to macroeconomic policies have assumed that markets and particularly financial markets are stable and efficient, such that leaving financial institutions to self-regulate would ensure market efficiency. The NCM model has continued to take an active approach to the overall research and has also been accommodated in higher-education institutions. Also, a lot of funds have been directed to NCM studies by research organisations. Most research conducted by the government as well as by the central bank has been based on NCM ideas since the early 1990s.

It is certain that before witnessing the financial crisis, a considerable number of mainstream economists were claiming the effectiveness of their established policies and theories pertaining to macroeconomics. For instance, Rajan, the chief economist of IMF (2005), claimed that macroeconomics at that time was 'progressive' in a methodological sense of advancing rather than politically progressive. Further, after the crisis, most NCM advocates have believed that the NCM theory and policies had nothing to do with the overall causes of the crisis (Bernanke, 2009). According to Taylor (2009) argued that the main cause of the crisis is the failure to adhere to the Taylor rule. However, the crisis triggered a new debate about NCM and mainstream economics. The debate has clearly demonstrated flaws in the NCM policies and models which were not even questioned before the crisis. Therefore, heterodox economists have continued to derive the notion that there is a need for re-examining the existing macroeconomic theory and policies. In the rest of this chapter, I investigate the

NCM model then the post-Keynesian critiques of NCM. Finally, a conclusion will be drawn.

2.2 The New Consensus Model

The New Consensus Model (NCM) is mainly based on the neoclassical school of thought. It has been associated with neoclassical economics and with the neoclassical synthesis, which combines neoclassical methods and Keynesian approach macroeconomics (Olivier J. Blanchard, 2008). It is rooted in the following key assumptions: a representative agent with maximizing-utility and maximizing-profit objectives, rational expectations, and forward-looking behaviour. Further, as an implication of these assumptions, the neutrality of money in the long run and the ineffectiveness of fiscal policy are key elements (Arestis & Sawyer, 2008). Moreover, intrinsically it assumes markets are stable by nature, and the laissez-faire economy and flexible price adjustment ensure the market clears and reaches equilibrium (Lavoie, 2009). Further, NCM theory and policy were in the interests of the financial sector in its push for deregulation, while it led central banks to abandon their main tools for effective and independent monetary policy (ibid). Margin requirements, reserve ratios, the discount window rate, credit controls, and bank supervision were left behind so as to only utilize open market operations, focused on the short-term interest rate and targeting the rate of inflation (Singleton, 2006). Singleton (2011) also found that by the end of the 1990s most advanced central banks set inflation targeting (IT) as a primary objective to be supported by an independent central bank maintaining monetary policy credibility, rather than having as their objective maintaining financial stability in the financial system.

Following the NCM model, monetary policymakers believe that inflation is a demand-pull-plus-expectations phenomenon, with demand being manipulated via interest rate and expectations through the credibility of the central bank to fight inflation as its primary responsibility, which is delegated by the government (Kriesler, 2015). Consequently, NCM monetary policy used the nominal interest rate as the key policy instrument to achieve IT.

NCM is viewed as an extension of the New Keynesian and neoclassical way of thinking, where the supply side determines the long-run outcome of output and employment (Lavoie, 2009). As with the strong emphasis on the long run in neoclassical models, this stream of thought believes that monetary policy is effective in the short run but is neutral in the long run. This stream emphasizes the existence of temporal nominal rigidities in wages and prices, and based on "Ricardian equivalence" it remarks on the ineffectiveness of fiscal policy (Arestis & Sawyer, 2008, Please see chapter 2 for more details on RE).

To simplify the NCM model, three equations are used: 1) Aggregate demand equation, 2) Phillip curve equation, and 3) monetary rule or Taylor rule. Essentially, these core equations capture the dynamics of output (output gap), inflation, and the interest rate.

The aggregate demand equation has been described in more depth by Creel and Fontana (2010) as

Equation 1

$$\left[\frac{(y - \bar{y})_t}{(y - \bar{y})_{t-1}} \right] = a_0 + a_1 \left[\frac{(y - \bar{y})_{t-1}}{(y - \bar{y})_{t-2}} \right] + a_2 E_t \left[\frac{(y - \bar{y})_{t+1}}{(y - \bar{y})_t} \right] + a_3 \left[\frac{(i_t - E_t(\pi)_{t+1})}{(i_t - E_t(\pi)_t)} \right] + s_1$$

y : current output, \bar{y} : potential level of output, t : time, E_t : expectation operator, i_t : short-term nominal interest rate, π : the rate of inflation, s_1 : stochastic shocks

In this equation, the current output gap $\left[\frac{(y - \bar{y})_t}{(y - \bar{y})_{t-1}} \right]$ depends on the past output gap $\left[\frac{(y - \bar{y})_{t-1}}{(y - \bar{y})_{t-2}} \right]$, the expected future output gap $E_t \left[\frac{(y - \bar{y})_{t+1}}{(y - \bar{y})_t} \right]$, and the real interest rate $\left[\frac{(i - E_t(\pi))_{t+1}}{(i - E_t(\pi))_t} \right]$. As in the previous versions of this equation, the interest rate has an inverse relationship with the output gap, given that a_3 is a negative parameter. The aggregate demand equation basically shows an inverse relationship between the real interest rate and the output gap, and that level of output is affected by the nominal interest rate and inflation expectations.

The second core equation of the NCM can be presented as the following Phillips-curve equation:

Equation 2 (Creel and Fontana, 2010)

$$\pi_t = b_1 \pi_{(t-1)} + b_2 E_t (\pi_{(t+1)}) + b_3 [(y - \bar{y})]_t + s_2$$

This equation represents the supply side of the economy, allowing for sticky prices and rational expectations. Furthermore, it shows that inflation, π_t , is a positive function of past inflation, $\pi_{(t-1)}$, future expectations of inflation, $E_t (\pi_{(t+1)})$, and the output gap, $[(y - \bar{y})]_t$. The key idea of this equation is that there is an output–inflation rate trade-off in the short run, while this trade-off disappears in the long run. Therefore, it can be considered as the equivalent of the model of the nonaccelerating inflation rate of unemployment (NAIRU).

Phillips' work (1958) showed an empirical relation between inflation and some measurements of economic activity, such as unemployment and the output gap (Daly, 2014). According to the Phillips-curve mechanism, there is a short-run relationship and trade-off between unemployment and wage inflation, where lower (higher) unemployment leads to higher (lower) inflation. Therefore, there is a danger of low unemployment, as it could lead not just to a higher rate of inflation, but also even to hyperinflation. Implicitly, the Phillips curve includes expected inflation and economic activity as determinants of the rate of inflation (Forder 2016). We could look to the Phillips curve as an indirect measure of the degree of credible commitment of the central bank to the main objective of price stability. Both ways of representing the NCM Phillips curve basically show that, in the short run, there is a trade-off between inflation and output.

The main contribution of the NCM was to reject the Quantity Theory of Money (QTM) analysis, by rejecting the targeting of money supply to control inflation in favour of the interest rate tool and by implicitly rejecting exogenous money supply in favour of a weak form of endogenous money (Lavoie, 2009). The utilization of the interest rate tool came from Wicksell's work, where he introduced two interest rates, the natural rate of interest (which is used in Taylor's role as a given), determined by supply and demand in the goods market, and a loan interest rate, determined by the banking system (Fontana, 2006). According to Wicksell, an inflationary (deflationary) process, where the price level becomes higher (lower), will start whenever the loan rate is lower (higher) than the real natural interest rate (ibid). Moreover, the difference between

investment and savings, which is a function of the difference between the loan rate and the natural rate of interest, causes changes in price levels or inflation (ibid). However, Keynes (1936) in his *General Theory* contradicts the idea of a specific interest rate, such as the natural rate of interest that equilibrate savings and investment, by arguing that a natural interest rate corresponds to each level of demand and results in bringing investment and savings into balance. He assumes that asymmetric information and credit are considered nominal because of circumstances where bank loans' interest rates differ from policy interest rates.

A particular monetary reaction function, often referred to as the Taylor rule (Taylor, 1992), is the third equation of NCM, and it can be represented as follows:

Equation 3

$$i_t = r^* + c_1 (\pi - \pi_T) + c_2 (y - \bar{y})$$

This equation shows that central banks have power to set a short-term nominal policy interest rate, giving them the capacity to determine the natural interest rate, r^* . In addition, this equation indicates that the real interest rate is not only influenced by the inflation gap, which is the difference between inflation and the inflation target, but also by the output gap. In other terms, the nominal interest rate is explained by the current output gap, the deviation of current inflation from its target, and the natural rate of interest (Arestis, 2009).

These three main equations in effect summarise the dynamic stochastic general equilibrium approach (see chapter 5 for further discussion on the DSGE model), which central banks have used in addition to other Macro forecasting models. These equations represent the core conceptual framework of the operations of many central banks around the world, whereby they use the interest rate tool to achieve long-run price stability as well as output stability in the short run. However, post-Keynesians have criticized NCM and its misconceptions. The main criticisms are discussed in the following section.

2.3 Post-Keynesian Critiques of NCM

Post-Keynesian economists have criticized the NCM in numerous ways. They argue first that the NCM is unrealistic in its views of financial stability, rationality, risk, and micro-foundations. The second of the main critiques is to reject, first, the apparent absence of money and banks in the NCM model, which is implicitly based on the Quantity Theory of Money, and, second, the separation between the monetary sphere and the real production sphere (Chick, 2013). Those features are similar to those of 'monetarism,' where the money supply is exogenous and monetary policy is neutral in the long run (Lavoie, 2009). Third, it is argued that inflation is not a monetary phenomenon (demand-driven); rather, it is driven by supply (cost-push) factors such as wages, profits, exchange rate changes, and international prices (Sawyer, 2003). Fourth, rejecting the notion of the ineffectiveness of fiscal policy, they consider fiscal policy as a powerful stabilizing tool that can provide a "floor" for the economy (Arestis & Sawyer, 2008). Fifth, they reject financial market deregulation, and consider financial stability as the main objective of central banks, given the inherent instability of the financial system.

Start with the first set of criticisms, and specifically the problem of how NCM views the financial sector. Following the neoclassical paradigm, NCM designed a macroeconomic model based on an idealistic approach and a perfect world with no default or bankruptcy, one representative rational agent, and individuals optimising over infinite time horizons in a self-correcting and self-regulating market (Dow, 2017; Goodhart, 2016). Goodhart (2016) argued that the NCM model assumes no defaults because of the efficient market hypothesis. Unsurprisingly, this assumption is based on the free banking school, which assumes that a freely competitive banking sector (financial market) will always be in equilibrium in the long run. In the 1930s, the free banking school was revived in the debate between Keynes and Hayek. The latter, in addition to Friedman later, was a true believer in the stable nature of the banking sector in the sense that a free, competitive, and self-regulating financial market will enhance stability in the financial market and the economy (Goodhart, 2010). Therefore, such theorists argue, there is no need for a central bank in the first

place, and no need for regulation, as this will be a destabilising force. In contrast, Keynes, and Minsky later, argued that the banking sector and financial market are instable in nature, that the free-market mechanism and self-adjusting market are myths rather than a reality. Thus central banking and macroeconomic policies are a must for stabilizing such an unstable economy (Minsky, 1986).

Another aspect of reality the NCM model explicitly disregarded is animal spirits. The atomic nature of society is essential to the NCM, reducing all individuals to a rational representative agent who is a utility-and-profit maximiser. The rational representative agent is rather unrealistic, as sentiments and animal spirits of investors and markets, in general, are an economic reality (Dow, 2013).

Dow argued that fundamental uncertainty introduces an important dimension in the market which further challenges such an unrealistic assumption as rationality. The notion of fundamental uncertainty is fundamental to post-Keynesian theory. That simply means the future is unknown and unknowable. As Keynes (1937,) put it, fundamental uncertainty says that 'We simply do not know.' This notion is different from probabilistic risk. In this vein, predictions and forecasting based on calculable probability cannot provide a true economic model, mainly because of the limited availability of information. In a sense, expectations cannot be based on a true model of the economy, and will themselves feedback on the outcome of economic processes (Hein, 2016). Basically, fundamental uncertainty prevents precise maximisation strategies from being applied by firms or households; satisficing rather than maximising behaviour dominates the scene. Davidson (1988) considers uncertainty to be a major characteristic of human life as such.

Another controversial aspect of NCM is what is called 'the micro foundations of macroeconomics', in the sense that macroeconomics is a simple aggregation of microeconomic decisions and actions, and the direction of causation goes from the micro level to the macro level. Individual behaviour is aggregated to one representative agent who is rational and an optimiser in nature, and who also has an infinite life horizon. Sawyer (2018) argues first that the relationship between micro and macro analysis goes both directions, and not only one

direction, which means from micro to macro as well as from macro to micro. Second, aggregating micro behaviour means that it is necessary to understand macroeconomics as psychological, collective, coordinated behaviour in an uncertain world, rather than as based on one representative agent who represents all. This reflects the view of political-economy analysis where institutions and power are essential to understanding macroeconomics. Thirdly, some macro concepts cannot be simply disaggregated, such as interest rate, inflation, and unemployment, as they can only be understood and analysed at the macro level. Sawyer further states: "Macroeconomic analysis, whether in theoretical terms, for empirical forecasting or pedagogical reasons, has generally proceeded by invoking relationships between macroeconomic aggregates" (Sawyer, 2018).

For instance, the NAIRU is a level of unemployment at which (according to the theory at hand) the rate of inflation would be constant. The rate of inflation and the rate of unemployment are macro concepts, and the NAIRU cannot be derived from summing individual experiences. The NAIRU is a macroeconomic concept that is derived at the economy-wide level, but inflation and unemployment change continually depending on business cycles and other factors. Given that there is no warrant that NAIRU is an attainable notion, thus it may not act as a 'strong attractor' for economic activity (Sawyer, 2016; Sawyer, 2001). Therefore, there are many concepts and relationships which are macroeconomic in nature in the sense that they cannot be derived by the summation of individual microeconomic behaviour.

Moving on to the second major post-Keynesian criticism, the absence of money and banks in the NCM is very critical from a post-Keynesian perspective. As Lavoie (2009) described NCM, it is 'Monetarism without money' or, as it was described elsewhere, 'Hamlet without the prince'. The absence of banks is based on the free banking school view. Further, the neutrality of money is based on the view of money as a nominal phenomenon that does not have any real effects. Money is viewed mainly as exogenous to the economy and its main function as a medium of exchange (it is just a price), thus having no social value. In contrast, post-Keynesians view money as an endogenously created by the banking system

and more importantly as a social phenomenon. It is based on the right-obligation commitments between banks and firms which have developed over time. In a wider sense, the existence of money and its value is derived from trust and social reality (Lawson, 2016).

NCM 'upgrades' the role of central banks through interest rate policy as the only macroeconomic policy instrument. But the NCM downgrades the role of the central bank as a monetary authority (by excluding money from the model) and as a bank of banks (by making a model with no banks; indeed, banks do not appear in the NCM index of Woodford's book [Fontana and Passarella, 2018]).

In NCM, given its abstraction from money and banks, the real sector and the monetary sector can be separated (Chick, 2013). However, given that our economy is a monetary-production economy, as it was described by Keynes, money is endogenous—the sectors cannot be separated. Investment and spending decisions (demand for loans) drive the supply of money. Thus, money/credit creation is essential to our integrated monetary-production economy for two reasons. First, in order for production to take place, credit must be issued first. Second, since the future is uncertain, and money has a store-of-value function, economic agents would prefer to hold cash, so that could cause fluctuations in effective demand and in investment decisions (Lavoie, 2009). Therefore, money and banks play an essential role in a monetary-production economy and the monetary transmission mechanism. From an endogenous-money point of view, banks have a crucial role in creating (money) loans for firms. Since loans create deposits, the failure of banks to supply loans (credit) would affect production and the whole of the real economy, and would constrain any expansionary policy led by government or monetary authority (ibid).

Therefore, money is non-neutral in the short- and in the long-run, which means that there may not be any long-run equilibrium position for the economy that is independent of monetary policy (Epstein 2013). Empirical evidence suggests that interest rate variations can have long-lasting effects over investment and the stock of capital, showing the long-run non-neutrality of monetary policy (Lavoie 2012).

The third post-Keynesian critique concerns the central bank's monetary-policy focus on price stability, deriving from NCM's view of inflation as the major threat to economic stability. NCM considers inflation a monetary phenomenon and a demand-pull phenomenon (Hein, 2017; Dow, 2017). The NCM theoretical aspects have incorporated the real business cycle (RBC) mode of thought as a basic methodology with some alternatives that include recommendations for policy and market friction possibility (Hein, 2017). The framework of this theory resulted in the belief that the main goal for central banks when forming monetary policy is to maintain prices in a relatively stable state (Lavoie 2012). Besides, the existence of various conditions in the model enhances output growth, and as a result, there is stability of inflation. In order to enhance inflation stability, there is a need for monetary institutions and authorities to actively seek a nominal anchor (ibid). Thus, for NCM a central bank committed to achieving price stability would increase its accountability and credibility, which would enhance the independence of central banks, and this would ensure economic stability (ibid). Several countries have adopted the use of this model as it was seen as a simple, perfect model that captured and resolved all the economic problems.

Post-Keynesian economists dispute the ideas based on monetarism and QTM that inflation is a monetary phenomenon, and that money supply is the one and only cause of inflation. Rather the causality is the inverse. Expansion of the money stock is a consequence of inflation (Lavoie, 2014). They emphasise supply side factors and cost-push as the main causes of inflation. However, post-Keynesians do not reject the possibility of demand-pull as one possible cause of inflation (Sawyer, 2008).

Some studies found that there is no relation between interest rate and inflation rate as is claimed by the NCM. Consider as evidence recent experience with the low interest rate policy that was practiced by major central banks while inflation rate stayed low among developed countries for almost ten years (Lavoie, 2016). Thus, a close-to-zero interest rate was not able to increase inflation rate in most of the advanced economies. To support demand after the financial crisis, there was a necessity to ease monetary policy, but the nominal rate of interest rapidly

met a lower zero bound, hence creating a liquidity trap (Lavoie 2012). Thus, one lesson I would draw from the past decade is that Taylor rule has not been adhered to.

In accordance with the theory of Monetary Circuit, some mainstream economists suggest that an increase in interest rates will increase inflation, that will correspondingly increase the scope of monetary policy. Cochrane (2014) has argued that as the optimal solution for the low-interest-rate and inflation-rate issue in the recent period, a higher target of inflation should be set so as to maintain higher nominal rates. This means a higher interest rate is needed to increase inflation, which is inconsistent with the NCM policy reaction function.

In addition, post-Keynesians also denied the role of price stickiness in explaining unemployment, and they also rejected the Philips curve and its trade-off between inflation and unemployment (Arestis & Sawyer, 2011). The Phillips curve was originally an empirical observation on the wage inflation/unemployment rate relationship, which has moved to be a theory-driven idea about the price inflation/output gap relationship. Sawyer (2014) argued that the Phillips curve does not capture cost pressures on inflation, nor does it capture wage-price spiral effects in which price inflation pushes up wage inflation, and wage inflation pushes up price inflation. It also ignores any conflicts over income shares, which come to the fore in other explanations of the inflationary process. In contrast, following Keynes and Kalecki, for post-Keynesians, employment, income, and inflation cannot be understood outside of the monetary-production economy, where credit and money play an essential role. Furthermore, unemployment is a feature of a capitalist economy, with the notion of active price setting of firms in oligopolistic or monopolistic markets. That is also based on the fundamental notion of effective demand and full employment, as capitalist economies are faced with unemployment and excess capacities beyond the short run and they take the rate of capacity utilisation as an adjusting variable also in the medium to long run (Hein, 2017). Therefore, whether prices are flexible or not is not the issue; what matters is the fundamental fact of unemployment as an outcome of the distributional effects in a capitalist underutilised monetary-production economy.

The fourth post-Keynesian critique asserts that fiscal policy, using price and income policies, is a better macroeconomic policy to deal with price level instability, and more broadly, the post-Keynesians look to a fuller set of policy instruments than just monetary policy. As recognised by Keynes, government intervention and monetary policy are essential for investment decisions, contrary to the sole utilization of interest rate that is low. What is more, many post-Keynesian economists consider that achieving the full-employment objective could promote financial stability as well (Forder 2016). Conversely, it is hard to maintain full employment in the economy without having a stable financial structure. Therefore, a crucial role of monetary policy is to effectively promote stable full employment, through the financial-stability objective (Lavoie, 2012).

In this vein, some post-Keynesians consider that financial stability should be the main objective of central banks (Arestis & Sawyer, 2009). Fiscal policy is the only existent tool for countering the recent prolonged crisis in particular when both monetary policy and quantitative easing have reached their limits (Lavoie, 2012). Thus, post-Keynesians rejected the ineffectiveness of fiscal policy in NCM, by rejecting Ricardian equivalence (Sawyer, 2008). Fiscal policy is intended to underpin full employment and enhance economic stability. In addition, it also helps to avoid disaster in the financial markets, which usually comes in the form of a drastic increase in public debt and deficit. Further, investment decisions are insensitive to the interest rate, or at best low sensitivity; thus, investment decision is based on many other factors such as 'animal spirits', future profitability, and uncertainty (Sawyer, 2008). Further, central banks could achieve financial stability through their lender of last resort, accommodative, and defensive functions, as well as employing the interest rate, supervision, and regulatory tools, all in coordination with fiscal policy (Lavoie, 2012).

Further, post-Keynesians denied Friedman's argument that the central bank's seeking to maintain price stability is more effective in promoting financial stability (Schwartz Hypothesis) than regulating the banking sector or intervening in the financial market. For instance, Kriesler (2015) argued that central bank inflation targeting to maintain price stability may lead to financial instability: by generating optimistic expectations for macro agents, inflation targeting could

lead to a credit boom and rising assets prices, and thus, financial instability. Following a similar line of thought, the Bank of International Settlements concluded that assets prices could be good indicators of output growth and future inflation. Thus, it could be argued that stock market prices are based on discounted future dividend payments, and thereby linked with future output and inflation.

On the fifth post-Keynesian critique, according to the efficient financial market hypothesis in NCM, deregulating the financial markets and removing legal limitations on financial institutions' actions provide incentives to arbitrage regulatory and economic controls purporting to avoid excessive leverage and risk-taking (Bernanke, 2006). This could be interpreted as saying that deregulation enhances financial stability. However, post-Keynesians following Minsky argued that financial markets are inherently unstable. Banks and financial institutions are primary agents for the spreading of the financial crisis in the market. Thus, central banks' intervention as lenders of last resort because of inadequate liquidity and insolvency is crucial to save the economy from collapse and to avoid deflationary growth of the monetary system (Epstein 2013). It is prudent to combine regulatory controls with interest rate policies and to increase the range of monetary policy with rules that are flexible (ibid). Interest rate policy addresses aggregate variables whereas the regulation policies solve specific problems.

Finally, as credit and finance matter, post-Keynesians have extensively studied and analysed the changing roles and structures of financial markets and institutions, what it is termed 'financialisation'. They put emphasis on changing financial norms, new financial instruments (credit card debt, home equity lending), deterioration of creditworthiness standards triggered by securitisation of mortgage debt, and 'originate and distribute' strategies of commercial banks. Those strategies made increasing credit available to low-income, low-wealth households (Hein, 2017). Financialisation will be studied in the next chapter, in particular the efficacy of monetary policy in the presence of securitisation.

2.4 Conclusions

In the light of the recent great recession, the NCM theory fallacies explain very clearly why existing policies are inadequate and why all the recent 'unconventional' measures have not succeeded. It is mainly due to the unrealistic and static theory and assumptions such as one representative agent; rational expectations; agents' optimising behaviour; no money; no banks; free, self-regulating and self-adjusting markets; and the possibility of predictions and forecasting. Also, NCM is a simple mathematical model that policies depend on. Central banks are still following Greenspan the 'Maestro' in dealing with the crisis, and following Bernanke and Gertler (1999), central bankers think they should limit themselves to "cleaning up" after busts, rather than worry whether they can "lean" against booms. Further, instead of questioning the ontology of central banking, central banks are event-led: while committing to IT, central banks keep their options open. Given their critiques of the unconventional standards, free market followers blame the Keynesian approach for the unsuccessful recovery. Here I would disagree. Calling these measures as Keynesian measures is misleading.

Alternative, realistic theories and policies should be allowed in the central banking arena if central banks want to really solve the 'unsolvable' crisis. For instance, post-Keynesians provide an ontologically more realistic approach which is based on economic and social reality. Post-Keynesian theory is based on uncertainty, irrationality, collective rather than individual behaviour, interrelation and interaction, conflict of power, the existence of institutions, endogenous money, the unstable nature of our economy, the importance of macroeconomic policies, and the role of cooperation between monetary and fiscal policies to achieve different goals and objectives. Before the recent crisis, many advanced central banks adopted the inflation target following the NCM model. The overnight rate has been considered as a viable policy instrument to fight inflation and ensure price stability. NCM paradigm based on free market mechanism, efficient financial market hypothesis, deregulation, the ineffectiveness of fiscal policy, and central bank independence has spread into academia and policymakers. However, the recent financial crisis has shown the

inherent flaws of NCM model. In order to enhance and provide a suitable set of instruments that lead to economic crises, there is a need to re-examine the NCM paradigm. Post-Keynesian perspective shows the fundamental elements of a monetary production economy. Money is inseparable from production decision (Hein 2012). The crucial role of banks lies in providing credit for financing investment and economic activity. The inherent instability of the financial market evidences the need for macroeconomic policies to promote financial stability. Monetary and fiscal policy interdependency is crucial to achieve full employment and promote financial and economic stability. Macroeconomic policies addressing the increasing role of financial sector 'financialisation' should be seriously taken into consideration. Thus, macroeconomic theory and policy should be re-examined to avoid the next economic crisis. The following chapter will challenge NCM monetary policy in the arena of securitisation.

Chapter 3: *Financialisation and Central Banking: The Impact of Monetary Policy on Securitisation*

3.1 Introduction

For the past three decades, the role of finance has escalated, changing the dynamics of the world economy, with a dramatic evolution and an increasing role of the financial sector at the macro and the micro levels of our world economy. Such a phenomenon is known as financialisation, which is defined and elaborated below. It has been the centre of attention among economists, particularly heterodox economists.

This phenomenon of 'financialisation' is associated with the influence of neo-liberal policies, which have been widely adopted since the 1980s, whereby policy makers pursue 'laissez-faire' economics and push for deregulation in the financial market. Furthermore, monetary theory and policy ruled by mainstream economics have limited the role of a central bank to one instrument (short-term interest rate) and one objective (price stability through inflation targeting).

In contrast, heterodox economists, particularly post-Keynesian ones, have stressed the role of money and banks in our monetary production economy and have identified the role of the central bank as a 'bank of banks' as a crucial one, where the central bank should focus on financial matters and financial stability. In addition, the dramatic increase of complex financial innovations, such as 'securitisation', has changed the banking model from 'originate and hold' to 'originate and distribute'. This newer model involves banks' transforming illiquid assets to liquid, creating more liquidity by expanding their balance sheets (off-balance sheet activities), lowering lending standards, increasing risk taking, increasing their ability to create liquidity, and more importantly being less dependent on central banks' liquidity.

Given the effects of securitisation, it is therefore important to re-examine the role of monetary policy and its transmission mechanism through bank credit channel. This paper aims to address the question of whether, and how securitisation offsets the effects of monetary policy on bank balance sheets. We empirically investigate the interdependencies between monetary policy and

banking activities using data from 1995 to 2015 for a panel of 10 countries. Our sample falls in the period of what is known as the 'Financialisation era'. We particularly focus on the interactions between securitisation activities and monetary policy using a panel VAR model, estimated using a GMM system. Our paper contributes to the evolving literature on the interactions of monetary policy and banks behaviour.

This study will first shed light on the financialisation era by providing a general description and understanding of this phenomenon. Second, I study monetary policy as formulated by mainstream economists. The third section will analyse the securitisation process to give a better understanding of this phenomenon, including its evolution and its financial structure. Then, the role of central bank policy will be analysed in relation to securitisation in order to investigate the efficacy of monetary policy and its transmission mechanism through the bank lending channel (balance sheet channel). Then the data will be considered, an econometric model applied, and the results analysed. Finally, I critically assess the role of securitisation and draw conclusions.

3.2 Financialisation

In the last thirty years, the increasing role of finance has changed the way the world economy works, shifting it from a real production economy to a finance-led capitalist economy. This phase of capitalism is what Minsky (1986) called 'the money manager phase of capitalism'. Minsky has described this phase as the outgrowth of a new banking business model with risky short-term performance and behaviour rather than a stable-long-term model of the overall financial sector's performance where the sector would play a role that serves the overall economy. The shift to this phase is called financialisation, one of the most popular terms used by heterodox economists to characterize the present phase of capitalism, in which it is ruled by neoliberal ideas (often supported by mainstream economists). Epstein (2005) defined financialisation as 'the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies'. Financialisation refers as well to the growing engagement of non-

financial corporations in the financial sector or the shift to shadow banking in financial markets (Nersisyan and Wray, 2010).

By way of context, since the early 1980s neo-liberal policies have been widely implemented. With deregulation of labour markets, reduction of government intervention into the market economy and of government demand management, a shift of income from (lower-income earners') wages to profits and top management salaries, and deregulation and liberalisation of national and international financial markets (Hein, 2011). Post-Keynesian economists have found in these paradigms and concepts the root cause of the current crisis. Furthermore, following Minsky's work (Minsky, 1986), some post-Keynesian economists have argued that financial fragility and instability is a systemic problem in such a neo-liberal system. It is a result of internal market processes that allowed fragility to build over time (Nersisyan and Wray, 2010; Stockhammer, 2010; Hein, 2011; Lapavitsas, 2010). In post-Keynesian terms, the financial system evolved from hedge to speculative, to, finally, a Ponzi scheme (Nerisyan and Wray, 2010).

Such an evolution mirrors a process of financialisation, which can be presented as the increasing and excessive use of financial innovations and products such as credit default swaps (CDS), derivatives, options, and mortgage-backed securities, as well as the excessive growth of leverage.

In a system with financialisation, the model of non-financial firms has completely changed from 'retain and reinvest' to 'downsize and distribute' or 'retain and buy financial assets'. Firms' long-term vision substituted for a shorter-term one, and firms are more involved in managing financial portfolios and financial matters than in production, affecting real investment in the economy (Lazonick and O'Sullivan, 2000). Firms' sales growth is driven by higher incentive management fees, higher dividends and stock options, and a booming stock market, along with looser credit standards and thus higher household debt ratios (Lavoie, 2008). Furthermore, industry, banks, workers, and financial markets have become financialized, individually and as a whole (Lapavitsas, 2010).

3.3 Securitisation

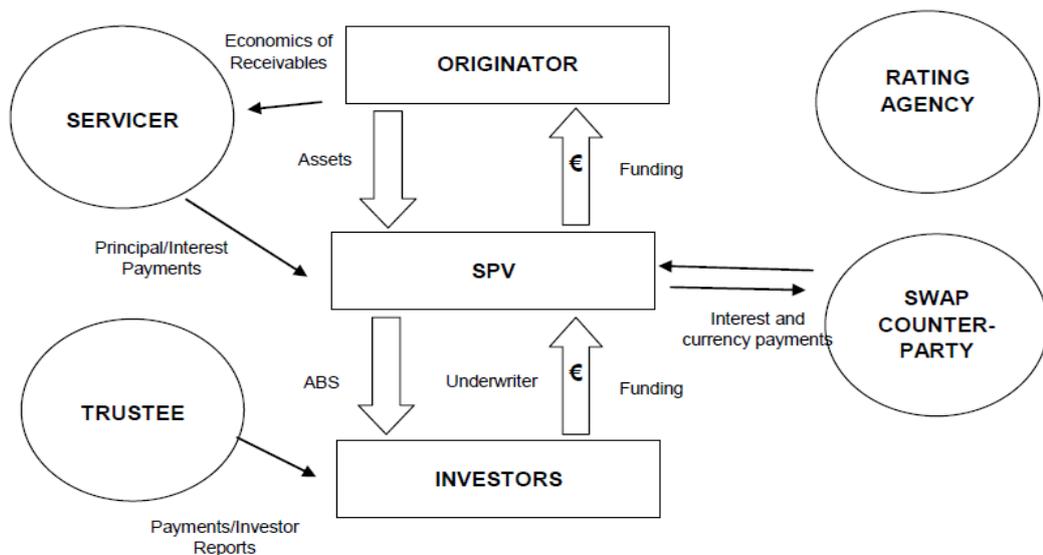
I focus on one important financial innovation: securitisation, which changed the traditional mode of operation of banks from 'originate and hold loans' to 'originate and distribute loans' by transforming their illiquid assets – long-term loans – into liquid ones that can be removed from their balance sheets, in the sense that the securitised loans are sold to other financial institutions. This securitisation mechanism helped banks to expand their balance sheets and have more power in liquidity creation. It delinked interest rate policy's impact on the volume of credit. Indeed, this dramatic change helped banks to be less dependent on central banks' policies and their transmission mechanism, in particular liquidity creation and the bank lending channel (BLC) through the balance sheet channel (off-balance sheet activities). Securitisation, first, helps banks to be at the centre of liquidity creation in the wholesale market (Dymski et al., 2016). Second, it gives them relief from Basel capital requirements, which allows them to increase credit volume with less constraint (Chick, 2016). Finally, it allows them to compete in the financial market, increasing their short-term profitability, thus banks' profits become based on fees rather than the interest rate spread (Dymski et al., 2016).

Securitisation is one of the most notorious and complex financial innovations of the last three decades. This phenomenon has undergone an expansive growth, which has produced profound changes across the financial sector, particularly the way in which banks create liquidities and generate income.

Simply, the securitisation process chain (see figure 2 below) starts when banks (originators) sell their account receivables, such as residential and commercial mortgages, auto loans, credit cards and student loans, which are known as 'true sale', to special purpose vehicles (SPVs). The latter then issues securities and usually acquires the underlying asset from the originator. SPV creates pools of loans depending on maturity and interest rate, then sells these pools of loans or securities in 'tranches' (senior, mezzanine, and unrated equity tranches) to investors. At the same time, the SPV appoints a servicer, usually a bank, to collect interest and principal payments on the underlying loans (Marques-Ibanez and Scheicher, 2012). This process guarantees the separation of the underlying

assets from the solvency of the originator. In this process, there are three other parties involved, the swap counterparty, the trustee, and the rating agency. The swap counterparty is usually involved in hedging the interest-rate and currency risk, while the trustee ensures that the money is transferred from the servicer to SPV and that investors are paid as well. Rating agencies are responsible for rating senior and mezzanine tranches using credit risk management techniques.

Figure 2: The process of Securitisation



Source: *A Resource Guide*, European Securitisation Forum (2006).

Functionally, securitisation can be defined as transforming illiquid assets to liquid ones as far as the banks are concerned and hence helps banks to increase their liquidity. We could summarize the motivations for securitisation in three categories. First, when banks sell their loans to what is called special purpose vehicle (SPV) and obtain a lump sum value by using off-balance-sheet techniques, it increases liquidity and profitability. By doing so, the banking system can secure additional funding, and it can satisfy the credit demand (Gorton and Pennacchi, 1995). Moreover, when banks service the securitized loan, they also obtain revenue from this process, increasing profitability. Second, by selling loans and getting involved in off-balance sheet activities, banks can transfer credit risk to SPV's and other financial institutions in the securitisation process chain. Indeed, Menton, Sanders, and Strahan (2004) and Bannier and Hansel (2008) found that the primary purpose of securitisation is credit risk transfer, as well as to serve as a new funding tool, which helps banks to be more

efficient, share risk, and increase liquidity. Furthermore, according to Pennacchi (1988), this process provides a lower cost method of financing for banks facing a competitive deposit market. Third, banks obtain regulatory capital relief by the removal of loans from their balance sheets, which allows for increased liquidity.

I focus on the first motive, which relates to the increase of liquidity by the expansion of balance sheet through securitisation. This self-feeding process, based on the recirculation of loans, encourages banks to increase their credit supply and lower their credit standards, by giving loans to non-worthy clients and allows them to be less impacted by central bank's policy rate. Moreover, through securitisation, banks were able to escape the reserve constraints, and thus, monetary policy will not be effective through banking lending channel (Romer and Romer 1990). However, banks in some countries like Canada and Australia (and UK for sometimes) are not subject to reserve constraints.

In the USA, securitisation can be traced back to the 1930s, when the Federal National Mortgage Association was created to buy and sell insured mortgages federally. However, it was not until the 1970s that securitisation developed in the residential mortgage market. The USA was first to implement this financial innovation by the public law of the US Housing Ministry where the Government National Mortgage Association (GNMA or Ginnie Mae) has purchased mortgage loans and issued securities on them to support undercapitalized regions (Kotz 2010). The market for assets-backed securities started to develop by means of government-sponsored agencies, such as the Federal National Mortgage Association, known as Fannie Mae, and the Federal Home Loan Mortgage Corporation, known as Freddie Mac, which enhanced mortgage loan liquidity by issuing and guaranteeing but not originating asset-backed securities. The secondary market for mortgage-backed securities was around \$7.5 trillion in the middle of 2008 (Fed 2009). In the US, securitisation evolved under the framework set by the Glass-Steagall Act (1933), where investment banking, commercial banking, and securities firms were separated. In 1999 this regulation was replaced by the Gramm-Leach-Bliley Act (GLBA), which allows banks to associate with securities firms, in order to accommodate the needs of the financial sector. The growth of securitisation in the US, before and after the

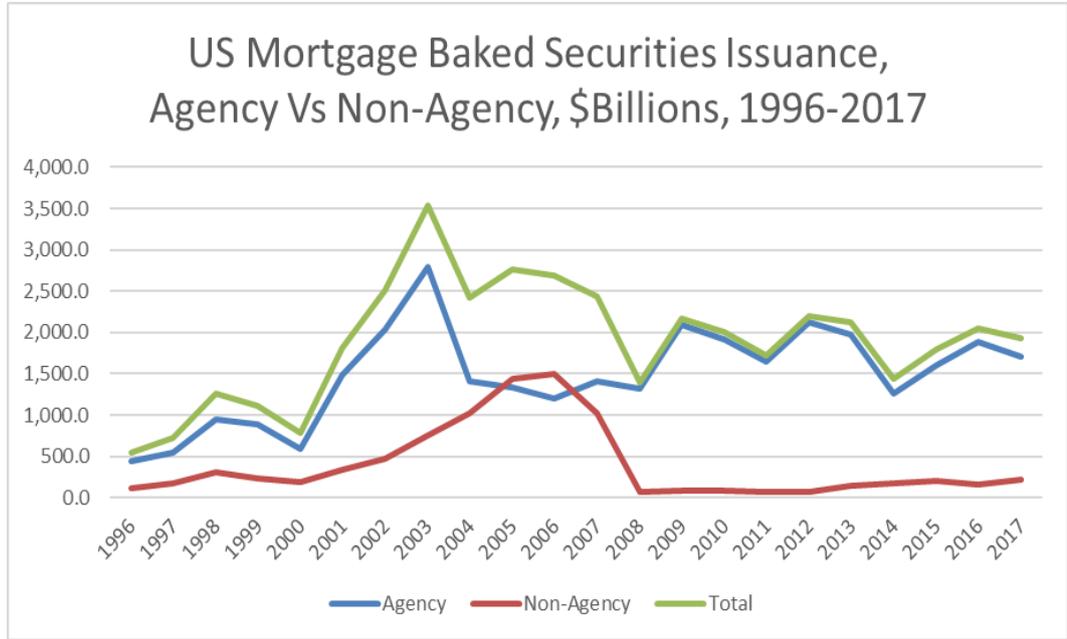
crisis, saw Mortgage-Backed Securities issued by government-sponsored agencies and private labels over time and saw the growth of assets backed securities, as is illustrated in figures 3 and 4 below.

In contrast to the US experience, the development of asset securitisation market started relatively late – at the end of the 1990s – in the Euro area. The reasons for the growth in securitisation activities were technological and financial innovations, and the introduction of the Euro, as well as the increase of demand for asset-backed securities. Since the introduction of the Euro, the increase of financial integration and the removal of exchange rate risk among Euro area countries have contributed to the growth of the securitisation market (Baele et al. 2004), as shown in figure 3. As in the US, the growth of securitisation in the Euro area has been supported by the financial sector regulatory framework, which has adapted to the needs of this sector. For instance, with the introduction of Law 130 (1999), known as the Italian Securitisation Law, Italian financial institutions were allowed to securitize and act as SPVs. The increase of securitisation activities was different among Euro area countries. Countries such as Italy, Spain, Portugal, Ireland, and the Netherlands have experienced a significant increase due to the rise in real estate prices. Furthermore, by 2005 commercial and residential mortgage-backed securities represented approximately 68% of all Euro area securities (European Securitisation Forum, 2005). Figures 5 summarizes the growth of securitisation issuance in the UK and the Euro-Zone countries.

A different approach to securitisation originated in the late eighteenth century in Denmark and Germany, where covered bonds are more active than mortgage-backed securities (Golin, 2006). In the case of covered bonds, the originator creates pools of the illiquid assets, and banks keep these covered bonds recorded and registered before then offering them to investors (Smallman, 2006). That is different from securitisation, where the illiquid assets are off the balance sheet. Instead, assets remain on the originators' (banks') balance sheet. Therefore, through this mechanism, the issuing bank will increase liquidity without transferring risk. In addition, given that assets in a pool are recorded and registered, in the event of the insolvency of the originator, investors can

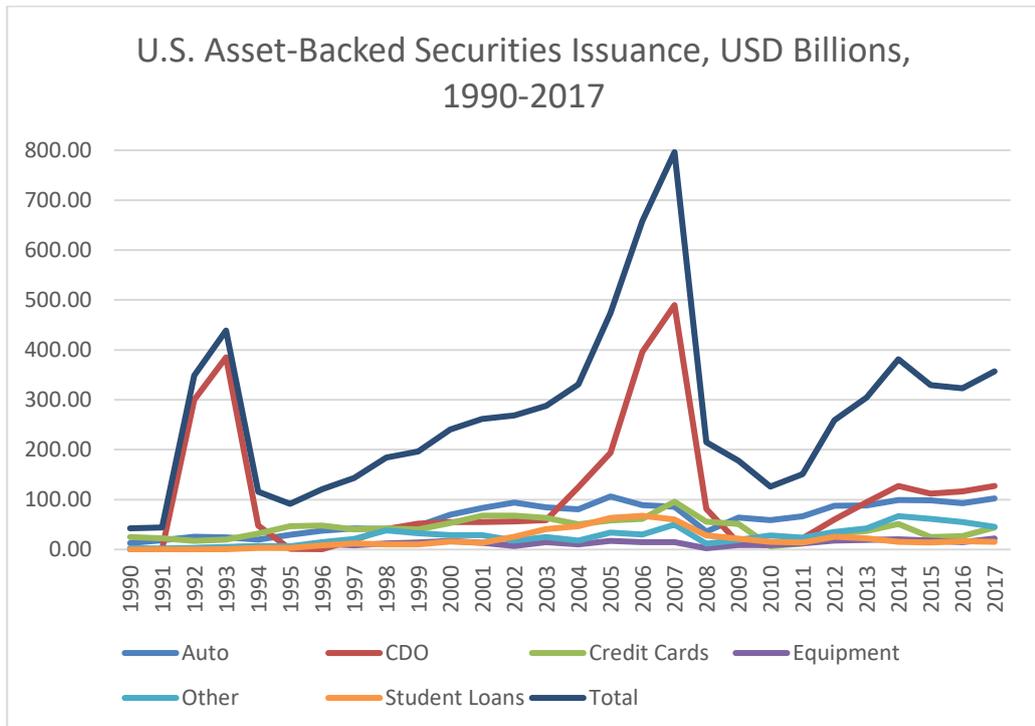
claim the assets backing the pool. In this way, payment through covered bonds is backed by the originator and the underlying assets.

Figure 3: US origination: Government Sponsored Enterprises (GSEs) Vs Private Label issuers. Source:



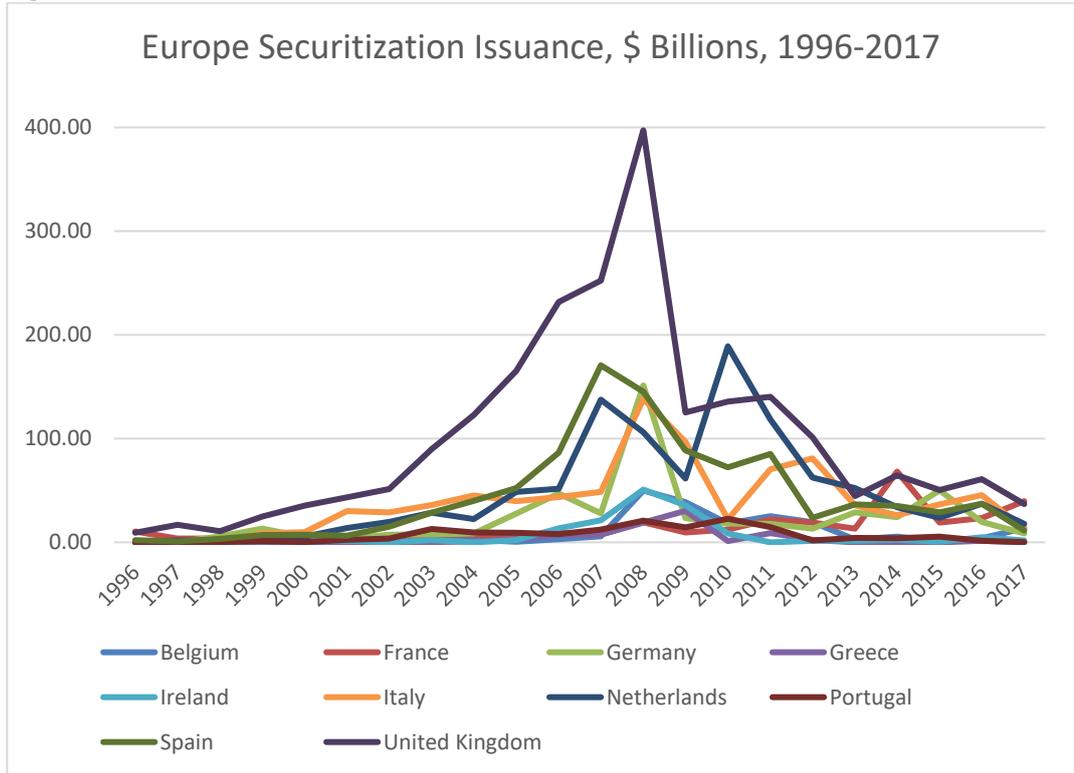
SIFMA, 2018.

Figure 4: ABS Issuance: US.



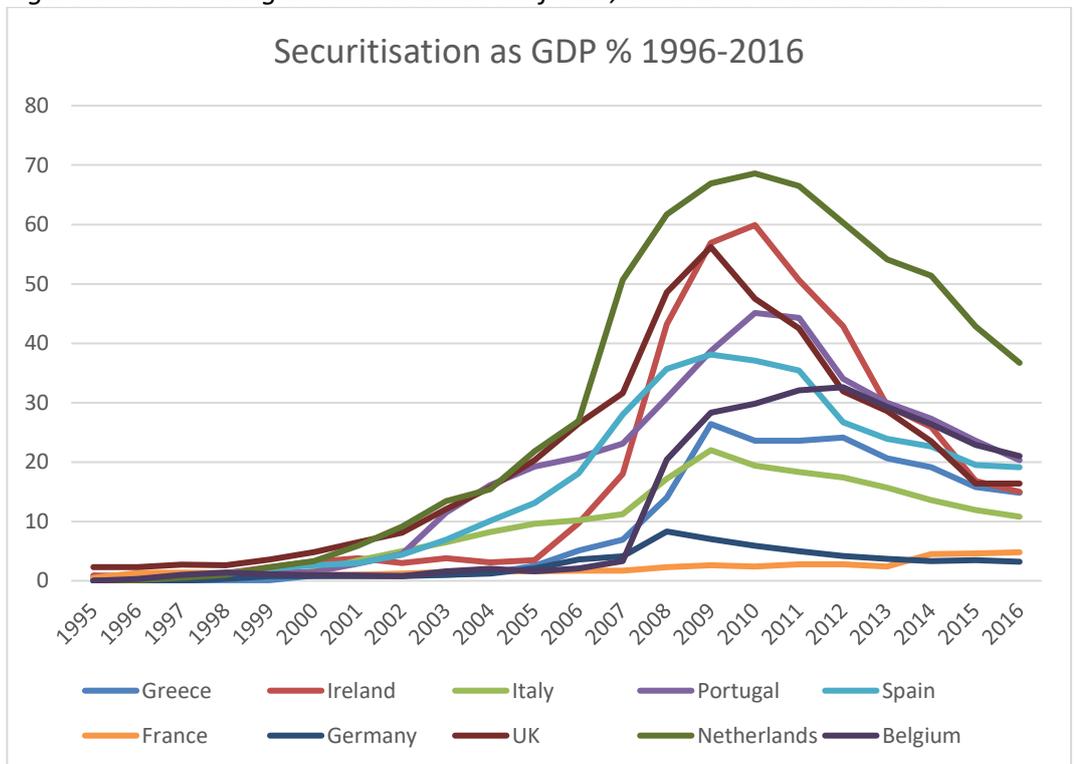
Source: SIFMA, 2018

Figure 5: UK & Euro Area countries



Source: SIFMA, 2018.

Figure 6: Outstanding Securitisation as % of GDP, UK & Euro Area Countries



Source: SIFMA, 2018.

The rapid growth of securitisation, before the crisis, in the US, the UK, and the Euro area, and its impact on the financial market and banks, leads us to research its effects on central banking and monetary policy. Such research is especially relevant with the call for a revival of securitisation in US and Europe, based on the idea of restoring liquidity in the market (BoE & ECB, 2014).

3.4 Securitisation and Monetary Policy

Securitisation has changed the financial structure and the way banking business is conducted. Many economists have pointed out that banks changed their traditional way of working from 'originate and hold' to 'originate and distribute', with the aim of generating income from the spread of interest rate (Kregel 2007). Furthermore, during the last thirty years, the role and the nature of banks have changed dramatically in the financial markets, where commercial banks lost their prominent role in the economy to the advantage of investment banks and financial markets (Seccareccia 2012).

An important aspect of securitisation is its impact on monetary policy and its transmission mechanisms, where changes in liquidity and credit-channel transmission mechanisms have reduced policy effectiveness (Estrella, 2002) due to the deep connection between banks' funding and financial markets. Through securitisation, banks are not subject to reserve constraints, and thus, monetary policy will not be effective through banking lending channel (Romer and Romer 1990). Banks' lending becomes more dependent on financial markets' conditions than on banks' deposits from the public. Indeed, securitisation could have a remarkable effect on the banking sector's ability to lend (ECB, 2008b). This is mainly due to the relief of the illiquid assets from banks' balance sheet. In this manner, by securitising the illiquid assets banks do not need to wait for the loans to be repaid. These findings are supported by Altunbas, Gambacorta, and Marques-Ibanez (2009), who used European banks' data to demonstrate that securitizing banks are less responsive to monetary policy because of the loosening of the link between central bank policy rate and banks' loans and deposit interest rates. Furthermore, they found that securitisation weakened banks' lending channel (in contrast to Aysun and Hepp (2011), who found that

the higher the degree of securitisation, the higher banks' responsiveness to monetary policy). Similarly, Altunbas, Gambacorta and Marques-Ibanez, Berger and Bouwman (2010) studied the influence of monetary policy on banks' liquidity creation (on and off-balance sheet) in the US, and found that medium and large banks' liquidity creation is not significantly affected by monetary policy. Furthermore, they have found that during economic crisis, banks' liquidity creation is even less responsive to monetary policy. The significance of these findings is evident when considering that medium and large banks in the US are responsible for the creation of approximately 90% of USA banks' liquidity. Moreover, the increasing influence of financial market forces towards determining credit expansion has limited the ability of the Fed to affect the economy through its monetary policy (D'Arista, 2009).

Nevertheless, according to Bernanke (2007), the then Fed chairman, "the globalization of financial markets has not materially reduced the ability of the Fed to influence financial conditions in the United States," but has only "added a dimension of complexity to the analysis of financial conditions and their determinants." Furthermore, Woodford explained: "all that matters is that the Fed be able to control overnight interest rates; this gives it the leverage that it needs in order to pursue its stabilization objectives [including price stability]" (Woodford, 2002:88).

Securitisation has also affected the lending standards of banks. Diamond (1984) and Gorton and Pennacchi (1995) have pointed out that the profitability of transferring assets from banks' balance sheets to markets has discouraged the screening of borrowers, changing the monitoring function of banks. That is consistent with the lowering of lending standards observed in economies with high securitisation rates, such as USA (Dell'Ariccia et al., 2008), and with the fact that securitizing banks make more loans (Altunbas et al., 2009). Furthermore, the lowering of lending standards will increase banks' default rate. Lower lending standards have another cause as well: Maddaloni and Peydró (2009), who studied the determinants of banks' lending standards in the Eurozone. They have found that low interest rates for extended periods of time

('cheap money') lower lending standards, regardless of borrowers' creditworthiness, while increasing banks' risk-taking.

And banks' risk-taking is accentuated by the use of securitisation under short-term low interest rate, along with weak lending-standards supervision. In addition, the more risk banks take with the ownership of mortgage-backed securities, the higher housing risk will be (Dong 2011). Furthermore, as the ECB admits in agreement with Kregel, "[securitisation] worked well for more than thirty years, but, in practice, instead of dispersing the risks associated with bank lending, securitisation had the perverse effect of concentrating them in the banking system" (ECB 2010, p. 77).

Therefore, given the impact of securitisation on banks' liquidity, lending standards, banks' risk-taking, and effectiveness of monetary policy, the role of the central bank as the bank of banks should be re-examined.

What should the primary objective of the central bank be? With the changing behaviour of financial markets and of banks, the central banks should focus on financial matters, taking into consideration the fragility of the financial market and system, rather than focus on interest rate policy to achieve inflation targeting (as prescribed by NCM). Therefore, given the central bank's importance as the centre of monetary and financial systems, it should play an important role in directing banks and financial institutions as well. Put differently, central banks should maintain their ability to regulate and control financial institutions, portfolio strategies, and loans' conditions. In other words, it should be the one to write the rules of the game (Minsky, 1975). Economists such as Minsky consider that central bank should play its 'bank of banks' role by focusing on the banking system, financial matters, and financial stability rather than inflation rate and price stability, and do not sympathize with the stance central banks adopted towards financialisation. Minsky argued that changes in the structure of the financial market should have led central bank actions and efficacy to be re-examined (Minsky, 1957).

3.5 Empirical analysis

3.5.1 Data and Methodology

To explore the efficacy of monetary policy and understand its transmission channels through the bank-lending channel (i.e., the balance-sheet channel), I use annual data from 1995 to 2015 for a panel of ten OECD countries (nine Euro-Zone countries and the UK). The variables in our empirical analysis include policy rates r - representing monetary policy; total stock of loans L ; and a proxy for securitisation, SEC . The SEC activity is constructed as follows:

Equation 4

$$SEC = \left(\frac{SL_{i,t}}{TA_{i,t-1}} \right) \cdot 100,$$

where SL stands for the flow of securitised lending in year t in country i , and $TA_{i,t-1}$ represents total assets at the end of the previous year. The data for securitised assets include mortgages-backed securities (MBS) and assets-backed securities (ABS). This measure of securitisation activity is consistent with Altunbas et al. (2009).

In addition, other relevant variables are included that are likely to interact with monetary policy as well as the banking sector. These variables include liquidity ratio LIQ and real output Y . The data for r , Y , and L are taken from Eurostat. The data for securitised assets are taken from Securities Industry and Financial Markets Associations (SIFMA).

I employ a panel VAR model, using GMM estimation technique. The implementation of a VAR model is a common practice in the literature to study the effects of monetary policy. The Panel VAR approach that I adopt has the same advantages as the traditional VAR model used for time-series analysis.

The panel VAR model can be represented as follows:

Equation 5

$$Y_{i,t} = \alpha_i + A(L)_i Y_{i,t-1} + \beta_i \varepsilon_{i,t}$$

where $Y_{i,t}$ represents a vector of endogenous stationary variables for every country ($i=1,2,\dots,T$), α_i represents a vector of country fixed effects, $A(L)_i$ is a

matrix polynomial in the lag operator (L), and β_i is the contemporaneous matrix of the disturbances $\varepsilon_{i,t}$.

It is well known that fixed-effects estimation in a cross-sectional time series (panel data) is inconsistent because of the presence of lags of the dependent variable, resulting in a correlation between fixed effects and regressors (Nickell 1981). In the presence of correlation between fixed effects and regressors, the standard mean differencing leads to biased estimates (Holtz-Eakin et al., 1988). Following Love and Zicchino (2006), this problem is overcome by adopting the GMM procedure, using the forward mean differencing known as the Helmert transformation. This procedure involves the transformation of all variables into deviations from forwarding means, which preserves the orthogonality between transformed variables and lagged regressors. The lagged regressors are used as instruments in the GMM estimation to obtain unbiased coefficients.

To obtain orthogonal impulse response functions by following a Cholesky decomposition, the ordering of the benchmark model is as follows:

Equation 6

$$Y_{i,t} = [\ln(Y), r, \ln(L), \ln(LIQ), \ln(SEC)].$$

The ordering of the first two variables is consistent with the vast empirical literature on the identification of monetary-policy shocks in VAR models, where output precedes the policy rate (see, e.g., Christiano et al. (1996, 1999), and Mojon and Peersman (2001) amongst others). The ordering of the last three variables is not addressed in the existing literature. However, it can be argued that this ordering is consistent with the behaviour of modern central banks. The monetary authorities directly respond to output fluctuations to fulfil the objective of stable economic growth. Therefore, output shocks have contemporaneous effects on output whereas policy rates affect output with a lag. On the other hand, monetary authorities do not respond directly to credit growth in the economy whereas banking behaviour is directly affected by monetary-policy decisions. Therefore, monetary policy shocks contemporaneously affect banking behaviour but banks' behaviour, in turn, affects output and policy rates with a lag. Finally, our proxy of securitisation is directly affected by all variables

whereas securitisation affects all variables in the system with a lag. The results of a Cholesky decomposition are usually sensitive to the ordering of variables; we, therefore, try different orders to test the sensitivity of our results, as will be discussed later.

Prior to the estimation of a VAR model, I apply several panel unit-root tests. First, the cross-sectionally augmented IPS (CIPS) test proposed by Pesaran (2007) is used, which accounts for the cross-sectional dependence. For completeness, I also apply Levin, Li, and Chu (2002) and Im, Pesaran, and Shin (2003). If the variables are found to exhibit a unit root, I difference them and re-test them for a unit root. The purpose of this exercise is to ensure that all variables comprising our vector $Y_{i,t}$ are stationary, which will result in a stable model.

The aim here is to investigate the role of the central bank as the 'bank of banks' in the financialisation era by studying the interdependencies between securitisation activity and monetary policy. Considering a panel of UK banks during the period 1980-2016 and Euro-area banks for the period 1996-2016, I look at the relationship between securitisation and monetary policy in order to study, in the presence of securitisation, the efficacy of monetary policy through the transmission mechanism whereby its policy rate affects banks' lending behaviour.

For the Euro-area, Eurostata are used for macro variables and bank-specific variables and the Securities Industry and Financial Markets Associations (SIFMA) for securitized assets. In this analysis, only mortgage-backed securities (MBS) and asset-backed securities (ABS) are considered as securitized assets.

The main contribution of this data analysis is to show that securitisation significantly affects the credit channel, which reduces the efficacy of monetary policy, confirming the recent empirical studies (Altunbas et al. 2009). The empirical literature about the estimation of this dynamic model (model1) started with Kashyap and Stein (1995), Ashcraft (2006) Altunbas et al. (2009), and Lopreite (2012).

3.5.2 Empirical results

Table (6) shows the results of panel unit-root tests. Overall, it can be concluded that all variables contain a unit root except the proxy for securitisation. The first difference of the variables containing a unit root is found to be stationary. The construction of the proxy for securitisation is based on the flow of loans. Thus, it is not surprising that this variable is stationary, as the flow of loans (i.e., the first difference of the stock of loans) is stationary.

Table 6: Unit-root tests

	$\ln Y$	$\ln \Delta Y$	$\ln L$	$\ln \Delta L$	r	Δr	$\ln LIQ$	$\ln \Delta LIQ$	$\ln SEC$
LLC	-1.509*	-4.604***	-0.967	-3.745***	-3.506***	-10.141***	-0.509	-12.653***	-3.507***
IPS	1.569	-3.927***	1.518	-2.816***	-0.855	-7.527***	-0.193	-10.709***	-2.710***
ADF	2.164	-3.767***	4.797	-2.957***	-0.805	-7.123***	-0.168	-8.974***	-2.749***
Hadri	6.953***	0.796	7.419***	5.720***	8.517***	0.803	5.719***	-0.160	2.022**

I include stationary variables in this model and estimate a dynamic panel VAR model. I use several lag-length selection criteria, all indicating the inclusion of one lag. Figure 6 shows the impulse response obtained using a Cholesky decomposition.

I first focus on the interactions between monetary policy and the activities of the banking sector. An interesting result emerging from the model is the response of securitisation activities to a monetary-policy shock. The results indicate that a one-standard-deviation positive shock to monetary policy (increase in interest rate) immediately increases the securitisation activities of the banking sector. On the other hand, the growth of traditional (non-securitised) loans immediately reduces in response to an increase in the interest rate. The empirical evidence here is in line with the argument that the banking sector in response to monetary policy tightening offloads their balance sheets via shadow entities. Thus, monetary policy does not seem to be effective in controlling credit growth in the economy but can rather induce credit intermediation, which may further increase system risk. This finding is consistent with some of the recent

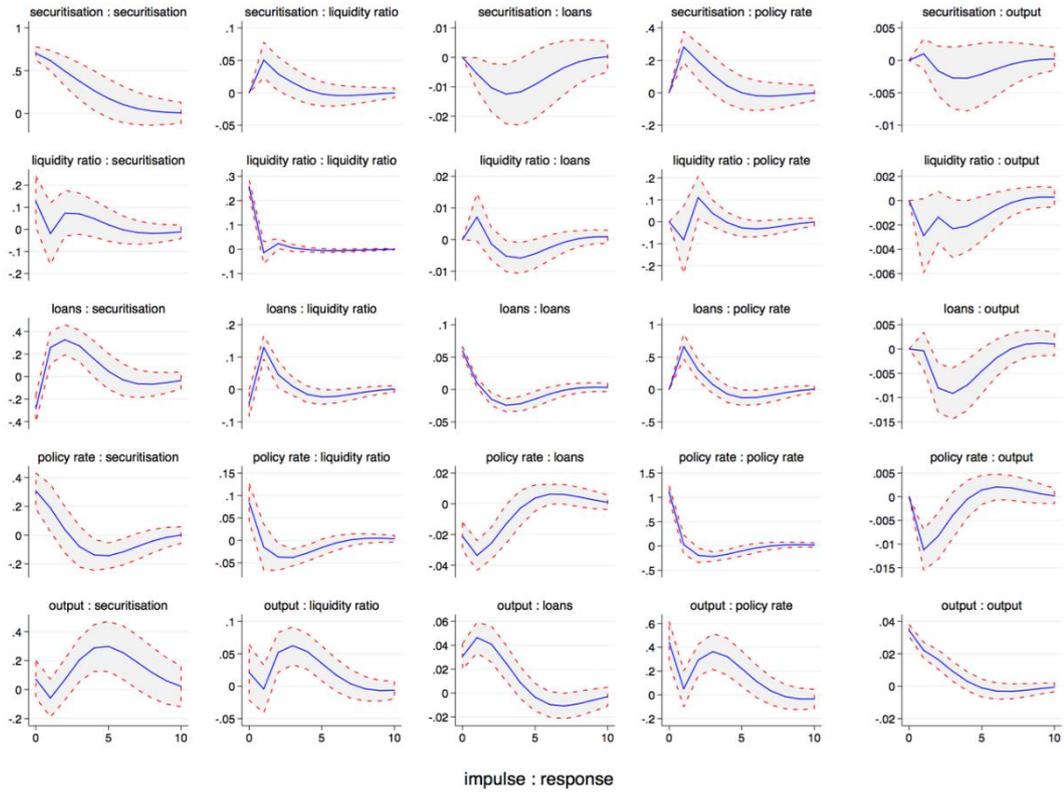
studies including Kashyap and Stein (1995), Ashcraft (2006) Altunbas et al. (2009, 2010), and Lopreite (2012), amongst others.

I focus in part on the interaction between securitisation and other developments in the banking sector. My results suggest that a shock to the growth of loans has a positive effect on securitisation, as expected. It is well known that an increase in the size of banks' balance sheets has greatly strengthened their ability to securitise loans over the last few decades. A one-standard-deviation positive shock to the liquidity ratio also has a positive impact on securitisation. A securitisation shock in turn also raises the liquidity ratio, as can be seen from the impulse responses. However, the same shock has a negative impact on loans; this could be explained as the banks' off-balance-sheet behaviour, which reduces the amount of loans held on their balance sheet through the securitisation process. This result is consistent with the fundamental objective of securitisation, which involves the transformation of illiquid assets into liquid ones, thereby increasing liquidity in the system.

I also focus on the interactions between real economic growth and the banking sector; the evidence suggests that real output shocks increase securitisation as well as loans. This result supports the general idea that a rise in economic activity is likely to increase the activities in the financial markets. Finally, our results indicate that securitisation shocks have a negative but insignificant impact on the growth of output and stock of loans.

My results are consistent with many recent studies such as Nelson et al. (2015), from BoE. They found a similar result: with contractionary monetary policy, the banks' assets decrease but the shadow-banking assets increase by the increase of securitisation activity, which makes the monetary policy less effective. In the same vein, Botta et al. (2016) have investigated the role of shadow banking and securitisation in macroeconomics, and they found that securitisation activities increase banks' liquidity and profitability and shadow-banking activities as well. However, they argued that risky activities and instability increase both in the real and the financial sides at least in the short run.

Figure 7: The impulse response obtained using a Cholesky decomposition.



Note: 95% confidence bands, lags=1. The shock is defined as a one-standard-deviation positive movement in a variable.

Figure 7 shows the forecast-error variance decomposition of securitisation. The variation in securitisation is largely explained by shocks to the growth of loans (apart from the shocks to securitisation itself). Monetary policy seems to play a minor role in explaining the dynamics of securitisation, once again calling into question the efficacy of monetary policy.

Figure 8: Forecast error variance decomposition (FEVD) for securitisation

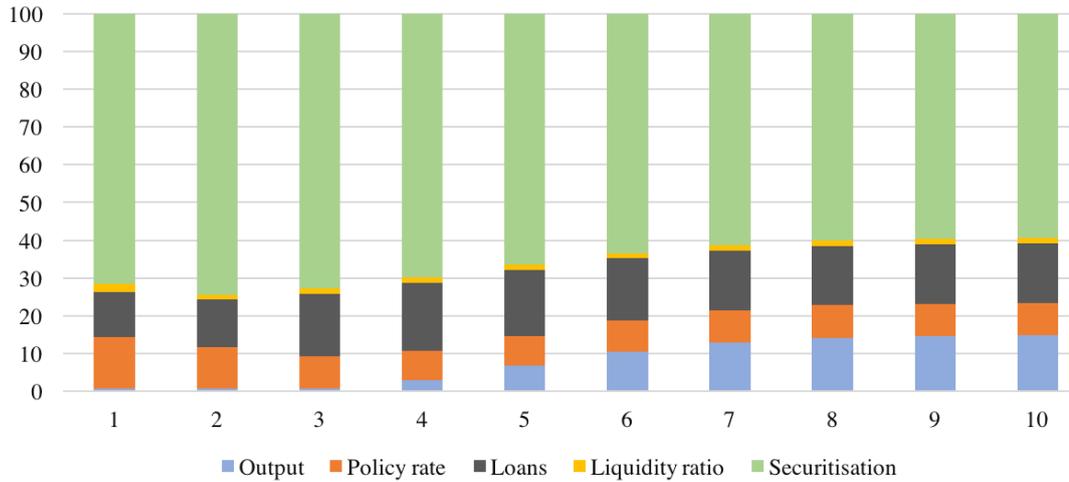
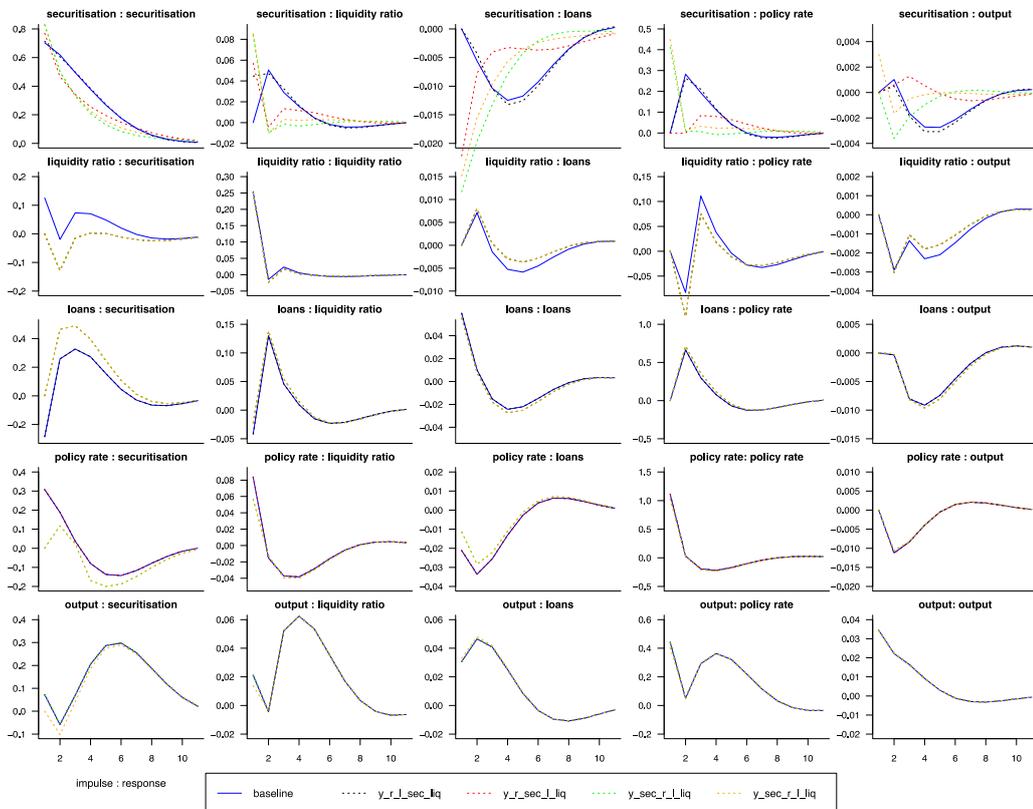


Table 7: Short-run causality

Note: GMM estimation, $n=10$, $T=20$

Dependent variable	Chi square (χ^2) statistics				
	$\ln\Delta Y_{t-1}$	Δr_{t-1}	$\ln\Delta L_{t-1}$	$\ln\Delta LIQ_{t-1}$	$\ln SEC_{t-1}$
$\ln\Delta Y_t$	-	-0.009*** [28.32]	-0.007 [0.05]	-0.012* [3.75]	0.001 [0.72]
Δr_t	-12.87*** [34.85]	-	12.68*** [75.52]	-0.524* [3.22]	0.40*** [32.18]
$\ln\Delta L_t$	1.56*** [71.38]	-0.027*** [53.88]	-	.031*** [4.12]	-.007*** [3.59]
$\ln\Delta LIQ_t$	-2.67*** [27.01]	0.02 [0.95]	2.45*** [86.77]	-	0.07*** [13.30]
$\ln SEC_t$	-12.05*** [88.06]	0.12*** [7.27]	8.18*** [145.21]	-0.51*** [6.75]	-

Figure 9: Robustness



As discussed earlier, the results of VAR models are sensitive to the ordering of variables when Cholesky identification is used. I pay considerable attention to the model sensitivities that might emerge from our ordering assumptions. In this regard, I estimate the model using various orderings. In particular, I focus on the position of our variable of interest, securitisation, which is modelled in every possible position in the VAR matrix. It is natural to expect that the shapes of impulse responses would differ because of different constraints on contemporaneous effects, as can be seen in the first row of figure 8. However, it is important to highlight that the results are quite robust to the ordering in the sense that they do not affect our overall conclusion in any fundamental way. That increases our confidence in the validity of the model.

3.6 Critical Assessment of the Role of Securitisation in the Financial Market

The changing behaviour of banks has come about so banks could maintain their leadership in the changing system, which is characterised by deregulation. Deregulation increased complex financial innovations and the beliefs that financial actors such as hedge funds and private-equity funds have the ability to exceed the market return, and make short-term profits, using diversification and simple mathematical formulas and models of risk management to eliminate risk. Minsky, anticipating such beliefs, stated that "the total return on the portfolio is the only criteria used for judging the performance of the managers of these funds" (Minsky 1996).

The behaviour of these financial actors pushed insurance companies, trust funds, and other intermediaries in the same direction. Securitisation promised to best match the preferred risk/return and holding-period profiles of market participants in general, but it tends to systematically understate risk (Coval et al., 2009). Banks' liquidity risk – a key source of vulnerability in an under-regulated banking system – is apparently less in a system with securitisation, but banks' exposure to risk remains because of recourse risk (Dymski 2010). And while securitisation improved banks' balance sheets and improved their profitability in the shorter run, it led to systemic risk and hid vulnerabilities that were brutally exposed by the subprime crisis. In effect, the expansion of

securitisation permitted deeper linkages between the major banks originating credit and non-bank financial firms in need of higher-return assets to purchase. The linkages led to systemic risk.

No financial expert expected that securitisation might cause such systemic risk or be as fertile as equities as a site for zero-sum short-term trading games, or that the parameters on which pricing was based might be corrupted. Only cautious doubts were registered about credit-rating agencies' accuracy prior to the crisis (Fender and Mitchell 2005). And as further evidence of lack of foresight, the very opacity of securitized instruments was taken as proof of markets' superiority in pricing (Oldfield 2000).

The increased importance of shadow banking and non-transparent financial transactions has made the credit process as a whole more opaque: loans that are securitized disappear from bank balance sheets, and the process is made more reliant on short-term non-deposit funding (Kroszner and Strahan, 2011).

Deregulation combined with the increase in securitisation and cross-border trade and finance has fed innovations in the practices and organizational logic of these firms that have far-reaching consequences. The interconnectedness between major banks and the shadow banking has added a huge growth in the complexity and size of these institutions, and these developments, in turn, have transformed both the character of financial instability and the role of banking firms in economic dynamics.

The banks at issue have not disappeared since the crisis but instead remain, with the help of the central banks' quantitative easing. Securitisation-based credit issued by such banks is, if anything, more dominant now than before 2008. By 2009, the "big four" banks held nearly half of all loans on the balance sheets of US commercial loans (Dymski and Kaltenbrunner 2016); this imbalance would be even greater were securitized loans to be included.

That is not the only cause for worry. All the efforts that have been made since the global financial crisis – such as the Dodd-Frank Act and the EU's Banking Union – to avoid future crises on the basis of capital requirements that properly

structured incentives (enough skin in the game for banks' owners) are thought to be sufficient by policymakers to avoid any repeat of this crisis. However, a new and more comprehensive account of major big banks' behaviour throws doubt on such a conclusion. Even worse, Botta et al. (2016) showed that the securitisation process makes legislations on capital requirement not only ineffective but also potentially counterproductive. If banks have to adhere to strict capital-ratio requirements, while having access to securitisation, they will have a strong incentive to take part in the creation of structured finance products to lighten their balance sheets, hence harming the stability of the economy as a whole (Botta et al., 2016).

There are many studies that claim that the regulations are working perfectly, and that it is a good practice to encourage the securitisation activity to increase liquidity in the market. For instance, Adrian (2017), of the IMF, argued that in advanced economies, many of the risky activities that led to the global financial crisis no longer exist or pose a threat to financial stability. He states: 'To cite just a few areas, securitisation practices have been strengthened, repo market activities have been overhauled, money market funds have been made more robust, and interconnectedness between banks and shadow banks has declined. Reform efforts have aimed at transforming the structural characteristics of riskier aspects of shadow banking, as well as the economic incentives. The business models of intermediaries have fundamentally changed as a result'. A similar work from BoE and ECB (2014) argued for the potential benefits and importance of securitisation on increasing liquidity and lowering risk.

But the new, challenging banking behaviour under financial markets with complexity and opaqueness could not be simply controlled through new capital requirements for banks, 'skin in the game' capital standards for shadow-banking subsidiaries or affiliates, greater transparency, and more diligent reporting. Most of these reforms are being implemented. But beyond these elements is the very business model itself that too-big-to-fail banks have embedded at the heart of contemporary global finance. The lack of any base-line function within the broader economic system and the blind insistence on above-average rates of return are, quite simply, an explosive combination, given that the megabanks

have become too big to fail and have largely resisted efforts to rein in their behaviour to date. This the main reason why shadow banking occurs partly inside the boundary of megabanks, and partly outside it.

All in all, the increasing instability and complexity of the financial sector, particularly in megabanks and shadow banking, has changed the fundamental role of central banks. Acting not only as a 'lender of last resort', where it rescues the on-balance-sheet credit commitments of banks, it also acts as 'dealer of last resort' to rescue the money market positions by which the banks fund themselves. It does so to protect the interwoven circuits of borrowing and lending that support derivative and repurchase-agreement positions (Mehrling 2012). More important, the credit-creation process that drives money creation is now funnelled through securitisation processes that prioritize asset price increases over productive credit. As Keynes argued, 'when the goal of credit issuance is not the financing of productive activities, but the creation of financial commodities, the job is likely to be highly noxious for the economy'. As Michell (2015) argued, it is clear that mega-banking decenters the money-creation process, involving shadow banks in holding and circulating money – and even, arguably, in creating it – such that money remains endogenous in a megabank-dominated system.

Given the causes of the instability, central banks should urgently apply credit controls to govern the link between the issuer of the credit and the securitizing system. Central banks should re-examine their role as a 'banker's bank', taking into consideration not only their role in financial stability and bank supervision but also their role in the overall economy and the social cost of the changes in mega-banking, shadow banking, and financial innovation.

3.7 Conclusion

The increasing importance of the financial sector in the last three decades has been identified as financialisation by post-Keynesian economists, political economists, sociologists, and many others. This era has been led by neoliberals and mainstream economists, with their paradigm of "laissez-faire economy" and deregulation of financial markets. One of the most important characteristics of

'financialisation' is the rapid growth of financial innovations such as securitisation that changed banks' model from 'Originate and Hold' to 'Originate and distribute' by selling loans and transforming illiquid assets to liquid ones. This process creates more liquidity, which allows banks to expand their balance sheets (off-balance-sheets activities), issuing more loans, lowering credit standards, taking more risk, and more importantly being more independent of central banks, that process could be considered as the root of the current crisis. Moreover, the high usage of securitisation by banks and other financial corporations benefited from the deregulation and monetary policy provided by central banks. Therefore, central bank policies focused on price stability (inflation targeting) rather than financial matters and financial stability may have played a crucial role that led to the crisis.

It would be a wasted opportunity if this financial crisis did not lead us to think deeply about the framework for central banking and monetary policy-making: the objective of policy; the models underpinning our analysis; and the indicators on which I focus when making policy decisions. Hence, central bank theory and policy should be re-examined.

Having discussed one aspect of central banks' relationship with banks, in their role as 'banker's banks', in the next chapter I discuss the relationship between the central bank and its government. I examine the role of the central bank as a 'government's bank'.

Chapter 4: *The Theory of Monetary-Fiscal Policy Interaction in Different Paradigms: Separation, Coordination or Interrelation*

4.1 Introduction

The Great Moderation era, the era from the 1990s until the 2007-8 financial crisis, is defined as the decline of macroeconomic volatility and more precisely as the decline in the variability of both output and inflation (Bernanke, 2004). Policymakers around the world were strongly influenced by New Consensus Macroeconomics (NCM), which is mainly based on New-Classical, neo-classical and New-Keynesian schools of thought. NCM understands a capitalist economy to be stable in nature. It also views the central bank's and government's behaviour as similar to firms' and households' behaviour, as they face a budget constraint (spending = revenue) like any other economic agent. This view comes from the Microfoundations of Macroeconomics premise that I have discussed in chapter 2.

During the Great Moderation era, following the recommendations of NCM, governments around the world implemented austerity measures. In particular, in the eurozone area, the Stability and Growth Pact sought to reduce the fiscal deficit with the aim of balancing the public budget (ECB, 2004). In addition, governments ensured a credible and politically independent central bank through monetary policy by implementing a Taylor rule (a positive interest rate rule), which ensured price stability² through its impact on aggregate demand and output (as I have discussed in chapter 2). These policies were viewed as essential to achieving sustained and non-inflationary economic growth.

In the NCM paradigm, two constraints are needed to ensure that the central bank can efficiently conduct its inflation-targeting policy. Firstly, the central bank should be independent of the government, so as to not be politically influenced

². Up to 2008, many countries ran budget deficits, e.g., UK of the order of 2-3 percent of GDP; deficits rose sharply in 2009 and some 'Keynesian' policies implemented, followed from 2011 by fiscal consolidation – but which has often not been able to reach a balanced budget.

and to be credible in its pursuit of economic stability. Second, a central bank should act within its budget constraint to ensure its solvency and credibility³.

The ineffectiveness of fiscal policy in the short and long runs is also a crucial assumption of the NCM paradigm, and this is based on the Ricardian equivalence (RE) hypothesis and the private-investment crowding-out effect. According to the RE hypothesis, rational economic agents react to increasing government spending by consuming less and saving more today to meet the predictable tax increase tomorrow. As a result, government spending will not impact aggregate demand (Sawyer, 2009). In other words, fiscal policy is ineffective. Accordingly, its main objective should be to balance the budget.

The recent crisis has challenged this paradigm. In particular, central banks faced a zero-nominal-interest-rate lower bound (ZIRB) along with a negative real interest rate and falling prices,⁴ which made monetary policy impotent (Summers, 2014; Curdia, 2015). The loss of interest-rate policy as a primary tool to raise inflation in the ZIRB case is an important reason why central bankers fear deflation. A ZIRB can induce an unstoppable spiral into a great depression, as loss of consumer confidence and pessimism in private investment lead to a sharp fall in aggregate demand and negative expected rates of return. In such a state, expansionary fiscal policy in the style of New Deal policy is the only available tool to pull economies out of a macroeconomic-austerity trap to return the economic activity to its wheels.

In the aftermath of the 2008 financial crisis, some New Keynesian (NK) economists working within the NCM framework have prioritized fiscal policy over monetary policy, at least in abnormal times and temporarily, to maintain economic stability. Those NK economists have developed what is called 'the fiscal theory of the price level' (FTPL) (Woodford and Sim, 1994). According to FTPL, fiscal policies are effective in the short and the long runs. They put more emphasis on the crucial role of state intervention, mainly automatic stabilizers as a fiscal tool and expansionary fiscal policy in exceptional times (time of crisis).

³ Here it is referring to the enlarging of central banks' balance sheet: acquiring risky assets and buying government debt.

⁴ Based on Fischer equation nominal interest rate = real interest rate + inflation rate.

However, they believe that expansionary fiscal policy should be a temporary measure to counteract price stickiness, as by assumption the economy will return to its natural equilibrium in the long run. They further argue that policy interaction and greater cooperation between fiscal and monetary authorities have been inevitable aspects of effective policy initiatives to meet macroeconomic objectives in the current financial and economic crisis (Cochrane, 2014).

However, Buiter (2017) has criticized the FTPL, and he argued that monetary policy has an inevitable fiscal dimension. Central bank money is willingly held and accepted even though it is dominated by a pecuniary rate of return (Buiter, 2017). He proposed the fiscal theory of seigniorage (FTS), which recognizes that the Treasury is the owner of the central bank and that a monetized balance sheet expansion by the central bank increases the central bank's fiscal stance. Buiter's view follows Friedman's Helicopter-money model, which is the parable of the fiscal dimension of monetary policy. Thus, he argued that active use of concerted monetary and fiscal stimulus can always boost nominal aggregate demand, based on the Quantity Theory of Money view.

Interestingly, Post-Keynesianism shares with FTPL some positions (Arestis and Sawyer, 2003), such as the view that fiscal policy could be an important macroeconomic tool and dominate monetary policy without hampering economic stability. However, FTPL framework is still based on the rules and constraints that have continued to be central to NCM fiscal policy (Creel et al., 2014).

In contrast to NCM and NK, following Keynes's work, the Post-Keynesians believe in the need for government policies to reach economic stability and full employment in particular during a deep recession (Lavoie, 2013). In a capitalist economy, appropriate macroeconomic policies are vital to counteract the market's destabilizing tendencies⁵. Furthermore, given the increasing complexity and sophistication in a monetary-financial capitalist economy, the efficient-

⁵ Capitalist economy is inherently unstable as the laissez-faire market mechanism is faulty (Minsky, 1986).

markets hypothesis simply is not true (Lavoie, 2013). Thus, active and permanent state intervention is essential. Furthermore, coordinated monetary-fiscal policies are vital to constrain the instability of the economic system.

Post-Keynesians argue that government is an essential part of the mechanism by which societies provide for their continued survival, especially given the inescapable uncertainty that an economy faces (Dow, 2017). As I have argued in chapter 2, Post-Keynesians view is that NCM theory and policy have many flaws. If policymakers keep following the NCM doctrine of the neutrality of money and the ineffectiveness of fiscal policy, then macroeconomic performance will continue to be disappointing and frustrating.

The final theory I discuss in this chapter is Modern Money Theory (MMT). MMT's advocates, such as Wray, follow Abba Lerner and argue that in a monetarily sovereign government, the government possesses a taxing power that gives the government unlimited power to create state money through spending. Following Post-Keynesians, MMT understood endogenous money as a social necessity.⁶ That is a key element to understanding capitalism (Parguez, 2002). However, MMT gives more attention to state money as a main driver for the economy. Further, MMT views the constraint on government spending and debt as a self-imposed constraint – a political decision – not an economic constraint (ibid). However, it is important to clarify that there are many political and institutional constraints in real world economy that should be taken into consideration. Further, Post-Keynesians and MMT believe that Macroeconomic concepts and analysis should be understood differently than those of Microeconomics, as Macroeconomics is not a simple aggregate of Microeconomics (see chapter 2's discussion). That is mainly due to the unique economic and political nature of the government and the central bank as public institutions, which face different objectives and goals than those of private agents.

⁶ NCM ideology assumes that money is just a medium of exchange as a commodity and it is neutral in the economy. However, Post-Keynesians paradigm offers a deep understanding of the philosophy of money creation and its evolution as a social phenomenon, which is crucial to understand our monetary production economy.

This chapter is divided into three sections. In the first section, I explore NCM's monetary and fiscal policies and their main theoretical assumptions. The second section discusses the FTPL, its critics, and the Post-Keynesians and MMT perspectives on it. In the last section, I analyse and shed light on the Post-Keynesians theory of monetary-fiscal policy interrelations. In doing so, I apply some ideas from MMT. Finally, a conclusion will be drawn.

4.2 The Separation of Monetary and Fiscal Policy within the NCM

The separation principle of monetary and fiscal policies is at the heart of the NCM. Monetary policy based on the concept of neutrality of money, which holds that the stock of money does not impact real economic activity in the medium to long run, has been limited to targeting price stability. Maintaining central bank independence from the Treasury is an important element for ensuring the credibility of monetary policy in stabilizing inflation. Fiscal policy is said to be ineffective due to Ricardian equivalence and the private-investment crowding-out effect. In this section, I explore these concepts in further detail.

4.2.1 Central Bank Independence and State Solvency

The concept of central bank independence is very broad. It can be viewed from different perspectives. Wray (2014) argued that central bank independence could be regarded on different levels. First, the central bank may be said have the freedom to choose among monetary policy tools depending on the economic situation (at least to some extent). Such choices include the use of discount window versus open market operations versus required-reserve ratios and the use of the discount window or overnight markets to determine interest rates. Of course, such freedom did not exist in recent experience. For instance, in the UK and US, the BoE and the Fed turned to their governments for approval to enact QE. Second, central banks may have operational independency, whereby they maintain a sharp separation from the government and the treasury. Some central banks, such as ECB, are prohibited from directly financing governments' budget deficits. The rationale is that the government should turn to private banks when in need of finance, as any other economic agent does. In such a way, the interest rate monetary tool is made independent of the treasury's debt

policy. Finally, central bank independence can be seen as insulation from political pressure and especially freedom from political interference in rate-setting deliberations.

As I have discussed in chapter 1, the high-inflation period that started in the late 1960s and 1970s gave way in the 1980s to the emergence of monetary targets (only later followed by inflation targeting). That central policy change then led to independent central banking in the early 1990s in industrialised countries. The main NCM argument for CBI is that CBI is required to allow price stability and that if central banks were committed to the price-stability objective (through Friedman's monetary targets, which are based on QTM), then economic agents' expectations would be more stable. That stability of expectations could eliminate 'uncertainty' in the market and ensure economic stability, as the efficient-markets hypothesis maintains (Buiter, 2007).

However, after the unsuccessful era of monetary targeting, a Taylor-rule type of policy has emerged to control inflation (Taylor, 1992). Major central banks around the world adopted a version of this monetary rule: one tool (nominal interest rate), one objective (inflation targeting). The main point was to move away from discretionary monetary policy to a rules-based policy (Buiter, 2007). This policy rule is used to better ensure central bank independence from the treasury and from politics to be better able to prevent inflation and stabilize the economic activity. According to Bernanke et al. (2010), the inflation targeting (IT) regime is the best monetary regime because (i) it improves communication between the public and the monetary authorities and thus increases the agents' capacity to forecast future inflation, and (ii) it disciplines the central bank's monetary policy, thus giving it credibility. Even though central bank independence was challenged during and after the recent crisis, it is still regarded as an important element of NCM and NCM-based policy-making.

After the 2007-8 global financial crisis, most of the central banks in advanced economies shifted to a policy that has been challenged for undermining the price-stability objective and central bank independence. Specifically, central banks dramatically decreased the nominal interest rate and increased their balance-sheet size by holding government and private debt securities while

paying interest on reserves. This central bank behaviour made some economists, such as Rudebusch (2011), Carpenter, Ihrig, Klee, Quinn, and Boote (2013) and Greenlaw, Hamilton, Hooper, and Mishkin (2013), and Ricardo Reis (2013), raise the question of central banks' 'solvency'. The questioning is based on the use of a formal model of central-bank risk, founded on modern finance theory, to describe the evolution of a central bank's financial position. According to these economists, the increasing of the central bank's balance sheet with large public and private bond portfolio creates a risk of losses, either from defaults on the bonds or from declines in their market value when interest rates rise (Reis, 2013). For instance, Reis (2013) argued that the Fed faces two risks to its solvency. First, the huge expansion of the Fed's portfolio and the inclusion of some bonds with default risk exposes the Fed to capital losses when interest rates rise. Second, the new (post-crisis) obligation to pay interest rates on reserves will expand the Fed's reserves as the economy returns to normal and interest rates rise (Reis, 2013).

Reis (2013) continued by arguing that the central bank faces a resource constraint that makes it to solve the balance sheet problem, for two reasons. Firstly, from an accounting perspective, it is difficult to keep track of the value of the assets and liabilities in a central bank's balance sheet. Not only are these assets and liabilities peculiar, but there are also no accounting standards that naturally apply to a central bank, which is neither a private corporation nor a conventional government agency (Reis, 2013). Secondly, from an economic perspective, since a central bank is an agent with limited resources, keeping track of its resources and uses of these resources reveals what the central bank can and cannot achieve. The main conclusion, according to Reis, is that the central bank's main power is to manipulate its interest rate in pursuit of its inflation target; its balance sheet gives it little latitude to pursue other goals (Reis, 2013). Designing a policy that robustly achieves this goal (inflation targeting) requires carefully considering what information to reveal, how transparent to be, and how agents learn about the central bank's intentions (see Morris and Shin, 1998, and the large literature that followed). Therefore, according to Reis's argument, the central bank may only be able to buy some time before its balance sheet problem becomes more difficult to handle;

consequently, central banks should get back to their earlier business: inflation targeting.

Not surprisingly, Christian Noyer, the governor of the Banque de France, has argued strongly for a return to normal. He states, "It is all the more important to maintain our clarity of purpose and stick to two fundamental characteristics of what central banks inherited from the pre-crisis consensus: the focus on price stability and, its corollary, central bank independence"¹ (Noyer, 2012). Thus, we see that central banks' independence and price stability objective are very crucial to NCM, which argues that the two aspects of central banking should be regained as soon as possible to ensure economic stability.

4.2.2 The Neutrality and Ineffectiveness of Fiscal Policy

Also at the heart of NCM dogma is the concept of the ineffectiveness of fiscal policy. Fiscal policy has been downgraded to only relying on automatic stabilizers, and essentially (according to NCM) it should be concerned with broadly balancing government expenditure and taxation. This paradigm is based essentially on the usual New Classical (NC) assumptions such as first, crowding-out of private activity by government deficits, second, the Ricardian Equivalence hypothesis, and third, 'rational expectations' allowing households to optimise intertemporally (Arestis 2012). All these assumptions imply that fiscal policy is completely ineffective as a macroeconomic stabilization tool. The Ricardian Equivalence part of the NCM argument posits the irrelevance of the government's decisions to finance via taxes vs. debt. For instance, an increase in government deficit would imply an increase in the future tax burden, with rational economic agents expecting to decrease their current consumption and savings in anticipation of lower future income (Arestis 2012). That adversely affects investment, which is also hampered by higher interest rates caused by the increased deficit – the crowding-out effect. A further main theoretical property is the assumption of 'rational expectations', which, along with the Non-Ricardian Hypothesis (NRH), implies that expectational effects might outweigh the Keynesian type of multiplier effects. These arguments and assumptions are supported by a large literature within NCM such as Bernanke (2004, 2008, 2009).

Fiscal austerity in this approach is expansionary in both the short and the long run (NCM researchers use a cyclically adjusted measure for budget deficits in the long run).

To sum up, the NCM maintains that separation between monetary and fiscal policies is important to achieve economic stability in a competitive free market. Given the ineffectiveness of fiscal policy, empowering the central bank with an interest rate tool to maintain price stability and keeping the central bank independent from the Treasury ensure the central bank's credibility and solvency in order to sustain economic stability.

4.3 The Fiscal Theory of Price Level

Notwithstanding the overall NCM consensus, there are some NK economists working within the NCM framework who favour fiscal policy over monetary policy to maintain price stability – that is, at least in the short run and mainly in abnormal time (such as crisis time). Those economists, such as Woodford, Sims, and Cochrane, have developed what's called 'the fiscal theory of the price level' (FTPL). According to FTPL, fiscal policy is considered to be effective in the short and the long runs. In this section, I explore the FTPL concept to better understand this theory, its application, and its transmission mechanism. I then shed light on the main critics of this theory and discuss the Post-Keynesians view.

The main notion of the FTPL is based on the Quantity Theory of Money (QTM) equation. In accordance with New classical economics' 'monetarist doctrine', NCM argued that money supply is exogenous (M_t) and is the primary determinant of the price level and that inflation arises because too much money is chasing too few goods. The velocity of money is stable, fixed and exogenous (V_t), and nominal output is the price level P_t times real output Y_t :

Equation 7

$$M_t V_t = P_t Y_t, t = 0, 1, \dots$$

In contrast to this view, the FTPL maintains that velocity (or demand for money), in some circumstances, is unstable and is itself affected by other

macroeconomic variables, such as the nominal interest rate. Furthermore, in general, the price level cannot be only determined by M_t . Rather, it and the general equilibrium path of the economy are determined jointly by M_t , Y_t , and V_t . In such a way, there is no unique way to determine the price level, as there are several paths of P_t that satisfy QTM (Woodford, 1994). Further, with a central bank setting the exogenous interest rate (which reflects an implicit view of endogenous money that is consistent with Post-Keynesian as discussed later in this chapter), FTPL becomes more valid, as Sargent and Wallace (1975) argued that, in this case, the initial price level is then indeterminate, and subsequent inflation is subject to 'sunspots,' that is, uncertainty driven by self-fulfilling expectations. Thus, differentiating itself from the QTM, FTPL stresses that the price level is determined by government debt and fiscal policy alone, with no (or only an indirect) role for monetary policy.

The FTPL states that fiscal policy, through its fiscal deficit and debt, can directly move the price level. This first developed by Woodford and Sims in 1994 and Cochrane (2014), models price determination through nominal public debt with the following equation:

Equation 8

$$\frac{\text{Nominal Debt}_t}{\text{Price Level}_t} = E_t \sum_{j=0}^{\infty} \frac{\text{Real Primary Surpluses}_{t+j}}{\text{Discount Rate}_{t,t+j}}$$

(Nominal debt is the market value of debt.) According to FTPL, this equation is not a budget constraint, but represents the valuation equation for government debt, or an equilibrium condition (Cochrane, 2016). That equation shows that there is no need for monetary policy to target inflation. With no action taken, a changing expectation of future deficits can directly move the price level today. It is similar to how the stock price is moved today by changing expectation about future earnings (present value of expected dividends) (ibid).

In its simplest form, the FTPL assumes that the government commits to a fixed and exogenous present value of primary fiscal surpluses; this is a special case of what Leeper (1991) defines as an 'active' fiscal policy and Woodford (1995) defines as a 'Non-Ricardian' fiscal regime. One of the main assumptions for FTPL to be valid is the ruling out of a government default on nominal debt,

given that the monetary policy rate is set by the central bank's function as an ultimate provider of liquidity and the lender of last resort to the government, which allows for unlimited monetization of debt. In this case, the FTPL is just a version of a commodity money standard; money, as well as other government liabilities, is backed by the present value of future government surpluses, just as the value of Microsoft shares is backed by the present value of Microsoft profits (Cochrane 2005). Further, for FTPL to be credible, an implicit or explicit central bank commitment to prevent a government default through an appropriate monetization of debt is essential (Sargent and Wallace, 1981). Another crucial notion of FTPL is that government should be treated differently than other economic agents in terms of budget constraints because government has a special treatment and role: namely, if the private banks are not willing to lend to the government to finance its primary deficit, then the committed central bank would prevent a government default on the debt. The central claim of the FTPL is that equation (8) is only an equilibrium condition (as noted earlier) and not an intertemporal budget constraint as in the case of a household.

The FTPL claims that public debt is not neutral in the long term, but that different equilibria are possible. The central element of the FTPL is that the price level has to "jump" for the initial level of the real public debt to equalize the present value of the future flows of primary surpluses.

Now, it is important to understand FTPL transmission mechanism, which has two aspects. First, following Woodford (1995) government debt impacts aggregate demand through the 'wealth effect': if the real value of nominal debt is less than the present value of real primary surpluses, then households try to consume more goods and services. But due to full employment households cannot do this simultaneously, so this "excess aggregate demand" just pushes up prices until the real value of debt is again equal to the present value of surpluses (Cochrane, 2014). As Cochrane states, "Aggregate demand is nothing more or less than demand for government debt, as by the private-sector budget constraint the only way to spend more on everything else is to spend less on government debt" (ibid).

Second: Given the current situation of zero interest rate, interest paid on excess reserves, and a large balance sheet, central banks such as the Fed have limited power using money supply or interest rate to impact banks' lending⁷. And due to technological progress in electronic transfers, fiscal policy has the ultimate power to impact the price level through issuing treasury bills and government bonds on demand, which serve the financial sector as interest-paying risk-free assets and as accepted forms of payments for tax purposes (Cochrane, 2016). The bills and bonds could be bought directly from the central bank, which then issues the reserves to the banking sector, or they could be bought directly by the private sector (Cochrane, 2014). In this way, fiscal policy coordination with monetary policy is very crucial to financial stability, in the sense that private sector needs maturing government debt to pay its taxes and to have risk-free assets (ibid).

The ensuing FTPL framework concludes that fiscal policy mildly reacts to debt variations combined with a monetary policy with a loose inflation target where price adjustments ensure the intertemporal budget balance – a conclusion inconsistent with the NCM (see, e.g., Arestis, 2009). Further, Eggertsson (2006) suggests that:

"Without coordination deficit spending has no effect so that the multiplier is zero. The reason is that deficit spending works entirely through expectations about future interest rate policy (i.e., through the expectation of higher future money supply). Under coordinated policy deficit spending implies higher nominal debt, and optimal monetary policy under discretion implies that this will increase inflation expectations because higher nominal debt makes a permanent increase in the money supply incentive compatible. Without coordination, however, this link is broken because the central bank has a narrow objective that does not take into account the fiscal consequences of its actions. Instead,

⁷. I discuss this in detail later, but the point is that NCM believes that banks' lending decision is based on reserves (Cochrane, 2005).

there is strong deflation bias of discretionary monetary policy which is severely suboptimal when there are deflationary shocks." (p. 5)

A study by Woodford (2011) suggests that under conditions of 'zero-bound' nominal rate of interest, a fiscal multiplier more than unity is possible. That can happen only when the task of monetary policy to fill the output gap generated by the falling real rate of interest, due to inflationary pressures, is undertaken by fiscal policy.

Further, Eggertsson (2010) states that "The principal goal of policy at zero interest rates (ZIRP) should not be to increase aggregate supply by manipulating aggregate supply incentives. Instead, the goal of policy should be to increase aggregate demand – the overall level of spending in the economy". This vision also builds on insufficient demand and under-productive capacity. He found that at ZIRP and with insufficient demand, an expansionary fiscal policy has short-run and long-run effects on output and income of more than five times compared to normal times.

According to Goodhart (2012), when the public sector of a country becomes so indebted that its fiscal sustainability is potentially at risk, then monetary policy has to be closely integrated with debt-management and fiscal policy. This was the case in the United Kingdom in the decades after World War II. UK debt-to-GDP ratio started at around 250 percent in 1945 and fell through the 1960s and 1970s. In the 1970s budget deficits were often large in nominal terms, but in real terms the fiscal account was often in surplus as inflation decreased the real value of outstanding government debt. By the 1980s, however, as fiscal policies have recently been compromised and debt ratios have become much enlarged (in nominal terms), thus, the standing separation principle is becoming subject to increasing stress. In addition, ECB (2017) studied the importance of the interaction between monetary and fiscal policy in the euro area, and they found that if a policy arrangement with a non-defaultable Eurobond had been in place since the onset of the Great Recession, output could have been much higher and inflation kept in line with the ECB's objective. Further, eliminating conflicts between the fiscal and monetary authorities can be just as welfare improving as adopting a 'good' policy permutation when the underlying policy regimes remain

subject to switches (active and passive) (Leeper and Leith, 2015). Also, Allsopp and Vines (2015) have argued that, when interest rates are at their zero bound, the debt build-up should be ignored as an object of policy since (a) it is necessary for a recovery of demand and (b) can be remedied when other sources of demand – and, in particular, investment – have recovered. At the ZIRP, a practical fiscal reaction function should target inflation and, subject to that constraint, provide as much stabilization of output as possible. That is, it should be just like a monetary-policy reaction function: it should target the output gap so long as inflation is under control. Recovery would have been faster if fiscal policy had been responsible for the restoration of full employment, in an environment which tolerated the necessary rises in public debt (Cochrane, 2016).

In contrast to the above possible alternatives, policies of austerity, designed to reduce public debt, have slowed the recovery. Growth will not be resumed until the private sector begins to invest strongly again, creating the financial assets which the private sector wishes to hold, thereby enabling public debt to be retired (Ibid). That has not yet happened because the private sector, correctly, does not believe that macroeconomic policy is capable of sustaining a strong recovery. As Khon (2009) states, changing policy interaction and greater cooperation between fiscal and monetary authorities have been inevitable aspects of effective policy initiatives to meet our macroeconomic objectives in the current financial crisis and economic crisis. However, as the economic recovery takes hold, we will need to return to more normal modes of operation, circumstances central bankers are very much looking forward to. In a blog in April 2016, former chairman of the Federal Reserve Ben Bernanke argued that “under certain extreme circumstances - [such as] sharply deficient aggregate demand, exhausted monetary policy, and unwillingness of [fiscal authorities] to use debt financed fiscal policies - [money-financed fiscal programs, colloquially known as helicopter drops] may be the best available alternative” and that “it would be premature to rule them out”. Earlier in this vein, in 2003, Bernanke had recommended that Japan fight deflation through an expansionary fiscal policy financed by permanent purchases of government debt by the central bank.

To summarize, in contrast to NCM orthodoxy, FTPL has provided an unorthodox approach in regard to fiscal policy where fiscal policy, in contrast to the monetary policy interest rate tool, is an effective tool to achieve price stability. In the following subsection, I explore NCM critics of FTPL, mainly Buiter, McCallum and Nelson.

4.3.1 NCM Critics of FTPL

NCM proponents have found FTPL an unorthodox approach within mainstream economics. Further, FTPL has been criticized heavily by Buiter, who argued that given "its logical flaws, an inconsistent theory can have no empirical implications and the realism or lack of it of its assumptions is irrelevant" (Buiter, 2017). He argued that under the FTPL 'valuation equation' there exists a magical power of the general price level that somehow will do whatever it takes to bring the real value of the stock of nominal government bonds to the level required for government solvency (ibid). So, explosive government debt will never threaten sovereign solvency. Thus, if this delusional theory is to be taken seriously by some foolish government the result could be very painful fiscal-austerity measures, government default, or even hyperinflation (ibid).

However, the explosive nominal debt does not happen without a fully monetised central bank, which in the end means an increase in money growth, which causes inflation. Thus, McCallum and Nelson (2005) argued that FTPL is no different than standard monetary theory (QTM), except by giving the fiscal stance of monetary policy a more important role than the money stock. Either way, fiscal deficit financing does not occur without direct monetisation (printing money) or indirect monetisation (interest rate peg), both of which are actions by the monetary authority which involve money growth.

So, compare Friedman (1987) on the link between fiscal expansion and inflation: "Government spending may or may not be inflationary. It clearly will be inflationary if it is financed by creating money. If it is financed by taxes or by borrowing from the public, the main effect is that the government spends the funds instead of the taxpayer or instead of the lender or instead of the person who would otherwise have borrowed the funds". (Friedman, 1987, p. 17).

Further, the role of monetary-fiscal policy coordination in the monetarist analysis is implied by the following observations by Schwartz (1985)⁸:

“Coordination of debt management by the Bank [i.e., the monetary authority] and the needs of the Exchequer [i.e., the fiscal authority] is clearly desirable. The question is how to formulate an arrangement that recognizes the basic choice to be [between] financing government expenditures by the tax on money balances (implicit in the inflationary creation of money for government purposes), by taxation in other forms, or by borrowing at home or abroad at whatever interest rates are necessary”.

As Friedman stated the archetypal monetarist position on fiscal policy in 1981: "I don't think monetary policy has to be backed up by fiscal policy at all. I think monetary policy can curb inflation". Therefore, the central bank can conduct monetary policy in controlling inflation without the need of fiscal policy and even in the existence of large fiscal deficits, and detailed coordination is not needed for effective macroeconomic policy.

Therefore, regarding these assumptions, there is no disagreement between FTPL and QTM in regard role to fiscal policy in demand control and the existence of pressure to monetize fiscal deficits 'directly' or indirectly. However initially this is limited by monetary authority and money growth which is consistent with QTM⁹.

Buiter (2017) argued the fiscal stance emerges from the central bank's power as the ultimate provider of liquidity and the willingness of private agents to hold central bank money¹⁰. This is the case because a single-period consolidated

⁸ Friedman (1987) was also thinking along the same lines: "Fiscal policy is extremely important in determining what fraction of total national income is spent by government and who bears the burden of that expenditure. It is also extremely important in determining monetary policy and, via that route, inflation".

⁹ In the words of Brunner and Meltzer (1993): "A viable non-inflationary monetary regime requires severe constraints on the fiscal regime."

¹⁰. Buiter (2007, 2014, 2017) claimed that private agents are willing to hold central bank money even at zero interest rate, which gave central bank money a property that he called 'irredeemability'. Further, he claimed that central bank money is an asset to the holder but

state (treasury and central bank) balance sheet, including a monetized and expansionary central bank balance sheet, will allow the treasury to increase spending or cut taxes to boost aggregate demand. But notwithstanding that ability, the state should always honour its contractual obligations, which means act within its budget constraint, or in other words, within its means like any other economic agent, in order to ensure its solvency and in turn to contribute to economic stability (Buiter, 2017).

Thus, Buiter returned to Friedman's 'helicopter money drop' notion, where inflation is always and everywhere a monetary phenomenon. What is more, monetary policy always and everywhere has a fiscal dimension. This fiscal dimension of monetary policy exists even if the central bank is operationally independent. The key insight is that, given the outstanding stocks of state assets and liabilities, monetary policy and fiscal policy cannot be specified independently if the state is to remain solvent (ibid). Either there is fiscal dominance, and monetary issuance becomes endogenously determined (the residual), or there is monetary dominance and public spending and/or taxation have to adjust (becomes the residual) to maintain sovereign solvency (ibid). The active use of concerted monetary and fiscal stimulus can always boost nominal aggregate demand. The ability to stimulate aggregate demand through a helicopter money drop exists both away from and at the ZIRP, and regardless of whether government bonds are nominal bonds, index-linked bonds, or foreign-currency-denominated bonds (Buiter, 2017). He claimed that the fiscal theory of the price level is dead, but what he called the fiscal theory of seigniorage is very much alive (ibid).

To sum up, I have shown that FTPL provided a relaxed version of the NCM view of fiscal policy. FTPL gives fiscal policy a dominant role over monetary policy to control the price level, and says that monetary-fiscal policy cooperation plays an important role in an economy with high debt and zero interest rate, at least in the short to medium run, that is, until the economy gets back to equilibrium. The case against FTPL is that the ultimate power of the central bank as an

not a liability to the issuer. From a substantive economic and behavioral perspective, central bank money is an outside financial asset - it is net wealth.

ultimate provider of liquidity gives monetary policy dominance, and that monetary policy has a fiscal dimension. Thus, the main difference between FTPL and NCM is about whether fiscal or monetary policy has dominance in the short to medium run and about the issue of government solvency and default. However, both agree on the NCM assumptions related to central bank independence and ineffective fiscal policy in 'normal times'.

4.3.2 Post-Keynesians vs. FTPL

Post-Keynesians share some similarity with FTPL regarding the view that fiscal policy could be an important macroeconomic tool and may dominate monetary policy without hampering economic stability. For instance, both agree with the neo-Ricardian agent's behaviour against the classical Ricardian Equivalence Hypothesis. Moreover, FTPL shares with the Chartalists and MMT¹¹ the idea that the ultimate power of the state comes from its ability to issue money and debt and to tax. The main difference concerns how the debt is issued and for what reasons. FTPL clearly states that the government debt is issued on demand (Cochrane, 2014) and the state has unlimited power in issuing its debt by forming expectations of its real primary surpluses. Cochrane (2014) clearly states that "Ultimately, government debt is valued because you need maturing government debt to pay taxes, so government debt is backed by the present value of the government's ability and willingness to soak up money by taxing its citizens in excess of spending".

The problem is that FTPL argues that the current price level is driven by the asymptotic trend in expected primary fiscal balances. But since those expected balances are completely unobservable, there is no empirical way of testing the theory. Thus, it lacks an ideological interpretation and does not provide an understanding of the state money creation process, as it lacks a clear view of endogenous money theory or how the monetary production economy works.

¹¹ Modern Money Theory, which states that state money creation power comes from its power to tax and only accept its money as tax payments.

Another important point is related to private money creation and the role of banking. FTPL provides some insight on the endogenous money concept, by understanding that banks issue money on demand (ibid). However, following neoclassical, FTPL views money as just a version of commodity money, and banks' money creation power comes from their excess reserves (Tcherneva, 2013).

Similarly to Post-Keynesians, FTPL believes that the central bank sets exogenously¹² its key interest rate, meaning the government is able to have perfect control over the interest rate it pays on its debt. As the central bank intervenes through its open market operations tool in the primary market for the treasuries (Lavoie, 2009), Taylor rule is not needed (Cochrane, 2016). Thus, the central bank interest rate policy is a key determinant of the level and slope of the yield curve on Treasuries, but it is backed by the fiscal stance (Cochrane, 2014).

Both theories emphasize the importance of monetary-fiscal policy cooperation, as there is an obvious high correlation between policy interest rate and T-bill rate. This high correlation makes the financial operations of the Treasury and the central bank intertwined (ibid). So, in order to run an effective and smooth monetary and fiscal policy to maintain and support the monetary and financial systems, regular cooperation is essential in the sense that the central bank gets involved in fiscal policy and the Treasury gets involved in monetary policy. Thus, in contrast to NCM, central bank independence is a 'myth' at the operational level. It is a political and not an economic constraint, as the central bank cannot simply avoid supporting the Treasury in one way or another (ibid).

In a sense going beyond the view that the central bank and the treasury are intertwined, MMT advocates, such as Bell (2000) and Meulendyke (1998), argued that one can consolidate two in theory without a loss of generality for a monetarily sovereign government and that separating the two adds complexity without adding insights (Mosler 1999; Bell 2000; Bell and Nell 2003; Bell and

¹² Even though NCM believes that interest rule is applied to control inflation, in practice, they set interest rate exogenously on what they believe it should be (Lavoie, 2007).

Wray 2003; Wray 2012; Fullwiler 2013; Mitchell and Mosler 2002; Mitchell and Muysken 2008). In contrast to MMT, Post-Keynesians economists follow Keynes's (1937) view, in that even though the central bank could be considered as a government 'organ', it is still crucial to see them in an active partnership rather than one consolidated public entity (Lavoie, 2011). Problematically, it appears that MMT assumes that central bank is publicly owned, which is not the case for the Federal Reserve (and for Bank of England prior to 1947) (I have discussed this in detail in chapter 1). And if the central bank is operationally independent and potentially can take the decision not to provide finance to government, then it is analytically useful to treat central bank and government separately.

We can also compare Abba Lerner's 'functional finance' with FTPL. Notably, Seccareccia¹³ (2014) observed some similarity, as both are concerned with the outcome of the government deficit. Abba Lerner's (1943) article states that "The central idea is that government fiscal policy, its spending and taxing, its borrowing and repayment of loans, its issue of new money and its withdrawal of money, shall all be undertaken with an eye only to the results of these actions on the economy and not to any established traditional doctrine about what is sound and what is unsound" (cited in Seccareccia, 2014). Consequently, it does not matter whether the government has a large deficit if it is necessary for achieving price stability and full employment.

4.3.3 A Further Criticism

According to Cochrane (2014, 2016), the increasing importance of FTPL and fiscal policy comes from, firstly, a ZIRP condition, where the central bank has limited power in controlling inflation; second, the payment of interest on excess reserves along with a large central bank's having a balance sheet full of junky assets; third, the technological change that makes instantaneously transferable electronic reserves and T-Bills; fourth, the fact that the narrow spread between reserves and T-Bills, and the limited access to reserves from the private sector,

¹³ Seccareccia (2014) commented on Cochrane (2014) on Mosler blog moslereconomics.com.

as reserves are only issued to commercial banks, made private sector holding of the risk-free-rate T-Bills or government bonds more attractive; and fifth, the fact that the high level of debt in many advanced countries, such as the USA and some European countries, made the treasury more powerful in impacting the economy and more precisely the price level by changing expectations over the real primary surplus.

Thus, FTPL does not provide an economic theory of the monetary-fiscal policy behaviour but relies on some practical aspects and events such as technological advances or certain conditions such as ZIRP, interest-paying excess reserves, or high public debt. Further, FTPL main concern is to differentiate itself from NCM paradigm, based on the QTM, where monetary policy can control inflation using the interest rate tool, and offering fiscal policy as a key tool to affect inflation. Therefore, there is a lack of theory and a deficiency in understanding the economic evolution and the role of the public sector and the central bank in a capitalist economy. More precisely, the notion of private and state money creation and the role of credit money in a monetary production economy is completely absent or neglected from FTPL as it follows the NCM ideology of money. Positing a technological change and a cashless economy does not make any difference in the philosophy of money and its function in monetary production economy, and it doesn't make the economy moneyless either. As Seccareccia (2014) (on Moslereconomics blog) states:

"FTPL seems to suggest that the monetary system has changed because of technological change leading to diffusion of interest-paying electronic money and now interest on "base" money. All of this is nonsense because we could trace some of these same ideas literally to the nineteenth century within heterodox circles".

He continued by arguing that the technological change and the interest-paying-reserves system does not change monetary policy behaviour in providing

'reserves'¹⁴ or more correctly 'settlement balances'¹⁵, whether the reserves are interest paying or not. The change was mainly due to an institutional change in the 1990s after the failure to control monetary aggregates.

Consequently, FTPL framework is still based on assumptions, rules, constraints, and the like that have continued to be the hallmarks of NCM as far as fiscal policy is concerned (Creel et al., 2014). Further, the NCM criticism of FTPL is clearly based on Monetarism ideology, which is based on QTM. Accordingly, exogenous money supply and the neutrality of money are noticeable in their work. Witness Buiter (2017), who argued that central bank can print money exogenously and private agents are willing to hold central bank money even at ZIRP. He emphasized that fiscal policy objective should be to balance the budget and to maintain its solvency by meeting its contractual obligations. Thus, following NCM and neoclassical dogma, fiscal policy is limited, and monetary policy has interest rate tool to control inflation.

4.4 Post-Keynesians' Theory of Monetary-Fiscal Policy Interrelation

In this section, the theory of monetary-fiscal policy interrelation within a monetary production capitalist economy will be identified, as there is no way to understand a financial-capitalist economy without clearly understanding the crucial characteristics of money and the state and their vital role in this economy.

Keynes in 1936 states the way out of the Great Depression:

"It seems unlikely that the influence of [monetary] policy on the rate of interest will be sufficient by itself. I conceive, therefore, that a somewhat

¹⁴ According to FTPL followers, reserves are necessary for banks to enable them to lend and issue 'inside' money. This is in contrast to the view of endogenous money theory, in which money or more precisely 'credit money' is created as 'initial finance' to the economy on demand by firms, investors, households, and government, and when repayments occur, the issued money is destroyed.

¹⁵ The Central Bank of Canada conducts monetary policy with zero reserves system by ensuring 'settlements balances' on the banking sector at the end of the day, ultimately settling the final positions of system participants on the books of the Bank of Canada (See Howard, 2008).

comprehensive socialization of investment will prove the only means of securing an approximation to full employment."

In his General Theory, Keynes himself was in support of sustained public investment in the long-term to stabilize the capitalist economy (Seccareccia 2011-12). Without the "socialization of investment", the private market can get itself stuck in a state of secular stagnation, due to its inherent instability.

Following Keynes' work, Post-Keynesians believe in the necessity of the government policies to reach economic stability and full employment in particular in the time of a deep and great recession. Further, a free market stabilizing mechanism is rather weak, given that a laissez-faire economy is inherently unstable because of the fundamental uncertainty, irrational behaviour of the economic agents (in contrast to the mainstream rationality assumption which is based on self-interested behaviour and perfect information) and the underlying information asymmetry in the market. Thus, in a capitalist economy, appropriate macroeconomic policies are vital to counteract the market's destabilizing tendencies.

In the aftermath of the 2008 crisis, a 'new fiscalism' era has emerged in most of the developed economies such as the USA, where fiscal stimulus packages have been implemented (Seccareccia 2012) because the automatic stabilizers were rather weak (Costantini, 2015). Furthermore, given the increasing complexity and sophistication in a monetary-financial capitalist economy, a financial efficient-market hypothesis simply cannot hold up. Thus, an active and pervasive state intervention is very essential. Specifically, coordinated monetary-fiscal policy actions are vital to constrain the instability of the economic system.

In contrast to NCM, post-Keynesians argued that government is an essential part of the mechanism by which societies provide for their continuity and survival, especially with the ineradicable uncertainty that an economy faces (Lavoie, 2017). Most of the early post-Keynesians, such as Kalecki, have clearly criticized the crowding-out idea and the neutrality of money, and they put an emphasis on the importance of the state-deficit mechanism in generating profits through its impact on aggregate demand (Sawyer, 2003). Further, Arestis and

Sawyer (1998) reinstated the important role of fiscal policy as a powerful tool for macroeconomic policy. That is in opposition to the New Consensus theoretical framework, where fiscal policy is absent or even eliminated because of crowding out and the Ricardian Equivalence Theorem (RET) (Arestis and Sawyer, 2003).

Following Keynes's ideas, Post-Keynesians reject the whole idea of crowding out. Crowding out states that government deficits and fiscal policy expansion crowd out private investment and raise interest rates¹⁶. Post-Keynesians argues against crowding out if the economy is operating with spare capacity and unemployment, but for crowding out if the economy were operating at full employment. Given that interest rate is exogenously set by central bank and profits net of taxes equal consumption out of profits plus investment plus budget deficit (per the Kalecki equation; see Kalecki, 1971), fiscal deficits do not have any crowding out effects, and on the contrary, they enhance profits in the private sector in particular when an economy is under-full-employment. This Post-Keynesians position contradicts the neo-classical view of exogenous supply of money and the IS-LM analysis. Furthermore, the theory of endogenous money presented by post-Keynesians, where the interest rate is set by central bank, eliminates the crowding out effect (Arestis and Sawyer, 2003).

For its part, the Ricardian Equivalence Theorem (RET) assumes an equivalence between debt and taxes as sources of financing, and considers consumers to be forward-looking with rational expectations and optimising over their infinite life cycle. In this way, an increase in taxes today will be followed by lowering taxes tomorrow, and consumers will decrease savings today, knowing they will not have to pay more tomorrow, and therefore, the debt will be less. Hence, an increase in taxes will not trigger any change in consumer permanent income.

Consider in contrast a closed-economy model from a Keynesian view, where:

Equation 9 $G-T=S-I$.

¹⁶, RET based on rational behavior ideology, as private agents will react to fiscal expansion by consuming less and saving more as they expect an increase in taxes tomorrow because of the government balanced budget objective.

G represents government expenditure or deficit, T tax, S savings, and I investment. Any increase in government deficit while T and I are constant, will lead to an increase in savings, the opposite of RET and crowding out effects (Sawyer, 2017). What is more, Hemming, Kelly, and Mahfouz (2002) concluded that there is no significant evidence that shows the crowding out effect through the interest rate, and they did not notice any significance of the RET. Consequently, fiscal policy is effective from a theoretical point of view, and its efficiency is also supported by empirical evidence. What is more, fiscal policy's important role in the economy is undeniable, and it should be given its role in accordance with monetary policy.

In contrast to the idea of fiscal deficit 'crowding-out' private investment, post Keynesians argue that the deficit 'crowds-in' private investment, through the process of state-money creation to finance the state's deficit (Parguez, 2002). State money creation is reflected in an increase in reserves on the asset side of the commercial banks' balance sheets which exactly matches the net increase in the private sector stock of bank liabilities. That leads to an increase in aggregate demand, through public and private consumption. Assuming that the deficit has generated an equal increase in aggregate demand, the deficit is equal to firms' accumulated retained earnings (ibid). When the profit effect of the deficit is strong enough, aggregate profits can be greater than investment spending. Firms earn more profits than they have to pay back to banks to extinguish the debt incurred to finance investment. It is the existing retained profits, which are recycled into future investment expenditures. Retained earnings allow firms to substitute internal finance for credit, which lowers future interest payments. In a monetary economy, the deficit crowds-in private expenditures and "it may be facetiously considered the "goose" that lays the golden eggs for firms, workers, and banks as well" (Parguez. 2002). Planning a long-run growth of the deficit, the state becomes the cornucopia of the private sector, generating enough growth to reach a full-employment state with real wages being high enough to sustain household consumption.

In the following subsection, I discuss in detail Post-Keynesians theory of money and debt, which provides a deep conceptual framework on the critical role of

the treasury and the central bank and their interaction in a monetary production economy.

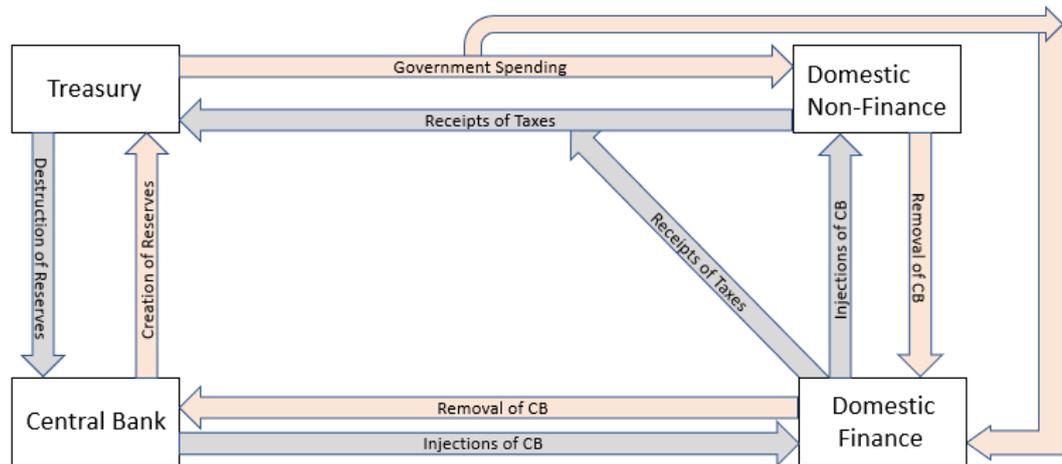
4.5 Post-Keynesian Theory of Money, Debt, and the State

To better understand the theory of monetary policy-fiscal policy interrelation in a monetary production economy, the post-Keynesians' monetary circuit theory explains how the state and creation of money play a crucial role. In a monetary production economy, a money creation-destruction process is prerequisite (Graziani, 2003). Both the state and firms need initial money injection to finance their expenditure. However, their future receipts, which are the outcome of the initial injection, account for the 'destruction' or 'final finance' of the monetary circuit (Parguez, 2002). It is important to emphasise the central role of money and to make a distinction between private money and a central bank or state money. Essentially, money is a social reality, and it exists as a mere debt obligation issued by banks on themselves (Parguez and Seccareccia 2000; Rochon, 2000). Also, the trust in this bank money as an accepted means of payment exists mainly because all economic agents share the belief in the strong creditworthiness of banks and the payment system (Lawson, 2016). That gives banks the ability to create private money (money created by banks and it is socially accepted). In the same manner, the central bank has the power to create state money (money created by the central bank) to provide to the state.

In modern economies, when the state decides its planned expenditure, the state money is created through the central bank ('the ultimate provider of money') in an 'initial finance' phase. On the other hand, when taxes are collected the destruction, or 'final finance', phase occurs. This clearly explains why both the state and private firms cannot depend on their generated future income in order to make their investment and expenditure decisions today. Thus, finance is crucial today (Sawyer, 2012). Once the state ('the treasury') decides on its spending, they ask for credits from the central bank, who would create money (reserves) required by the treasury by issuing debts on itself (see figure 9). The central bank would create a claim on the treasury on its asset side of the balance sheet; the counterpart would be the deposit by the state on its liability side. This

deposit will be then transferred to private agents, which causes an equal increase in the reserves of commercial banks.

Figure 10: Simplified Post-Keynesian treasury-central bank interrelation



That brings us to an important element of state money: according to MMT, in the creation-destruction process, taxes cannot be a source of funding, as taxes destroy money, as proved by the Lerner-Wray proposition (Bell 2001; Wray 1998). In the same sense, taxes reduce disposable income and reduce aggregate demand and are not a source of funding. Bond issues cannot, therefore, a source of funding for a deficit, which is already financed (Bell 2001; Wray, 1998). Abba Lerner had already tackled this issue long ago when he commented that:

“taxing is *never* to be undertaken merely because the government needs to make money payments. Taxation should, therefore, be imposed only when it is desirable that the taxpayers shall have less money to spend, for example, when they would otherwise spend enough to bring about inflation”. (Lerner 1943, 40)

It is important to note here that Post-Keynesians would argue that money is created when the government makes a spending decision and asks to borrow from the central bank, granting this loan to the government in the ‘initial finance’ stage. And when taxes are paid that money is destroyed (‘final finance’ stage).

In contrast to MMT, Post-Keynesians view taxes as final finance, and as a major source of funding (Sawyer, 2014).

What is more, an increase in commercial banks' reserves through state spending would make them seek to eliminate their excess reserves by holding treasury bills in order to maximize their profits (Parguez, 2002). In this case, the treasury will make new issues of bonds to absorb banks' excess reserves and prevent the automatic fall in the long-term rate of interest. Thus, interestingly the state does not issue bonds for 'initial finance' of its deficit but for targeting the short-term rate of interest to offset the impact of the deficit on interest rates (Parguez, 2002) (Seccarecia, 2012). The central bank's open market operation of buying/selling securities from/to the banks cannot be a final financing operation in the same way as private firms would need to do so in financial markets (ibid). Therefore, one main reason for government issuing bonds is to help the central bank in its interest-rate stabilization operations; and another one is to help financial institutions meet their capital requirements, as the treasuries' risk-free rate provides an ultimate proxy to value all other market securities (Tymoigne, 2014). In a monetarily sovereign economy, taxes and bonds are important as reserve-draining devices to maintain price and interest-rate stability.

It is interesting to note that Joan Robinson made the same point many years ago. So, Robinson could be considered as an honorary developer of modern monetary theory. She said: "A budget deficit financed by borrowing from the Central Bank has effects similar to those of gold-mining.... For the Central Bank, in lending to the government, increases the 'cash' of the banks, just as it does by buying securities or by buying gold.... The increase in the quantity of money, which takes place cumulatively as long as the deficit is running, will tend to produce a fall in the rate of interest" (Robinson 1937, p. 88).

Further, Godley and Cripps (1983, p. 158) were very much aware of the relationship between the government, the central bank, and reserves: "The central bank has to fund the government's operations but this in itself presents no problems. Government cheques are universally accepted. When deposited into commercial banks the cheques become 'reserve assets' in the first instance; banks may immediately get rid of excess reserves by buying bonds" (Godley and

Cripps 1983, p. 158). The fact that government default is virtually impossible ¹⁷ explains why interest rates on government securities in the USA and Japan are so low, despite their huge public debt (Lavoie, 2011). Obviously, markets are confident that Japan has the capacity and the ability to make interest payments on whatever amount of public debt its government can accumulate (ibid).

Therefore, an active partnership between the central bank and the government is very crucial in a monetary production economy to achieve greater economic goals. Kaldor (1958) stressed the necessity of government policies to achieve stability and growth in the economy. That could be achieved by coordinating fiscal and monetary policy; where monetary policy is a good tool to deal with the fluctuations of the economy, fiscal policy is a good tool to pursue long-term objectives of sustained growth in the economy. The long run effects of coordinated expansionary fiscal and monetary policy are positive for income, capital, and growth, especially when the economy is not close to its productive capacity or full employment (Tobin, 1974).

The early post-World War II "Golden Age" or the "Keynesianism Era" is a great example of an appropriate cooperation between government and central bank macroeconomic policy actions with a commitment to full employment in a peaceful Europe. Further, the recent financial crisis has also proven that the cooperation of the government and the central bank, in implementing 'unconventional' monetary and fiscal measures, is crucial to save the economy. The stakes are of much larger magnitude compared to the 1930s' great depression, especially with a more complex and integrated financialized economy (Lavoie and Seccareccia, 2017). Further, following Kalecki, Sawyer (2017) argued that public deficits are necessary not only during recessions but also during expansions.

A recent study within the FTPL framework on the impact of fiscal stimulus in the UK and France via coordinated monetary-fiscal policy rules and an accommodative central bank has found expansionary fiscal policy is effective

¹⁷ This refers to the central government, which issues bonds in its own currency; lower tiers of government can (and do) default, e.g., some local governments in the USA.

and has a long-run effect on GDP in both countries (Creel et al., 2014). What is more interesting is that a persistent fiscal deficit had a long-run effect on GDP in France, and an increase in public investment had a long-run effect on GDP in the case of UK (Ibid).

To sum up, in a modern capitalist financialised economy, coordinated monetary-fiscal policy actions are vital to and contain the instability of the economic system. And there is no way to understand our modern economy without clearly understanding the crucial characteristics of money creation and the state's vital role in this economy.

4.6 Conclusion

To conclude, NCM ideology has a serious misconception of the role and nature of the public sector, the central bank, and money in economic theory and practice. Its dominant influence on policymakers and authorities has made monetary and fiscal policies not only powerless but inadequate. This is mainly due to the belief in a self-adjusting free market, following the 'invisible hand' of Adam Smith, the belief in a limited independent central bank with the self-imposed rule of one instrument and one objective, and the belief in the neutrality and ineffectiveness of fiscal policy because of a self-imposed budget constraint as if the state had "limited financial resources".

Contrary to NCM paradigm, some NK economists have relaxed these assumptions at least temporarily and at time of the crisis, and have devised an FTPL, which somehow gave fiscal policy the power of limitless debt creation with a fully monetized central bank. FTPL emphasised clearly the importance of a coordinated monetary-fiscal policy to sustain macroeconomic stability. Even though Buiter with his FTS has criticised the FTPL heavily, his FTS is similar to FTPL but with central bank dominance rather than treasury dominance. And it is consistent with QTM and Friedman's 'helicopter money drop' exogenous-money ideology.

Post-Keynesian theory, with its rooted understanding of Macroeconomic theory and policy, following Keynes, Kalcki, Kaldor, Robinson, and Minsky among others,

has proved that NCM assumptions regarding monetary policy and fiscal policy are self-imposed political constraints rather than economic ones. We have noticed some similarity with FTPL; yet, the post-Keynesian approach provides an economic theory based on social reality, with a comprehensive understanding of the important role of the government and the central bank in stabilizing an unstable capitalist economy. It also stresses that there is nothing written in stone in terms of monetary-fiscal operations given the impossibility of separation between the treasury and the central bank in a monetary production economy, where monetary and fiscal policies are very interrelated by nature, both in theory and practice. Providing a theory of money and debt in a modern capitalist monetary circuit and understanding the central bank's ultimate power of money creation and its interrelation with the treasury is essential because it effectively liberates the government from being subject to an artificial, self-imposed budget constraint. Therefore, the theory allows the central bank to actively intervene and fill the gap of the underutilized capacity of our society as a whole – that is, strive to achieve full employment and economic stability. In the following chapter, I explore and critically compare the existing Macro models, which are DSGE NCM model vs. SFC Post-Keynesians macro model.

Chapter 5: *Macroeconomic Modelling*

5.1 Introduction

The purpose of this chapter is to provide a formal model that encompasses the interaction and behaviour of all macroeconomic agents, which in turn feeds back to the aggregate macroeconomic dynamics. Although it can be argued that econometric tools are not attached to a specific viewpoint of the world, this view does not always hold for macroeconomic modelling (see, e.g., Stockhammer and Onaran, 2004 for critical reflections on the Vector Autoregression (VAR) methodology). Further, there is always the question of how econometrics copes with a world of fundamental uncertainty when it is based on a probabilistic-risk view of the world with random error terms coming from a statistical distribution. In general, the macroeconomic modelling framework that is used by researchers often reflects to a certain extent their assumptions and understanding of the way the economy functions. That is why it is important to discuss and compare the merits and limitations of the different macroeconomic modelling methods that exist.

It could be argued that we have two classes of theoretical Macro models. DSGE models are one class models whose popularity has increased during the 1980s-2000s. The other class of "theoretical" models mainly used by economists and practitioners is structural macroeconometric models. SFC models can be regarded as a subgroup of the latter. In addition, agent-based (AB) macroeconomic models (and AB-SFC models) have been developed in the last two decades as an alternative modelling tool. VAR and SVAR models are also very popular. A VAR model is regarded as having "empirical" nature while a SVAR model is a middle ground between "theoretical" and "empirical" models, that's in addition to the input-output (meso) analysis models. However, in this chapter, I discuss and compare two macroeconomic modelling methods used by economic researchers, which are the Dynamic Stochastic General Equilibrium (DSGE) and the Stock-Flow Consistent (SFC) approaches. The purpose is to explain why the SFC is a more appropriate approach for macroeconomic modelling.

Firstly, DSGE has been developed and consistently based on the neoclassical macroeconomic theory, and it reflects that theory's assumptions and limitations. For instance, it reflects the neoclassical assumption of general equilibrium as the normal state of the market economy. DSGE's main contribution is to provide microfoundations to macro-modelling. However, this contribution is questionable as the approach views society as a simple aggregation of separate individuals who are homogeneous and do not interact. More specifically, DSGE adopts an atomic (individualistic) view of the world, with one representative agent (motivated by self-interest) who optimises and has rational expectations and an infinite time horizon (I have discussed this point in detail in chapter 1).

That not only reflects a false social ontology, it also creates space for fallacies of composition. Furthermore, the intrinsic assumption of stability across DSGE models creates a pre-determined understanding as to what causes certain economic phenomena, such as inflation and unemployment. To be sure, the models are open to non-neoclassical features, such as the New Keynesian price and wage rigidities, and they have been recently updated by adding financial 'frictions'¹⁸ to include banks and credit. However, those additions do not eliminate the fundamental faults of those models, such as disregarding the endogeneity of money.

In contrast to the DSGE methodology, the alternative of SFC macroeconomic modelling offers a more conceptual and broader framework which allows researchers to use and apply their different theoretical backgrounds. The clear separation between stocks and flows in SFC modelling gives the model an important element of dynamic interaction, whereby the realization of flows and the change of stocks link different short-term periods with each other. More importantly, it provides a solid basis for coherent social accounting and also creates the appropriate space for a comprehensive consideration of financial dynamics. SFC also allows different perspectives on human behaviour and is not locked into utility maximisation.

¹⁸ Notice here that in the DGSE model, the word 'frictions' usually corresponds to factors that slow down the price mechanism from equilibrating the market

The rest of this chapter is organized as follows: I first outline the most important developments within the DSGE tradition throughout recent years. I then move on to critiques of the approach. Next, I discuss the alternative of SFC modelling, identifying both its merits and its limitations. The last section concludes.

5.2 DSGE Models

DSGE models enjoyed a golden era before 2007. Most central banks and mainstream researchers utilised it, in addition to other Macro forecasting models, as an effective way of macroeconomic modelling, despite its shortcomings. Such as the absence in the models of banks, credit, and money, and implicitly money is exogenous (e.g., the Smets and Wouters (2002) model used by ECB), and other important economic aspects such as income inequality. One of the main arguments of DSGE models' 'success story' is their ability to fit the data (Christiano *et al.*, 2010), at least up to the 2007 crisis.

The crisis revealed flaws with DSGE models. However, following the crisis, DSGE modelling has made some progress by incorporating a number of real-world features such as a banking sector and by attempting to explain the existence of multiple interest rates by introducing financial frictions into the models (Fontana and Passarella, 2018; Goodfriend and McCallum, 2007). Further, Gerali *et al.* (2010) introduce a banking sector with monopolistic power and study the importance of credit-supply factors in explaining fluctuations in investment and GDP. The banks in their model provide loans to both households and firms, and draw funds not only from savings but also from retained earnings, thereby creating an important link between the real and financial sides of the economy. Furthermore, interest rates are sticky, while households demand either deposits or loans depending on their level of 'patience' (patience relates here to the discount factors that households apply to their future utility).

In another study, Kumhof and Ranciere (2010) introduce inequality as a factor increasing the financial leverage of households and increasing the probability of a financial crisis. In a similar vein, Charpe and Kuhn (2012) highlight the importance of inequality in dampening consumption and aggregate

demand. Their model includes a wage-bargaining mechanism and an endogenous labour share of income.

Additionally, newer DSGE models set a low elasticity of substitution between capital and labour, which limits the increase of labour demand that follows a fall in wages. In contrast to most of the existing DSGE literature, their results show how wage rigidities such as minimum wage help to stabilize the economy by containing the falls of output and employment. Christiano *et al.* (2013) endogenise wage inertia and examine the response of labour market variables to monetary, technological, and investment shocks.

As for the financial sector, Benes, Kumhof, and Laxton (2014a; 2014b) construct a DSGE model with banks and household credit, following a balance sheet approach for their banks. Adopting the key insights of the endogenous money theory, the authors suggest that it is not savings but rather demand for financing, banks' expectations of future profitability, and the risk-absorption capacity of their capital that govern banks' decisions to provide credit. They use their model to show that banks have the capacity to create purchasing power *ex nihilo*, while at the same time they show how large and risky loans create the seeds of a financial crisis. Christiano *et al.* (2014) also include financial frictions into their model, without however considering an explicit banking sector. What is interesting in their paper is that they adopt a two-stage decision mechanism for households, with a monetary shock in-between. With households deciding the size of their portfolio in the first stage, and the allocation of their wealth in the second one, this model permits the authors to depict a "flight to safety" situation.

5.2.1 DSGE Critiques

5.2.1.1 Microfoundations of Macroeconomics

The key point of the Lucas Critique (Lucas, 1976) was that expectations play an important role in explaining observed regularities at the aggregate level. In that regard, once there is a policy change, expectations change, and as a result, the observed aggregate relationships will change. To tackle this problem, macroeconomic models should start from the level of the individual, since

structural parameters such as consumption preferences and production functions are immune to policy changes. The above critique shaped DSGE models from their genesis so that the microfoundations approach provided DSGE models a strong *raison d'être*.

To evaluate the validity of the Lucas argument, one should first consider the purpose of mathematical modelling. If the aim is to conduct accurate prediction, as advocated by neoclassical economists (e.g., Friedman, 1953), the Lucas Critique is right in pointing out the possible instability in observed aggregate relationships. But then the disappointing performance of DSGE models in forecasting the crisis and post-crisis economic dynamics (for evidence see Edge and Gurkaynak, 2010) could be taken as a sign that not even the individual-based parameters are permanently fixed as assumed by the microfoundations approach. In that case, there is either a need to think of abolishing mathematical modelling altogether or to acknowledge the artificiality of the closures we construct when building such models. A mathematical model is, in essence, an analytical tool for exposing and communicating an argument. As such, it requires a vast number of simplifications. Although such communication might include projections of future scenarios, there is no obvious reason why we need to attach certain probabilities to possible scenarios, especially when our knowledge of such likelihoods appears to be so shaky. Neither is there any reason to pretend that the parameters utilized are going to stay constant when it is known that the parameters vary over time. Any projections will, of course, be sensitive to the stability of the parameters employed, but this not an error itself. In either a micro- or a macro-founded model, it is an error to forget the artificiality that surrounds the constructs. Even if the microfoundations approach provides a solution to a problem, it only does so by creating a few new ones. In particular, it introduces a false social ontology, which as such creates the hazard of false policy conclusions, while it also opens the space for fallacies of composition.

To start with the problem of social ontology, microfounded models such as the DSGEs are based on the dubious idea that society is an aggregation of individual households and firms so that we can conduct a valid macro analysis by focusing

at the level of the representative agent without losing scope. However, as argued by Kirman (1989, 1992), it is far from obvious that the aggregate of individuals acts in the same way as the representative agent, even if everyone is assumed to behave rationally. Put simply; there is no direct relation between individual and collective rationality. Furthermore, Kirman points out that even if we could somehow construct an accurate representative agent at a given point in time, such representation would be itself sensitive to policy changes. In Kirman's words, 'the representative constructed *before* the change may no longer represent the economy *after* the change' (1992: 123; emphasis in the original). That means that the Lucas Critique applies to DSGE models just as well as other models (also see Sawyer, 2017; Skott, 2014).

Despite the recent developments in DSGE modelling in incorporating insights from Game Theory, the basic microfounded ontology of the model leaves aside any element of social conflict, class divisions, or exploitation (Skott, 2014). For instance, under the basic routine of those models, households provide capital to firms, while in their role as workers they freely choose how much to work and how much to go on holidays based on the disutility they derive from their labour. To the extent that those elements are important in capturing real social dynamics, DSGE models act in a way that constrains rather than liberates the mind of the researcher.

Coming to the second problem, when microfounding of a macro world, it is easy to neglect the fact that some variables might have different and often opposing effects at the two levels. To neglect such a fact is to succumb to the fallacy of composition (Sawyer, 2017). For example, a key point raised by Keynes (Keynes, 1936) in his critique against the classical economics of his time is the 'paradox of thrift', a phenomenon that relates to the implications of increased savings.

As argued by Keynes, although increased savings can secure some increased future consumption if applied solely by the individual, the reverse occurs when such behaviour is adopted on a collective scale by the population. In that case, rather than securing an augmented volume of future consumption, increased savings will reduce consumption demand and therefore investment (Sawyer,

2017). As a result, not only will the economy experience a slump, but the savings will also end up being lower than before due to the fall in people's incomes.

5.2.1.2 Equilibrium

By virtue of their neoclassical underpinnings, DSGE models assume that equilibrium is something that exists in the real world. In that regard, DSGE models work with the deeply-rooted assumption that the market mechanism is capable of providing stability and full employment if left to operate freely. Of course, they employ all different sorts of frictions so as to mimic the data of the real world. However, the usage of those frictions does not change the main idea behind DSGEs, and this is of the utmost importance for policy conclusions. For example, one of the most common kinds of rigidities that can be found in DSGE is wage rigidities. The conventional (but not universal) wisdom across the DSGE community is that wage stickiness explains unemployment since it keeps the market away from the equilibrium wage that would deliver full (or non-accelerating-inflation) employment. Put simply, if there are legal barriers, such as the minimum wage, firms might not hire as many workers as they would do otherwise, and therefore the labour market does not clear. What is more, when, in a recession, workers refuse to accept a cut in their wages, firms will have to fire part of their staff in order to reduce their costs.

Other than the fact that as with before there is a fundamental fallacy of composition when taking wages solely as a cost factor and omitting their role as a source of aggregate demand, there is also an important issue in that DSGE modellers would usually assume that there really exists at all times an equilibrium wage consistent with full or non-inflation-accelerating employment. They ignore the fact that firms' decisions to hire do not relate solely to the wages they have to pay, but also to their expectations about the future so that especially in a recession we might very well have falling wages and increasing unemployment going hand in hand. Or, to state another example, even in the most advanced DSGE formulations, where banks are explicitly incorporated into the model, there is the implicit assumption that if we were to remove the specific element that creates financial crises, we could think of a stable financial

system. For instance, in Kumhof and Ranciere (2010) the problem of high leverage of financial firms is caused by income inequality, while in Benes *et al.* (2014a) it has to do with risky loans given out to households.

In none of the papers outlined above is there any thought that financial instability might be inherent to the functioning of the capitalist economy, rather than a symptom of specific regularities. That, of course, is not a coincidence, but a reflection of the fact that in DSGE models finance is at best considered as an afterthought, rather than an intrinsic feature of the process of capital accumulation. All those models outlined earlier can equally well explain investment with or without finance. Needless to say, my critique does not imply that observed regularities such as income inequality or risky loans are not important, but that there can be deeper causes behind financial crises not picked up by DSGEs. For instance, Minsky (1986) with his celebrated Financial Instability Hypothesis shows how financial fragility and speculation can be seen as intrinsic outcomes of the capitalist economy, given the way overoptimistic expectations are formed and reinforced in the expansionary phase of the business cycle. The precise schema that intrinsically creates financial instability goes beyond the current discussion. For my purpose, it suffices to point out that as long as there exist coherent explanations as to how unemployment, financial instability, and crises can arise as endogenous outcomes of the market economy. DSGE models act in a way that impoverishes the researcher by binding him or her to a very specific understanding of the economic system that assumes stability as its ultimate normality.

Furthermore, as Yilmaz (2015) argues, there is a very important distinction at the level of policymaking: rather than focusing on policy recommendations that would allow us to prevent unsustainable and destabilizing processes from building up, DSGE models tend to provide recommendations on how to improve the shock-absorbing mechanisms of the economy. Even more, as can be seen in the abovementioned literature, those recommendations are usually delivered in the aftermath of the occurrence of actual shocks, so that the usefulness of this kind of modelling can be directly questioned.

5.3 The SFC Alternative

SFC modelling has recently emerged as a way to move away from the problematic nature of DGSEs, while also opening up the space for a richer comprehension of economic phenomena. Despite the fact that the SFC approach has mainly been adopted by scholars broadly belonging to the Post Keynesian tradition, it devises a framework that can also be adopted by economists who do not necessarily share the assumptions and insights of the Post Keynesian theory. While the SFC approach has its roots in the works of James Tobin and Wynne Godley (indicatively see Brainard and Tobin, 1968; Tobin, 1982; Godley, 1999), it was the seminal book of Godley and Lavoie (2007b) that provided the main unified framework for the development of those models. It is this book, along with the recent review of SFC models provided by Caverzasi and Godin (Caverzasi and Godin, 2015), that mainly influences the outline provided here. First, as the name suggests, SFC models pay attention to clearly distinguishing between stocks and flows. As pointed out by Godley and Lavoie (2007b), such distinction gives an element of dynamic interaction in the model whereby different short-run periods are interrelated through the realization of flows and the corresponding change of stocks in the economy.

Furthermore, by focusing on the interaction of the balance sheets of all the agents that are included in the model, the SFC approach gives a strong emphasis to watertight social accounting. Namely, every flow needs to come from somewhere and go somewhere else, while every asset in the economy is always somebody else's liability. Although conceptually simple, this rule is powerful in making sure that we do not commit any fallacies of composition. In addition, it forces the researcher to comprehend the multifaceted role of assets/liabilities in economic dynamics. For instance, under proper SFC accounting, public debt always has a mirror reflection as wealth in the hands of the private sector.

The above rule also holds in the case of open-economy stock-flow modelling. In contrast with non-SFC models, the stock-flow approach requires the explicit modelling of the external sector. As with before, the logic of SFC models forces us to take into account the fact that every trade imbalance has two distinct points of view: the deficit of one country is always the surplus of another.

Similarly, the wealth that flies out of a country does not go into a black hole but ends up in the hands of an agent or fund in a foreign sector. Furthermore, unless special assumptions are employed, there is nothing in the system that guarantees balanced trade across countries in either the short or the long run.

In neither the closed nor the open economy set-up is there any default assumption of gravitating tendencies towards a market-clearing equilibrium point. Of course, the model still solves for a steady state in most (but not all) of the SFC applications (for a discussion of explosive trajectories in SFC models, see Macedo e Silva and Dos Santos, 2011). However, this does not imply that equilibrium is understood here as a feature of the real world. Rather, the steady state is merely employed as a reference point for the researcher to be able to draw inferences and conclusions. Similarly, it can be seen as a useful device for comparing alternative policies.

Although there is a growing stream of agent-based stock-flow applications (see for instance Carvalho and Di Guilmi, 2013), microfounding an SFC model is not required. In fact, most of the SFC models, including the ones outlined in Godley and Lavoie (2007b), have been so far based on macrofoundations. Note here that the macrofounding of a macro model does not imply a return to the old-school IS/LM framework. In most, if not all, SFC models there is a far richer interaction between the developments going on in the financial market and the real economy than what the IS/LM approach could allow for (Sawyer, 2017).

With regard to the behaviour of the model's agents, there is no specific requirement for assuming rational expectations. Decisions depend on expectations which turn out to be incorrect, and in that sense, mistakes made. Also of course decisions cannot all be implemented – a person may decide to buy but can only actually do so if there is someone ready to sell. Instead of rational expectations, a variety of expectation mechanisms can be employed. Most importantly, given that some key decisions of the agents are made at the beginning of the period before the economy engages in any sort of interactions, mistakes can also be made. For instance, households can err when calculating

their expected wealth, firms may face a discrepancy between the expected and actual sales of their products, and banks may face a gap between the asset and liability sides of their balance sheet. In all cases, a buffer element is assumed for every sector to ensure the ex-post coherency of the accounting.

One of the most interesting aspects of an SFC model is the way the financial market is depicted. As modelled, it is essentially based on the financial decisions of households, which, after deciding at the beginning of the period how much to consume. They then go on to estimate their end-of-period wealth and decide how to allocate it across the available financial assets (e.g., government bills and bonds, corporate equities) (Lavoie, 2014). The demand for every asset (which is proportional to expected wealth) is not only a function of its own rate of return but also relates with the rates of return of all the other financial assets, including cash.

The demand for money is generally either for liquidity or transactions purposes. In that way we end up with a system of equations that needs to satisfy the following Tobinesque principles: (i) the column of the coefficients that relate with liquidity preference (the constants of the equations) needs to sum up to one. (ii) the coefficients of all other columns need to sum up to zero; (iii) the sum of all the coefficients on rates of return, reading horizontally, need to sum up to zero as well. The logic behind those rules is that what matters for the decision making of households is not the rate of return of every asset per se, but its yield relative to all other assets. For the same reason, whether the rates of return are included in a nominal or in a real form does not make any difference (Godley and Lavoie, 2007: 326- 7). Furthermore, money holdings usually play the role of the buffer so as to correct the realized mistakes in expectations. In that regard, the ex-ante demand for cash usually differs from the actual ex-post cash holdings.

There is a three-stage process that needs to be followed when setting up and solving an SFC. First, in accordance with the requirement of watertight accounting, a balance sheet matrix must be designed for the model. That is meant to include all the stocks of assets and liabilities that every sector has at the beginning of the period, as well as the sectors' net worth. Second, a

transaction matrix is required to map every transaction that takes place throughout the period across the different sides of the economy. Any capital gains are also included here. As a reflection of proper accounting, in both the balance and the transaction matrices all columns and rows should sum up to zero. Third, the accounting identities and behavioural equations of each sector need to be established in order to illustrate the causalities that are assumed to run across the model. Then, the parameters and initial values of stocks and flows need to be obtained so as to simulate the model (alternatively one can solve the system analytically and stop there, or just stop at the specification of the identities and equations). As discussed in Caverzasi and Godin (2015), numerical values can either be theoretical or empirical; in the second case the researcher can either calibrate them or estimate them econometrically. Notice here that up to stage two, the model does not have a 'character' yet. Rather, it is only by means of the equations of stage three that the model incorporates insights from theory (also see Toporowski and Michell, 2011). For instance, the model could be either led by demand or supply and up to stage two, the choice would make no difference.

All in all, there are no specific constraints on the issues to be studied. Rather, SFC models can allow for a plethora of phenomena to be investigated such as income inequality, innovation, and financialization (see literature outline below). Moreover, there are no boundaries to the theoretical narratives that one might want to reflect on a model, so that the SFC approach does not advocate any kind of economic orthodoxy, either new or old.

5.3.1 SFC Literature Review

SFC modelling began with Morris Copeland's approach to modelling economic flows in the late 1940s (Copeland, 1949). Based upon the double-entry-bookkeeping principle, Copeland augmented this approach to recording flows from a social perspective, creating the quadruple-entry-bookkeeping principle (Caverzasi & Godin, 2015). An example of the quadruple-entry approach is the sale of a house. To purchase houses, the buyers must have either sufficient cash on hand or get a mortgage from a bank. For the sake of simplicity, let us assume the former, with the buyers using the money in their deposit accounts. Upon the

sale of the house, the buyers transfer the money to the account of the sellers, and in exchange, they receive the title to the house. In the end, four transactions between the buyers and the sellers take place. The buyers receive the houses, and thus their tangible capital increases, but their deposits decrease by the same amount to pay for the houses. The sellers lose the tangible capital, and their deposits increase by the amount of money received from the sale of the houses.

After Copeland, there were two other early major contributors to SFC modelling, James Tobin at Yale and Wynne Godley at Cambridge in the United Kingdom. The first major empirical SFC model focused on the U.S. economy, and was published in a paper by Tobin along with David Backus, William Brainard, and Gary Smith (Backus et al., 1980) (Caverzasi & Godin, 2015). Another significant contribution by Tobin was the development of a system of equations for portfolio allocation of wealth into various assets depending on their respective rates of return (Tobin, 1969) (Caverzasi & Godin, 2014). With respect to SFC modelling used by post-Keynesian economists, Godley made the significant early contributions on both theoretical and empirical sides. Perhaps the most important contribution to SFC modelling was the book Godley coauthored with Marc Lavoie: *Monetary Economics: An Integrated Approach to Credit, Money, Income, Production and Wealth*, published in 2007, with a second edition published in 2012. *Monetary Economics* introduces the fundamentals of SFC modelling and explores various facets of macroeconomics, such as open-economy models, realistic financial systems, and growth. It is the textbook for SFC modelling. A more in-depth discussion of SFC modelling can be found in *Post-Keynesian Stock-Flow-Consistent Modelling: A Survey*, by Eugenio Caverzasi and Antoine Godin (2015). In what follows I outline some of the most recent papers, with a special focus given to open-economy case studies.

To start with, van Treeck (2009) introduces some aspects of financialization into the SFC framework, running a number of experiments related to share buybacks and higher dividend pay-outs. Moreover, Arestis and Sawyer (2012) study the effectiveness of fiscal policy, and Ryoo and Skott (2013) investigate the fiscal requirements for continuous full employment. Dafermos (2012) designs a model that incorporates liquidity preference in all three sectors (households, firms,

and banks) at the same time. His analysis is facilitated by the construction of an uncertainty index that links to the economic agents' precautionary motive and asset selection, as well as their willingness to take up more debt. Passarella (2012) introduces the Minskyian dynamics of financial instability while modifying Minsky's theory by allowing equity price inflation and households' autonomous consumption (as related to capital gains and credit) to enter the model. Furthermore, Dafermos (2014) attempts to put together some of the key insights of Godley and Minsky, by taking on board Godley's 'financial balances approach' and merging it with an endogenous target of the private sector's net debt-to-income ratio a la Minsky. Nikolaidi (2014) studies the joint role of wage stagnation and securitization in amplifying macroeconomic instability. Her model consists of nine distinct sectors, including two types of households, commercial banks, Special Purpose Vehicle (SPV) underwriters, and institutional investors. Bhaduri *et al.* (2015) investigate the links between asset price fluctuations and the real economy. Interestingly, Bhaduri and his colleagues show how the inflation of asset prices can drive funds from real to financial investment, and thus contribute to systemic financial fragility. From their side, Caiani *et al.* (2014) study Schumpeterian innovation and its interplay with financial dynamics.

5.3.2 Limitations

Although the SFC framework is a promising alternative to conventional macroeconomic modelling, it has its limitations. First, most SFC models (but not all) still come down to a system of linear equations, as in the case of DSGE models. Similarly, despite its usefulness as a methodological tool, the steady-state assumption also creates some distance between the model and reality. However, it is worthy to notice that the steady state assumption is not necessary to empirical SFC models. Moreover, as discussed by Godley and Lavoie (2001/2) and Caverzasi and Godin (2015), the numerical solution of the model focuses on local stability, so that the researcher cannot know whether there are any other equilibria in the model and whether these are stable.

Aggregate SFC models usually employ a vast amount of equations (probably around a hundred equations on average). In addition, as pointed out by Toporowski and Michell (2011), the analysis of some phenomena such as stock

market inflation can require the splitting of one or more of the aggregate sectors and hence further augment the mathematical complexity of the model. In either case, such complexity can obscure economic interpretation, while the results can prove to be quite sensitive to parameter values. As discussed by Caverzasi and Godin, the parameterization of the model always involves some arbitrariness, irrespective of the strength of the underlying empirical analysis, while sometimes non-realistic values need to be assumed for the sake of obtaining a realistic, steady-state solution.

Taking all these considerations into account, it is important to remember that the SFC approach is a method of mathematical modelling. As pointed out earlier, while modelling techniques can allow us to understand and illustrate analytically some otherwise complex phenomena and interactions, there are always simplifications and sacrifices that need to be made. But even the most advanced and extended model one could ever imagine would not be in a position to capture the richness of theory. For example, although there are many bright mechanics that can be employed to illustrate aspects that arise out of Keynesian uncertainty, uncertainty itself remains a non-quantifiable concept. The way out of the conundrum is not to downgrade the importance of such non-quantifiable phenomena and constraints and treat them as disturbances to an otherwise smooth process, but to fully acknowledge them and in that sense also acknowledge the limitations of the modelling we are doing.

5.4 Conclusion

Paving the ground for the model developed in the following chapter, chapter 5 has discussed some of the main alternatives in macroeconomic modelling. In contrasting the DSGE with the SFC approach, the chapter points out the advantages of the second. As shown, the DSGE methodology offers the researcher a narrow modelling framework which intrinsically assumes stability as the normal state of the economy and which operates on the basis of microfoundations. On the other hand, the SFC approach provides a broader framework that can be employed by researchers coming from a variety of theoretical traditions. Some of the main merits of the approach include the

clear distinction between stocks and flows, the emphasis on watertight social accounting, and the creation of the space required for the thorough examination of the various financial relationships among the agents of the economy. In the following chapter, I investigate the interaction between monetary policy and fiscal policy in an SFC model, in a sense incorporating chapters 4 & 5.

Chapter 6: *The impact of monetary-fiscal policies coordination on financial stability in a post-Keynesian stock-flow model*

6.1 Introduction

I have discussed in chapter 4 the importance of a monetary-fiscal policies coordination from both the fiscal theory of price level and the post-Keynesian theory of monetary-fiscal policies interrelation. In addition, I have discussed the SFC modelling in chapter 5. Consequently, in this chapter, I use a post-Keynesian stock-flow model to investigate the role of a coordinated monetary-fiscal policy to achieve economic stability in particular financial stability. My concern here to emphasise the central bank's unique role as the as a fiscal agent (government's bank), which is very crucial to achieve macroeconomic stability. The latter is achieved when acting as the ultimate provider of liquidity to the economy and as a lender of last resort to both government and banks. Thus, an accommodating monetary policy which is based on the post-Keynesian 'horizontalists' view is not only essential, but it is vital to achieving economic stability (Fontana, 2004).

The main contribution for this chapter that it goes beyond existing literature, by incorporating a coordinated monetary and fiscal policy to achieve financial stability. Banking on Minsky's concept of Borrower's and Lender's risk of firms and banks, which is based on expectations and level of confidence. Post-Keynesian fundamental uncertainty is incorporated implicitly here in the sense to signify low confidence in expectations, regardless of probability, which is represented in the changing of firms desired investment and expected demand, and it is also reflected on Borrower's and Lender's risk of firms. More importantly, a monetary rule based on the solvency and liquidity risk of banks rather than the usual Taylor rule.

In the first section I discuss some literature on the importance of monetary-fiscal policies coordination. Then I build a SFC model in a closed financialised economy which consists of five economic sectors: households sector, firms sector, banks sector, a central bank and a government. That is done to investigate a coordinated expansionary monetary-fiscal policy on financial

stability when a solvency rule is applied in contrast to contractionary fiscal policy (austerity). I discuss the results of simulations and scenarios. Finally, a conclusion will be drawn.

6.2 Monetary-fiscal policies coordination

I have shown in chapter 4 that the interrelation of monetary and fiscal policy is essential to achieve overall economic stability. This is in contrast to NCM, where fiscal policy is impotent, and to FTPL, in which fiscal policy is only crucial for price stability. The post-Keynesian notion of monetary-fiscal policy interrelation is vital to achieving financial stability that would lead to economic stability.

Fontana et al. (2015) argued that coordinated monetary policy and fiscal policy can achieve financial stability. That is to say, both policies can affect the Minsky's notion of 'lender risk' and 'borrower risk' reducing the risk and restore confidence in the economy, by changing firms' and banks' expectations, which restores economic activity and promote financial stability. More precisely, monetary policy transmission mechanism uses its policy rate affecting the lending and borrowing behaviour of banks and firms, by impacting lenders' and borrowers' risk *a la Minsky* (Nikolaidi, 2017). This is so given that banks set their interest rate on loans based on mark-up over the central bank policy rate and on their credit risk which comprises liquidity and insolvency risks. Liquidity risk is the composition of their portfolio and by taking into account the ratio of illiquid and liquid assets. The liquidity risk increases when the ratio of illiquid/liquid assets of banks increases. Since loans to firms and households are normally identified as illiquid assets, banks will be less willing to accommodate the demand for credit if their portfolio is highly illiquid. However, the central bank can reduce the liquidity risk of banks by exchanging government bonds for private debts. Moreover, banks assess the insolvency risk according to the ability of firms and households to reimburse their debt. The ability of firms to repay debts, in turn, depends on their leverage ratio and Tobin's q (Le Heron, 2009).

Further, following Graziani's 'monetary theory of production', Fontana et al (2015) added fiscal policy dimension to financial stability. Given the direct relationship between income (Y) and government expenditure (G), then an

increase in (G) increases income level, which in turn affects the aggregate demand that leads to an increase in households' consumption. That will increase firms' production and profitability, which reduces their borrower' risk, which also reduces the solvency risk of the banks, given the increasing ability of firms to pay-back their debts. An increase in production will increase the demand for loans, and banks will be willing to increase the supply for loans due to a reduction in the borrower's risk given the increase of firms' profitability, liquidity, cash flow and expected sales revenue. Moreover, an increase in government expenditure is financed by a loans issued by the central bank in exchange of government bills and bonds. That also increases banks' liquidity, as central bank will provide these bills and bonds, which are very liquid assets for banks' balance sheets, in exchange of private debts, increasing banks' liquidity and ability to meets the increasing demand of loans by households and firms.

Thus, we have coordinated monetary-fiscal policy with an increase of government expenditure that increases aggregate demand, expected aggregate demand and income, and a decrease of central bank policy rate. All is accompanied by central bank financing of government spending, which will lead to change market expectation, which in turns improve the state of confidence of households, firms and banks by reducing the solvency and the liquidity risk in the economy, which helps, first in achieving financial stability, second increasing economic activity and ensuring stability.

6.3 The SFC Model

Following (Lavoie-Godley, 2001, 2007, Dos Santos-Zezza, 2004, Mouakil, 2006, Le Heron-Mouakil, 2008, Le Heron, 2009)work, I build a post-Keynesian stock flow consistent closed economy model, consist of five economic sectors: households, firms, banks, government and central bank. Firms take their investment and production decision based on desired growth of capital, which depends on their state of confidence in the economy, following Keynes 'animal spirit' behaviour. They demand banks' loans based on the availability of internal funds and their borrowing risk. Banks create money and grant loans based on their state of confidence and the creditworthiness and the financial structure of

the firms. Households supply work and earn wages, and they take their consumption decision based on their disposable income and accumulated wealth. To present a financialised household, they have access to loans, and they hold financial assets. Banks create money by issuing loans on demand which creates deposits, and they also have a portfolio of financial assets. The central bank sets the monetary policy rate, acts as a lender of last resort to government and banks, and provide currency and advances to banks on demand. It acts as a public agent as it does not hold any net wealth and it transfers its profit to the government. Government finances the public expenditure by issuing bills and bonds, and its expenditure grows constantly. The government collects taxes and receives profit from the central bank. In our model, a coordinated monetary-fiscal policy is crucial to achieve financial stability by its impact on the lenders and borrowers risk.

I illustrate the SFC model mechanism with an emphasis on an expansionary fiscal policy and an accommodating monetary policy that use a solvency and liquidity rule that is necessary to reach financial and economic stability. It is based on banks' lender's risk and borrower's risk, which is based on firm's risk in the first place. However, following Keynes's 'animal spirit', firms make an investment decision based on future profitability and expected demand. As discussed on chapter five, SFC modelling is based on two tables: a balance sheet matrix (stocks) and a transactions matrix (flows). Table 8 gives the transactions matrix that describes monetary flows between the five sectors of the economy. Every row represents a monetary transaction, and every column corresponds to a sector, which is fragmented in a current and a capital account, except in basic cases such as the government and that of households. Sources of funds appear with plus signs and uses of funds with negative signs, so every row must sum to zero seeing that each transaction always corresponds simultaneously to a source and a use of funds. The sum of each column must also be zero since each account (or sub-account) is balanced. Table 9 gives the balance sheet matrix of our economy. Symbols with plus describe assets and negative signs indicate liabilities. The sum of every row is again zero except in the case of accumulated capital in the industrial sector. The last row presents the net wealth of each sector.

Table 9: The balance sheet matrix

Sector/ Assets	Households	Firms	Private banks	Government	Central Bank	Σ
Capital		+ K				+ K
HPM						
high powered money	+ H _h		+ H _b		- H _s	0
Bank deposits	+ M _d		- M _s			0
Treasury Bills	+ B _h		+ B _b	-B _s	+ B _{cb}	0
Gov. Bonds	+ BL _h · ρ BL		+ BL _b · ρ BL	-BL _s · ρ BL	+BL _{cb} · ρ BL	0
Equities	+ E _{kh} · ρ e	- E _{ks} · ρ e	+ E _{kb} · ρ e			0
Loans	- L _h	- L _f	+ L _s			0
CB advances			- A _d		+ A _s	0
Net wealth	+ V _h	+ V _f	+ V _b	+ GD	0	+ K

6.3.1 Firms Equations

Following the theory of monetary production economy, firms need credit 'initial finance' in order to production takes place. In our model firms play a crucial role in terms of production, providing goods and services to households (C) and the government (G) for consumption. However, in our growth model the demand of investment (I_d) function, equation (11) grows by the desired rate of accumulation (gr_k) out of a capital target stock (K_t) plus depreciation (Da). The desired rate of accumulation (gr_k), equation (12), is a function of an exogenous state of confidence (γ_0), the capacity utilization rate (U_k), the borrower's risk, which is measured by the rate of cash flow (CF) that is the ratio of retained earnings (F_u) to capital (K_{-1}). Equation (10) represents the capital accumulation function, and a financial condition (FCI) which is measured by firms' loans defaults out of their investment. Equation (16) is the firms' profits (F_f) which is determined by the output (Y) out of wages paid (W_s) to workers, which consist of a number of workers (N_d) times wage (w), and interest payments for loans ($r_l^* L_{fd}$). Then they retained (F_u) a proportion (s_f) of (F) and the rest is distributed (F_d).

The desired investment financing decision is determined by internal finance, consist of undistributed profits (F_u) 'retained earnings', and external finance, consist of loans (L_{fd}) granted by banks. The difference between the desired investment (I_d) and the retained earnings (F_u) will determine the desired demand for loans (L_{fd}), equation (20). The latter, equation (21) depends on the bank's willingness to finance totally or in part according to their lender's risk (lr_f). For instance, if ($lr_f = 1$) then banks will refuse to finance investment demand for loans, and if ($lr_f < 1$) then they will accept to finance the firms demand for loans. Equation (22), the lender's risk depends on the firm leverage (lev_f) and some constant leverage ratio (lev_c), and it also depends on topin's (q) ratio. The lender's risk and the borrower's risk come from the analysis of H. Minsky.

Equation 9: Capital Accumulation

$$K = K_{-1} + I_d - Da \quad \text{where } Da = \delta * K_{-1} \quad \delta \text{ is a constant}$$

Equation 10: Desired Investment

$$I_d = gr_k * K_t + Da \quad \text{where } K_t = \kappa * Y_{-1} \quad \kappa \text{ is a constant}$$

Equation 11: Desired growth of investment

$$gr_k = \gamma_0 + \gamma_1 * CF_{-1} + \gamma_2 * U_{k,-1} - \gamma_3 * FCI_{-1} \quad \gamma_0, \gamma_1, \gamma_2, \gamma_3 \text{ are constant}$$

Equation 12: Cash flow

$$CF = F_u / K_{-1}$$

Equation 13: Financial condition

$$FCI = Npl_k * L_f / I_{d,-1} \quad \text{where } Npl_k \text{ is constant}$$

Equation 14: Rate of Capacity utilization

$$U_k = Y / K_{-1}$$

Equation 15: Firms' profit

$$F_f = Y - W_s - rl_{-1} * L_{fd,-1}$$

Equation 16: Wages paid to workers

$$W_s = w * N_d \quad \text{where } w \text{ is constant}$$

Equation 17: Distributed profits

$$F_d = (1 - s_f) * F_f \quad \text{where } s_f \text{ is constant}$$

Equation 18: Undistributed profits

$$F_u = F_f - F_d$$

Equation 19: Firms desired demand for loans

$$L_{fd} = I_d - F_u$$

Equation 20: Actual loans granted by banks

$$L_{fdd} = L_{fd} * (1 - lr_f)$$

Equation 21: Lender's risk

$$lr_f = \gamma_{lr} + \gamma_{lev} * (lev_{f,-1} - lev_c) - \gamma_q * q \quad \text{where } \gamma_{lr}, \gamma_{lev}, \gamma_q, lev_c \text{ are constants}$$

Equation 22: Firms' leverage

$$(15) lev_f = L_{fd} / F_u$$

What is important in the model is that firms issue equities, equation (24), that grow depending on firms' decisions among making desired investments, distributing profits, and retaining earnings, which is also a way to raise capital in the market instead of demanding loans from banks.

Equation 23: Equities issues by firms

$$E_{ks} = E_{ks,-1} + (1-s_f) * I_{d,-1} / p_e \quad \text{where } s_f \text{ is a constant}$$

Equation 24: Price to earnings ratio

$$PE = p_e / (F_f / E_{ks,-1})$$

Equation 25: Equilibrium condition, equities demand equals equities supply

$$E_{kd} = E_{ks}$$

Equation 26: Topin's q

$$q = p_e * E_{ks,-1} / (L_{fd} + K)$$

Equation 27: Equities demand by Households

$$E_{kh} = E_{kd} - E_{kb}$$

Equation 28: The rate of return on equities

$$r_k = F_d / (p_{e,-1} * E_{ks,-1})$$

Equation 29: Distributed profits to Banks

$$F_{db} = F_d * E_{kb} / E_{ks}$$

Equation 30: Distributed profits to Households

$$F_{dh} = F_d - F_{db}$$

6.3.2 Households Equations

The households in the model are financialised. In equation (32) households earn income (Y_h) which is based on paid wages by firms (W_s) in return to their supply of labour, dividends paid by firms (F_{dh}), interest paid on deposits ($r_{m,-1} * M_{d,-1}$) by banks, interest paid on treasury bills ($r_{b,-1} * B_{hd,-1}$), interest paid on government bonds ($r_{bl,-1} * p_{bl,-1} * BL_{hd,-1}$) minus interest paid for loans ($r_{l,-1} * L_{hd,-1}$) to banks. Equation (33) shows households disposable income (Y_d) is earned income (Y_h) net of taxes (T). However I added the changes of loans' demand minus repayments of loans ($\Delta L_{hd} - Rep_h$) as it is available for consumption and financial decision as well. Then, households make their consumption decision (C), equation (34) depending on their propensity to consume (α_1) out of their expected disposable income (Y_{de}), based on adaptive expectation equation (35), and (α_2) out of their previous wealth (V_{-1}). Household's wealth accumulation function (V) depends on his previous wealth (V_{-1}) and their savings out of their disposable income after consumption, a capital gain on equities will be added (cg_h) to their wealth accumulation as well, equation (37).

Equation 31: Households' income

$$Y_h = W_s + F_{dh} + r_{m,-1} * M_{d,-1} + r_{b,-1} * B_{hd,-1} + r_{bl,-1} * p_{bl,-1} * BL_{hd,-1} - r_{l,-1} * L_{hd,-1}$$

Equation 32: Households' disposable income

$$Y_d = y_h - T + \Delta L_{hd} - Rep_h$$

Equation 33: Households' consumption function

$$C = a_1 * Y_{de} + a_2 * V_{-1} \quad \text{where } a_1, a_2 \text{ are coefficients parameters}$$

Equation 34: Households' wealth accumulation

$$V = V_{-1} + (Y_d - C) + cg_h$$

Equation 35: Expected disposable income

$$Y_{de} = Y_{d,-1}$$

Equation 36: Capital gain out of equities

$$cg_h = \Delta p_e * E_{kh}$$

In a financialised world, households have access to finance their consumption and financial investment. Thus they are granted loans by banks based on their demand for loans. For simplicity, equation (38), the demand for loans (L_{hd}) is based on previous loans and a parameter (β) out of their consumption decision. The idea here is to present a consumption-debt-led behaviour, so households demand for loans is determined by their consumption level.

Equation 37: Households demand for loans

$$L_{hd} = L_{hd,-1} + \beta * C \quad \text{where } \beta \text{ is a constant}$$

Equation 38: Households' loans repayments

$$Rep_h = \beta_h * L_{hd,-1} \quad \text{where } \beta_h \text{ is a constant}$$

Households portfolio choice is fundamental in our model, as it is crucial to the dynamics of the demand for financial assets in a financial economy. They hold cash (H_h), and allocate their financial wealth (V_{fh}) between treasury bills (B_{hd}), government bonds (BL_{hd}), equities (E_{kh}) and deposits (M_d). This allocation is based on some preference parameter (λ) and the rate of return to each financial asset.

Equation 39: Households' demand for cash

$$H_h = V - B_{hd} - p_{bl} * BL_{hd} - p_e * E_{kh}$$

Equation 40: Households' financial wealth

$$Vfa_h = M_d + B_{hd} + p_{bl} * BL_{hd} + p_e * E_{kh}$$

Equation 41: Households' demand for treasury bills

$$B_{hd} = Vfa_{h,-1} * (\lambda_{20} + \lambda_{22} * r_{b,-1} - \lambda_{21} * r_{m,-1} - \lambda_{24} * r_{k,-1} - \lambda_{23} * r_{bl,-1} - \lambda_{25} * Y_{d,-1}/V)$$

Where $\lambda_{20}, \lambda_{21}, \lambda_{22}, \lambda_{23}, \lambda_{24}, \lambda_{25}$ are constant parameters

Equation 42: Households' demand for government bonds

$$BL_{hd} * p_{bl} = Vfa_{h,-1} * (\lambda_{30} - \lambda_{32} * r_{b,-1} - \lambda_{31} * r_{m,-1} - \lambda_{34} * r_{k,-1} + \lambda_{33} * r_{bl,-1} - \lambda_{35} * Y_{d,-1}/V)$$

Where $\lambda_{30}, \lambda_{31}, \lambda_{32}, \lambda_{33}, \lambda_{34}, \lambda_{35}$ are constant parameters

Equation 43: Households' demand for equities

$$p_e * E_{kh} = Vfa_{h,-1} * (\lambda_{40} - \lambda_{42} * r_{b,-1} - \lambda_{41} * r_{m,-1} + \lambda_{44} * r_{k,-1} - \lambda_{43} * r_{bl,-1} - \lambda_{45} * Y_{d,-1}/V)$$

Where $\lambda_{40}, \lambda_{41}, \lambda_{42}, \lambda_{43}, \lambda_{44}, \lambda_{45}$ are constant parameters

Equation 44: Households' demand for deposits

$$M_d = Vfa_{h,-1} - B_{hd} - p_{bl} * BL_{hd} - p_e * E_{kh} + L_{hd} - Rep_h$$

6.3.3 Banks' Equations

Banks are the main actors in the credit market, following post-Keynesian endogenous money theory banks issue loans to firms and households on demand. By issuing loans they also create deposits, and they accept deposits from households, equations (47, 48, 49). Equation (46) represents banks' profit (F_b) which is be made up of dividends received by firms (F_{db}), interest received on treasury bills ($r_{b,-1} * B_{bd,-1}$), interest received on government bonds ($r_{bl,-1} * p_{bl,-1} * BL_{bd,-1}$), interest received on loans issued to firms ($r_{l,-1} * L_{fd,-1}$) and to households ($r_{l,-1} * L_{hd,-1}$), in addition to capital gains on holding equities (cg_b), subtracting interest paid on deposits to households ($r_{m,-1} * M_{s,-1}$).

Equation 45: Banks' profit

$$F_b = F_{db} + r_{b,-1} * B_{bd,-1} + r_{bl,-1} * p_{bl,-1} * BL_{bd,-1} + r_{l,-1} * L_{fd,-1} + r_{l,-1} * L_{hd,-1} - r_{m,-1} * M_{s,-1} + cg_b$$

Equation 46: deposits to households

$$M_s = M_d$$

Equation 47: Loans supply based on Loans demand by firms

$$L_{sf} = L_{fd}$$

Equation 48: Loans supply based on Loans demand by households

$$L_{sh} = L_{hd}$$

In a monetary production economy banks play an essential role in order to investment and production take place. However, they issue loans after analysis of the credit worthiness of the firms, by analysing expected production plans, expected cash flow, and the borrower's financial structure ability in making repayments. So, as mentioned in the firms section, in my model banks issue loans based the borrower's risk (lr_f), and if ($lr_f = 0$). Then firms finance the total amount of firms desired demand of loans as in the case of the 'horizontalists' view, when banks foresees firms' future profits then they will be willing to finance all the loans demanded , and if ($lr_f = 1$) then banks refuse to finance firms demand of loans. This investigation is made according to their confidence in the state of long-term expectations of yields on capital assets, influencing what Keynes referred to as 'animal spirits'. The state of confidence of banks is notably taking into account by an exogenous variable (γ_4).

Banks charge interest on loans issued to firms and households (rl) Equation (50), with a mark-up over central bank's policy rate (r_{cb}), and taking into consideration the lender's risk on firms leverage (lr_b), equation (51) in addition to some fixed mark-up (add_1). Further, banks also pay interest on deposits to households (r_m), equation (52), based on central bank's policy rate (r_{cb}) subtracting a fixed parameter (sub_1). In addition, banks receive capital gains from holding equities (cg_b) equation (53).

Equation 49: interest rate charged on loans issued

$$rl = r_{cb} + lr_b + add_1$$

Equation 50: lender's risk

$lr_b = \gamma_{lr_b} + \gamma_{lev_b} * (lev_f, -1 - lev_c)$ where γ_{lr_b} , γ_{lev_b} parameters, lev_c leverage target

Equation 51: interest paid on deposits

$$r_m = r_{cb} - sub_1 \quad \text{where } sub_1 \text{ exogenously determined}$$

Equation 52: Banks' capital gain on equities

$$cg_b = \Delta p_e * E_{kb}$$

Banks' portfolio choice is also important in our model, as it is vital to the dynamics of the demand for financial assets in a financial economy. They allocate their profit (F_b) between treasury bills (B_{bd}), government bonds (BL_{bd}), equities (E_{kb}) equations (54, 45). This allocation is based on some preference parameter (λ) and the rate of return to each financial asset. However, equation (56), the demand for treasury bills is also based on balance sheet equilibrium where assets should equate liabilities. Where loans, bonds and equities are in the banks' asset side, deposits and advances demanded by the central bank (equation 57) in addition to banks' net profit. Further demand for advances depends on banks liquidity ratio ($(L_{sf} + L_{sh}) / B_{bd}$).

Equation 53: Banks' demand for government bonds

$$BL_{hd} * p_{bl} = F_{b,-1} * (\lambda_{60} - \lambda_{61} * r_{b,-1} - \lambda_{62} * r_{k,-1} + \lambda_{63} * r_{bl,-1}) \quad \text{Where } \lambda_{60}, \lambda_{61}, \lambda_{62}, \lambda_{63}, \lambda_{64}, \lambda_{65} \text{ are constant parameters}$$

Equation 54: Banks' demand for equities

$$E_{kb} * p_e = F_{b,-1} * (\lambda_{70} - \lambda_{71} * r_{b,-1} + \lambda_{72} * r_{k,-1} - \lambda_{73} * r_{bl,-1}) \quad \text{Where } \lambda_{70}, \lambda_{71}, \lambda_{72}, \lambda_{73}, \lambda_{74}, \lambda_{75} \text{ are constant parameters}$$

Equation 55: Banks' demand for treasury bills, a balance sheet equilibrium condition

$$B_{bd} = F_{b,-1} + M_s + A_d - L_{sf} - L_{sh} - p_{bl} * BL_{bd} - p_e * E_{kb}$$

Equation 56: Banks demand advances by the central bank

$$A_d = A_{d,-1} + z_1 * (L_{sf} + L_{sh}) / B_{bd} \quad \text{where } z_1 \text{ a constant}$$

6.3.4 Central Bank Equations

Central banks set monetary policy rate, in contrast to the NCM inflation targeting rule our model emphasizes the role of the central bank in financial stability. The central bank will consider banks' risk. The credit risk faced by banks is the sum of insolvency risk, which corresponds to the bank's perception regarding the borrower's likelihood of failure to repay the claim, and Liquidity risk, which entails the ability to liquidate assets when necessary. Thus, the monetary policy interest rate (r_{cb}) function, equation (58) depends on a natural rate of interest (r_n) (that makes savings=investment, it is assumed that is known and given). and taking into consideration banks' liquidity risk (Liq_b) compared to liquidity target (Liq_c), equation (59), And banks' solvency risk ($insolv_b$) compared to

solvency target ($insolv_c$), equation (60), both set by the central bank depending on weight parameters (β_1, β_2).

Equation 57

$$r_{cb} = r_n + \beta_1 * (Liq_b - Liq_c) - \beta_2 * (insolv_b - insolv_c)$$

Equation 58

$$Liq_b = (BL_{hd} + B_{bd}) / M_s$$

Equation 59

$$insolv_b = (BL_{bd} + B_{bd}) / (L_{sf} + L_{sh} + E_{kb})$$

Central bank performs its lender of last resort function for both the government and the financial sector to ensure financial stability by accommodating government demand for spending purpose and banks demand on advances, equations (61, 62, 63). The central bank will also hold treasury bills and government bonds which are not hold by banks and households to ensure financial stability and its full control over its policy rate. And as the ultimate provider of currency, central bank issues currency on demand equation (64).

Equation 60: Central bank's holding of treasury bills

$$B_{cb} = B_s - B_{bd} - B_{hd}$$

Equation 61: Central bank's holding of government bonds

$$BL_{cb} = BL_s - BL_{bd} - BL_{hd}$$

Equation 62: Central bank's supply advances to banks on demand

$$A_s = A_d$$

Equation 63: Central bank's supply currency on demand (the hidden equation)

$$H_s = H_h$$

Equation (65) central bank's profit on holding treasury bills, government bonds and providing advances, will be transferred to the government.

Equation 64: central bank's profit

$$F_{cb} = r_{b,-1} * B_{cb,-1} + r_{bl,-1} * p_{bl,-1} * BL_{cb,-1} + r_{a,-1} * A_{s,-1}$$

Equation 65: interest rate of treasury bills

$$r_b = r_{cb} + add_2 \quad \text{where } add_2 \text{ is mark-up}$$

Equation 66: interest rate of advances

$$r_a = r_{cb} + \text{add}_3 \quad \text{where } \text{add}_2 \text{ is mark-up}$$

Equation 67: Interest rate of government bonds

$$r_{bl} = 1/p_{bl}$$

Equation 68

$$p_{bl} = p_{blpar} \quad \text{for simplicity I assume government bonds price is fixed}$$

6.3.5 Government Equations

The national income (Y) adds the household consumption (C), investment of the firms (I_d) and the public expenditure (G).

Equation 69

$$Y = C + I_d + G$$

The government finances any deficit issuing bills and government bonds so that the supply of treasury bills (B) and government bonds in the economy is identical to the stock of government debt. In other words, government's new issue of bills is the sum of the previous period stock of debt plus its current deficit (DG) subtracting the change on government bonds equation (71). The current deficit of the Government includes the redemption of the National debt. It is assumed that private banks give limitless credit to the government at the long-term rate of interest:

Equation 70: Government's new issues of bills

$$B_s = B_{s,-1} + DG - \Delta BL_s$$

In this model, I assume that government expenditure (G) is always growing at a constant rate (gr_g), equation (72). Our model key element is the necessary coordination between the monetary and the fiscal policies, where the economy has a self-stabilizing tendency due to the coordination policy, through its impact on financial stability which leads to economic stability.

Equation 71: Government expenditure

$$G = G_{-1} * (1 + gr_g)$$

Government revenues come from collecting taxes (T) and central bank's profit (F_{cb})

Equation 72: Taxes

$$T = \theta * Y_h$$

Equation (74), government deficit is the difference of government expenditure (G), interest paid on bills, repayment of matured bonds and the tax revenue (T) plus central bank's profit (F_{cb}).

Equation 73: Government deficit

$$DG = G + r_{b,-1} * B_{s,-1} + BL_{s,-1} - T - F_{cb}$$

Equation 74: Government debt

$$GD = B_s + BL_s$$

$$Y_{fc} = \sigma * K_{-1} \text{ (Output full capacity)}$$

$$OG = Y_{fc} - Y / Y_{fc} \text{ (Output Gap)}$$

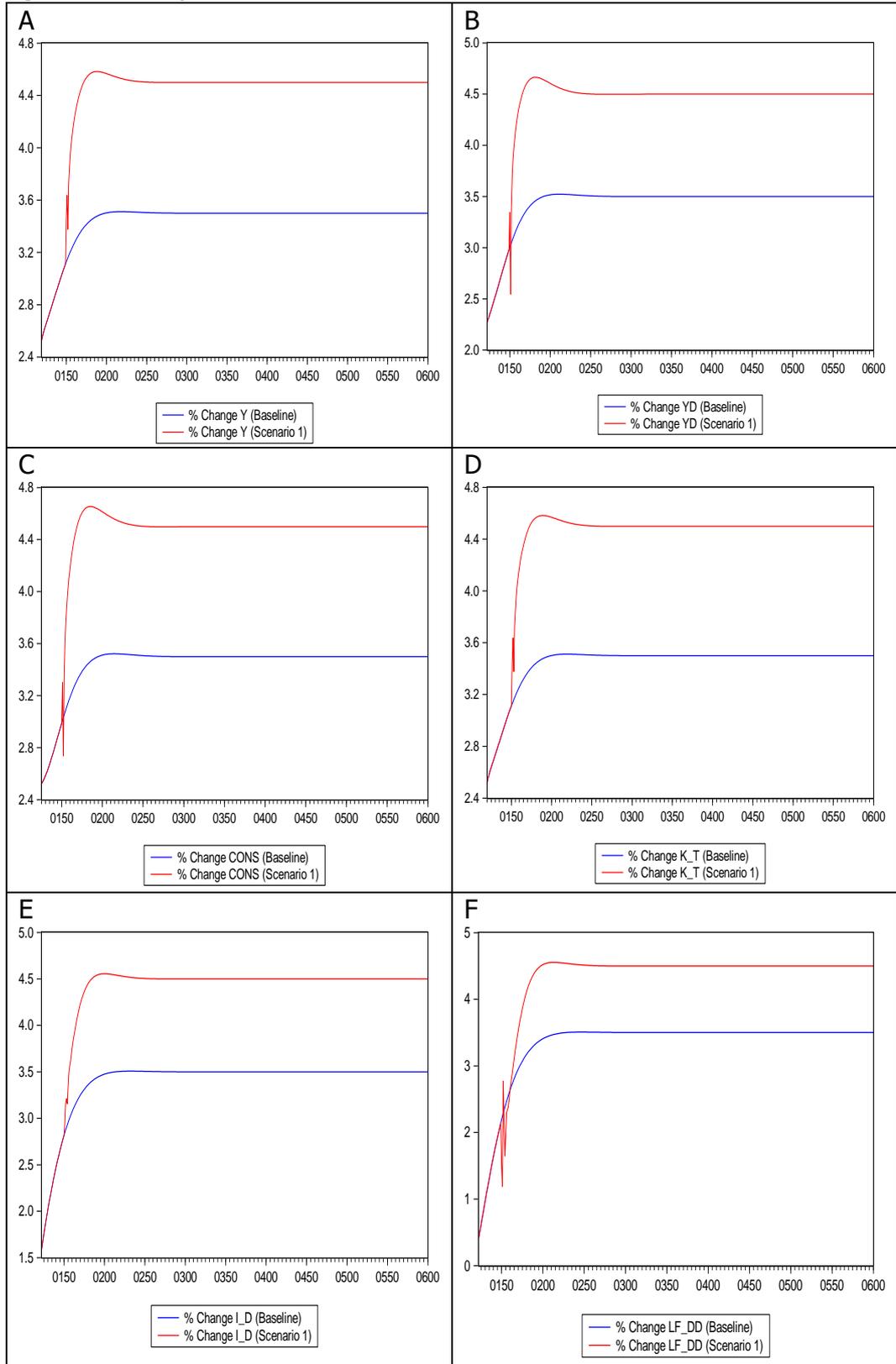
6.4 Model Simulation and shock

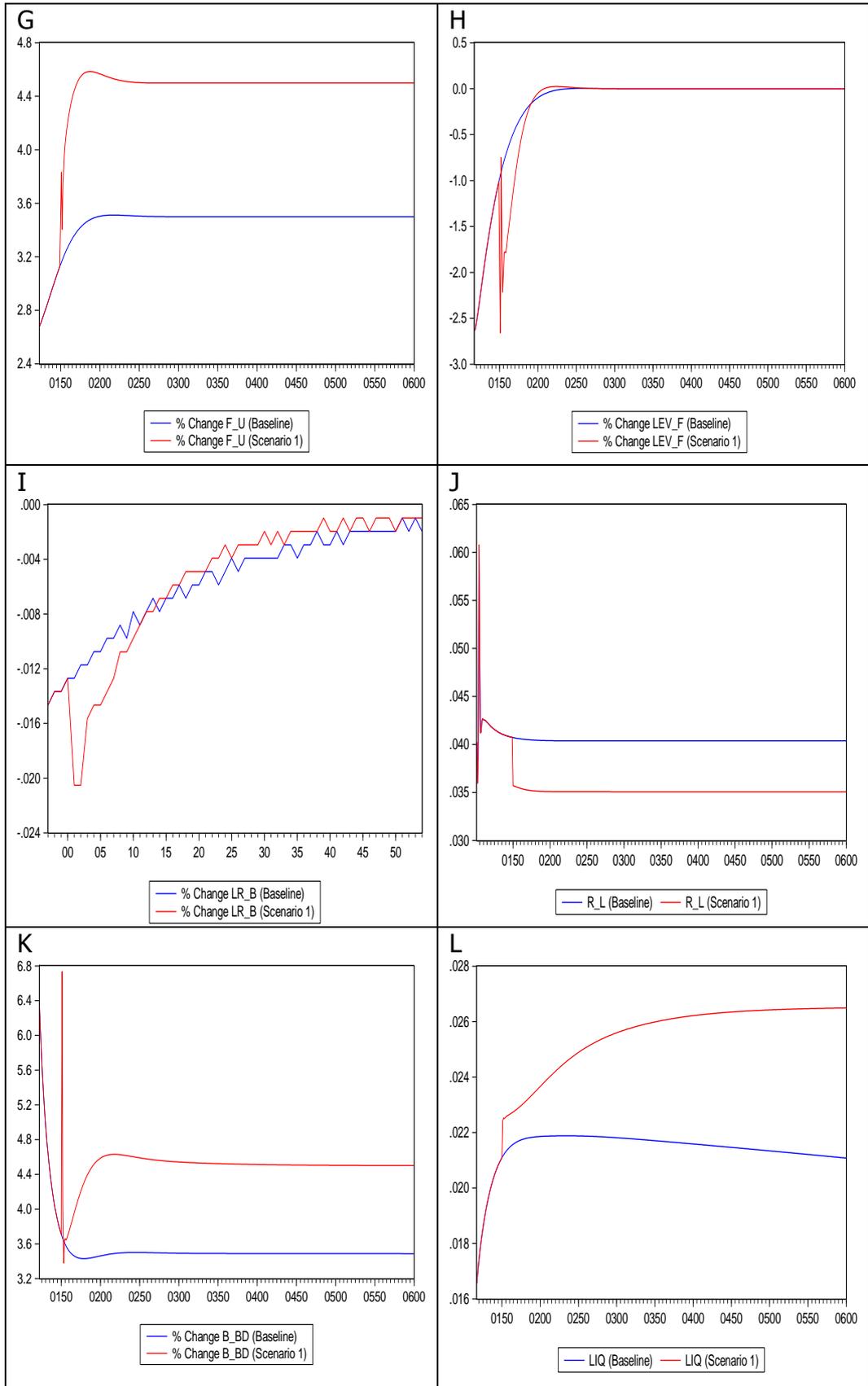
This section explores two scenarios for the mix policy by a shock of 1) an expansionary fiscal-monetary policy by a decrease in interest rate and an increase in government expenditure, 2) an expansionary monetary policy by a reduction of interest rate and contractionary fiscal policy (austerity) with a decrease in government expenditure. This representation is based on the real current world scenario, where policy interest rate is very low (near zero) and fiscal austerity measures in most countries that lead to poor macroeconomic outcomes (Sawyer, 2017). Then I look at both scenarios impact on output, disposable income, consumption, demand, and supply of loans, the borrower's and lender's risk. I use a plausible set of parameters values (see Appendix II) that is used in chapter 10 & 11 Godley & Lavoie (2007).

6.4.1 First Scenario: an expansionary monetary-fiscal policy

Starting with an initial state of crisis and loss of confidence, an increase in government expenditure by 1% combines with accommodative monetary policy, which entails a decrease in the policy rate and acting as a lender of last resort for the government. Given that there is a policy interest rate tool based on solvency and liquidity risks of banks, then the policy rate will accommodate this increase in public expenditure by a decrease in interest rate policy.

Figure 11: Shock first scenario





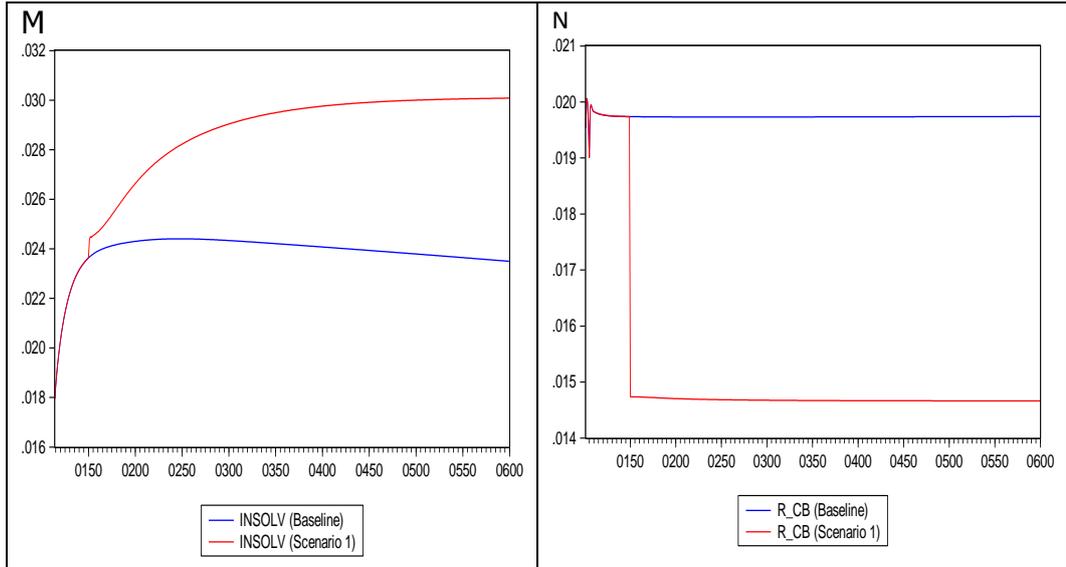
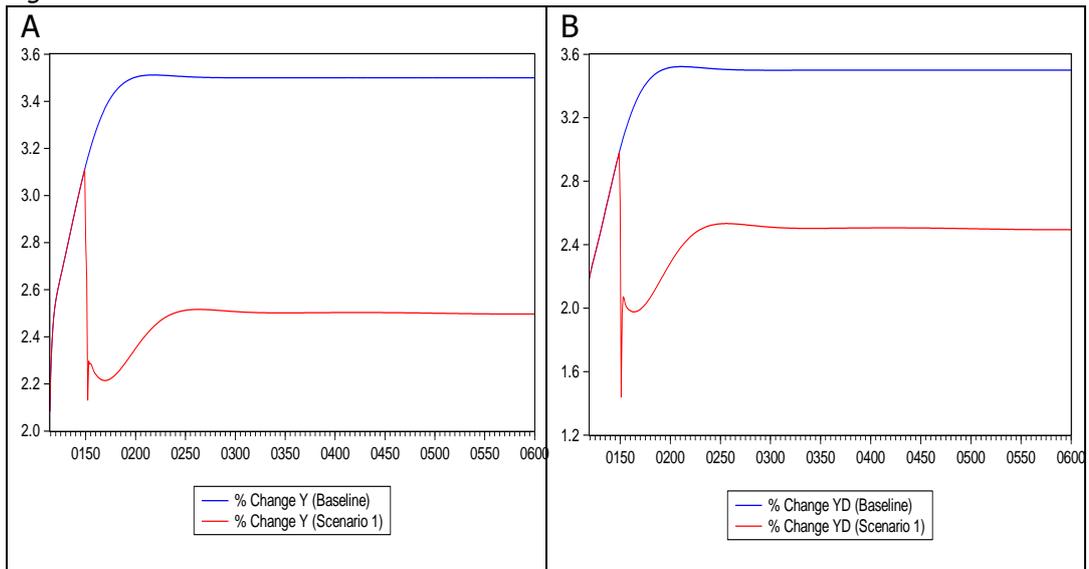
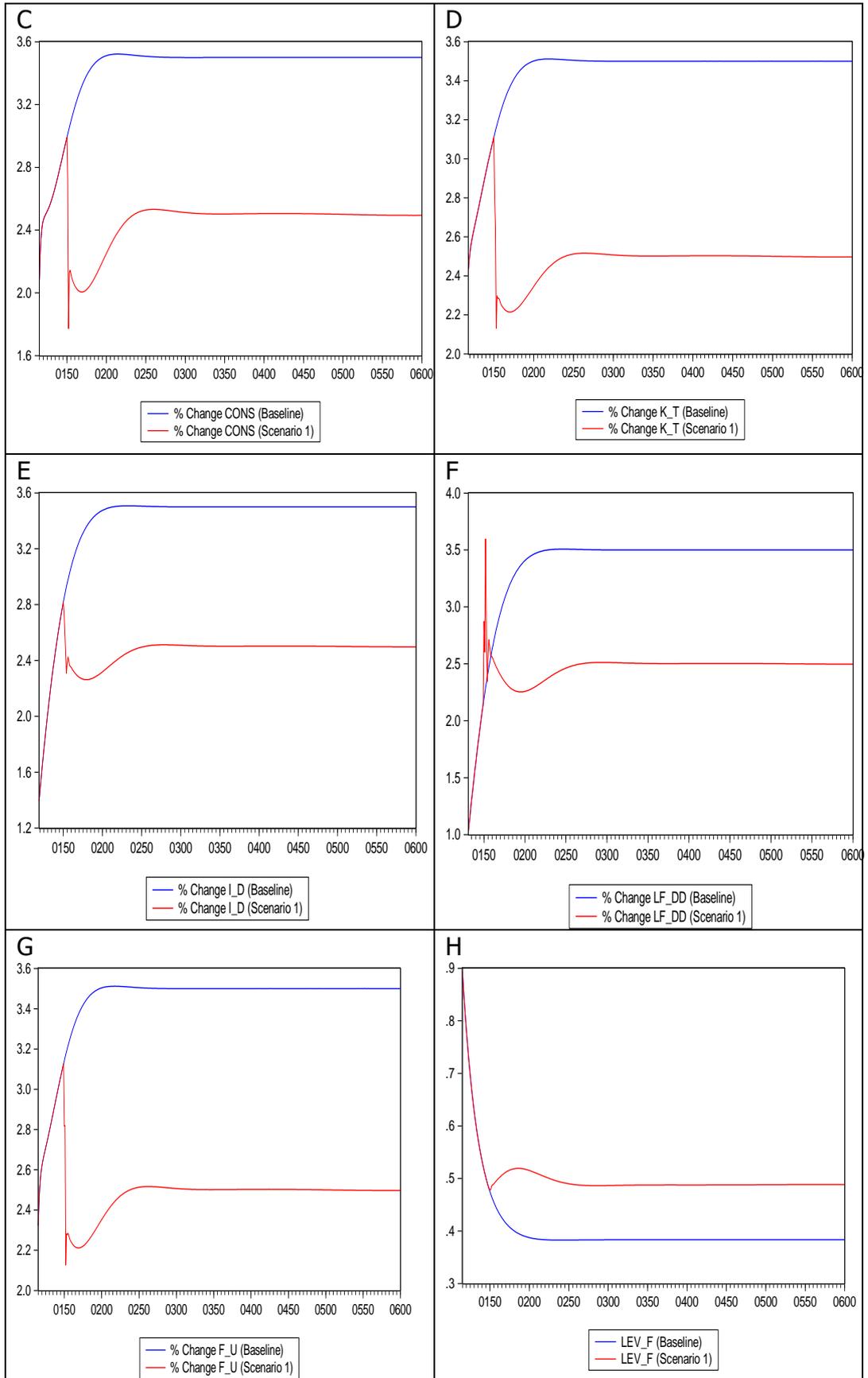


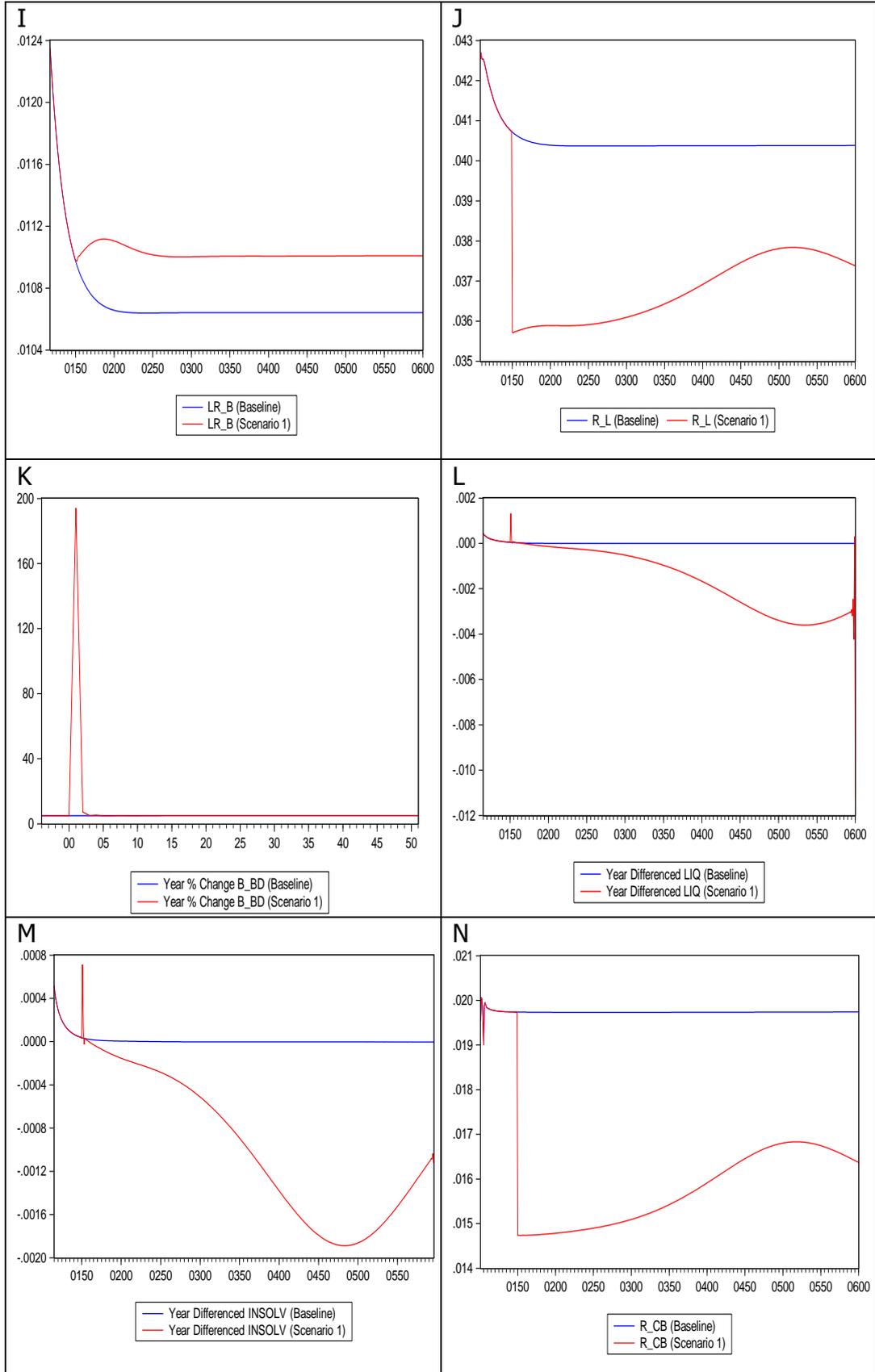
Figure 10 illustrates that the impact of an expansionary monetary-fiscal policy improves all the concerned variables output, disposable income, consumption, investment targets, desired investment, firms’ demand for loans, undistributed profits (internal funds), the borrower’s and lender’s risk, insolvency, banks demand for T-Bills, the interest rate on loans – Not only in the short-run but also in the long-run.

6.4.2 Second Scenario: an expansionary monetary policy by a decrease in interest rate and contractionary fiscal policy (austerity) decrease in government expenditure.

Figure 12: Shock second scenario







In contrast to the first scenario, an expansionary monetary policy by a decrease in interest rate and a contractionary fiscal policy (austerity) by a decrease in government expenditure will worsen all the concerned variables: output, as shown in figure 11, disposable income, consumption, investment targets, desired investment, firms' demand for loans, undistributed profits (internal funds), the borrower's and lender's risk, insolvency, banks demand for T-Bills, interest rate on loans at least on the short-run. Notably, desired investment is worst in the short and the long run, due to the deterioration in the level of confidence, leverage risk and increasing demand for loans while weakening internal funds. Furthermore, banks become more prudent as their liquidity and solvency ratio increase as the economic situation is falling.

6.5 Results and Discussion

The consequences of the financial crisis are examined for two kinds of policy mix: For scenario (1), monetary policy is concerned with financial stability matters, with a policy rate that follows solvency and liquidity anchor. There is coordination between the monetary and the fiscal policies. That gives rise to a favourable outcome for the whole economy not only in the short-run but also in the long-run through restoring the state of confidence and reducing the borrower's and lender's risk for all economic sectors.

For scenario (2), monetary policy is based on Taylor type of rule with inflation targeting. That corresponds to a unique mandate of the independent central bank: inflation gap only. Here fiscal policy is impotent and neutralized because we assume the fiscal rule that the ratio of the current deficit of the Government on the GDP is constant and equal to zero, as imposed by the Maastricht treaty for the European Union.

In our financialised economy, the steady state is not the full-employment equilibrium. The output gap is positive, with a significant rate of unemployment. Potential output corresponds to the full capacity output. Following Minsky and Keynes approaches, confidence and financial features explain the crisis. Scenario (1) produces much better outcome than scenario (2) in response to a fall in the state of confidence. With neutralising the fiscal policy by imposing austerity

measures to achieve a balanced budget, the economic situation deteriorates deeply and becomes more strongly cyclical.

Initially, after the crisis occurs, the decline in the state of confidence of firms is the first explanation to the depressed effective (expected) demand, i.e., the desired growth rate of accumulation of capital. But, particularly with the policy mix, banks also have an important responsibility, because financing conditions deteriorate. The rate of utilization of productive capacity falls more in the second scenario than in the first. The financial behaviour of firms explains these developments widely. With the depressed financial condition and the lower cash flow ratio, the borrower's risk increases seriously.

The effects on the self-financing of firms are very interesting. With the higher borrower's and lender's risks, firms and banks reduce external financing: self-financing of firms increases. It corresponds to a supply shock and a credit crunch. On the contrary, the lost confidence of households involves a shock of demand and self-financing of firms decreases. With the policy mix scenario (1) the higher government deficit allows an increase in the cash flow of firms. Their self-financing increases. Government indebtedness substitutes for that of firms. With the scenario (2), the weight of banks and households' behaviours is stronger and durably lowers self-financing of firms. We understand why the redoing of the ratio of self-financing is difficult and why it does not show the good state of the economy. The financing rationing of firms explains in part an increasing rate of unemployment. It exists sharp volatility in the financial markets (stocks and bonds) and a significant fall in the profit of banks. During the crisis, private banks try reaching a new equilibrium in their asset allocation. The structure of their balance sheet changes clearly. It is sure that our model over-estimates the size of equities. In the financialised economy, the firms finance the financial market more than the financial market finances the firms. Of course, the credit crunch will be deeper without the equities. These elements could explain the crossing of the financial crises to the real world.

The financing rationing of firms explains in part an increasing rate of unemployment. It exists a sharp volatility in the financial markets (stocks and bonds) and a significant fall in the profit of banks. During the crisis, private

banks try reaching a new equilibrium in their asset allocation. The structure of their balance sheet changes clearly. It is sure that our model over-estimates the size of equities. We can consider that one feature of our present economy is the 'financialised' accumulation of the profits. We can experiment our model with a higher part of the profits distributed to the shareholders. With an increase in the distributed profits, the rate of growth decreases and the borrower's and the lender's risks increases. The inflation decreases with the lower rate of growth and then the key interest rate of the central bank. With the higher leverage ratio and the lower self-financing for the firms, the gap between the short-term interest rate and the long-term interest rate increases.

These results support post-Keynesians view which provides a ground for a better understanding the mechanism of the unavoidable interrelationship between the treasury and the central bank to achieve financial stability, Impacting the state of confidence of the economy and affecting households, firms, and banks borrowing and lending behaviour and risk. Thus, when central bank follows her main function as a government's bank and her primary function as a banker's bank, with an accommodating policy, it leads to a better economic outcome, especially towards achieving financial stability objective.

6.6 Conclusion

A policy mix or a coordinated monetary-fiscal policy has given rise to a crucial debate between different economic paradigms. In this chapter, I analyse and investigate a coordinated monetary-fiscal policy from a Post-Keynesian perspective using Post-Keynesian SFC model of a closed economy with five agents: households, firms, banks, government and central bank. Our simulation provides proof of the Post-Keynesian theory of monetary-fiscal interrelation in stabilizing the economy, through changing the behaviour of firms and banks affecting demand and supply loans by reducing solvency and liquidity risk which impacts borrower's and lender's risk behaviour. An expansionary fiscal policy with an accommodating monetary policy and policy rate targeting banks' solvency and liquidity risk, will ensure achieving financial stability that improves the economic activity. Nevertheless, given the model complexity, the theoretical

plausible values (parameters and initial values) and the state of a closed economy, the model has its own limitations to provide an exact outcome for each economic variable in our economy. However, it produces a comprehensive understanding of a financialised economy. In the following chapter, I discuss the impact of monetary policy on inequality, using an expanded SFC model that I used in this chapter.

6.7 Appendix II

Table 10: The Firms Sector

PARAMETER	VALUE
$pr_{c,g}$	1
$W_{c,g}$	0.85
σ^T	0.9
δ	0.1
κ	1
γ_0	0.051
γ_1	0.05
γ_2	0.00515
γ_3	0.8
Npl_k	0.1
S_f	0.7
γ_{lr}	0.01
γ_{lev}	0.1
γ_q	0.01
lev_c	0.2

Table 11: Household Sector

PARAMETER	VALUE
τ_c	0.25
α_1	0.7
α_2	0.01
β	0.1
β_h	0.1
λ_{20}	0.35
λ_{21}	1.1
λ_{22}	2.2
λ_{23}	1.1
λ_{24}	1.1
λ_{25}	0.01
λ_{30}	0.15
λ_{31}	1.1
λ_{32}	1.1
λ_{33}	2.2

λ_{34}	1.1
λ_{35}	0.01
λ_{40}	0.4132
λ_{41}	1.1
λ_{42}	1.1
λ_{43}	1.1
λ_{44}	2.2
λ_{45}	0.01

Table 12: Banks Sector

PARAMETER	VALUE
γ_{rb}	0.01
γ_{levb}	0.0035
$levc$	0.2
sub_1	0.01
add_1	0.01
z_1	0.1
λ_{60}	0.3
λ_{61}	1.1
λ_{62}	2.2
λ_{63}	1.1
λ_{70}	0.4
λ_{71}	1.1
λ_{72}	1.1
λ_{73}	2.2

Table 13: Government & Central Bank

PARAMETER	VALUE
g_{rg}	0.03
g_{rc}	0.03
rcb	0.025
r_n	0.02
add_2	0.001
add_3	0.002
ρ_{blpar}	20
β_1	0.02
β_2	0.01
Liq_c	0.4
$insolv_c$	0.2

Chapter 7: *The impact of monetary policy on income distribution in a post-Keynesian stock-flow model*

7.1 Introduction

Since the 2007-2008 great financial crisis, income inequality and income distribution matters have gained increasing attention not only in academia but also from professionals such as large financial institutions. Mainstream economists also joined ~~also~~ this concert, with the famous work of Piketty's *Capital in the 21st Century* (2014). This income inequality has been rising since the early 1980s. Since 2010, median family incomes fell, while the mean rose. Inequality keeps rising. A Morgan Stanley study (2014) has also identified the rise in inequality, due to the growing proportion of poorly paid and insecure low-skilled jobs; the rising wage premium for educated people; and the fact that government (tax and spending) policies are less redistributive than they used to be a few decades ago. A report was written by the chief US economist of Standard & Poor's (2014), and another from Morgan Stanley, agree that inequality is not only rising but having damaging effects on the US economy. Janet Yellen, the chairman of the FED, recognised in her speech (2014) the growing gap between the rich and the poor, and she highlighted the risk of increasing income inequality to the American economy.

The key argument of this chapter is that central banks should take responsibility for the fight against the increasing inequality. Because of their central position between the government, the banking sector, and the society. Instead of only focusing on nominal anchor such as inflation targeting. My main contribution in this chapter that I developed a SFC model where I have tested the Pasinetti's 'fair rate interest' based on productivity growth against 'Inflation targeting'. The importance of the fair interest rate, compared to other alternative interest rates, is that the one which maintains purchasing power in relation to labour hours and money borrowed or lent and maintains the distribution of income between borrowers and lenders over time. From the fair rate perspective, central bank inflation targeting as currently practiced are not distributionally neutral in that they enable the capitalist class to take favourable financial positions.

I have found if the central bank incorporated a 'fair rate of interest rule' it would reduce inequality by distributing income from the rentiers class to other productive classes. That is consistent with Keynes argument against the unproductive rentier class.

This chapter will discuss inequality from a central banking perspective. Firstly, inequality will be defined, as inequality could take different forms. Section 2 will discuss how central bankers view inequality, causes, and consequences. That is mainly drawn from a mainstream perspective. Section 3 will provide a post-Keynesian approach, following Keynes, to inequality causes and consequences in a modern financialised economy. Then in section 4, I will build a SFC model to apply a post-Keynesian approach to interest rate and monetary policy. The fair rate of interest will be the policy rate; then simulation results will be discussed. Finally, a conclusion will be drawn.

7.2 Definition of inequality

Rising inequality has recently become a major concern in advanced economies, as it does not only affect economic activity but also it also affects social justice and fairness. Inequality could take different forms in a modern capitalist economy, inequality of wealth, income, financial exclusion, race, gender, globalization, technological progress, education and more importantly institutional set-up of our society. Inequality matters as it does not only impact our society today, but it has long run impact on the next generation.

Usually, mainstream studies focus on quantifying and simplifying inequality to limited and straightforward scope, such as wealth inequality, income inequality, opportunity inequality. However, the social justice, wholistic well-being, and the morally problematic issues are ignored. For instance, should we care about inequality in well-being, in social primary goods (Rawls, 1999), capabilities (Sen, 1992), opportunities, or some other relevant domain? For instance, Piketty's (2014) has justified that the current levels of inequalities are unjust in themselves.

According to Fontan et al. (2016), some recent theorists of justice what is relevant for justice is some measure of the means, resources, or capacities of the individual to pursue her life plans rather than the actual welfare level she attains (see, for example, Dworkin, 1981a). For example, inequalities in income or wealth are more straightforward to ascertain than inequalities in opportunities or capabilities. Further, Egalitarian theories of justice, in particular, have become more sophisticated than a simple call for equality in outcome. As a result, general claims about justice tend to focus on the inadmissibility of certain kinds of inequalities rather than call for outright equality (Fontan et al. 2016). For instance, the notion of equality of opportunity implies that people of equal talent should have equal opportunities or, put differently, that one's social background should not have any differential impact on one's life prospects. Second, we might employ Rawls's difference principle, which, as standardly understood, requires that institutions ensure inequalities in income and wealth maximize the expectations of the least advantaged (Rawls, 1999). Third, prioritarian views argue that we should be sensitive to both the size of the cake and the interests of those who receive the smallest slice, but without imposing a strict constraint as a maximum threshold (Parfit, 1997). Given its structure, prioritarianism promises to be particularly useful when it comes to trade-offs between containing inequalities and promoting economic growth. Other theories such as sufficientarian approaches view that what counts is not what people have relative to others, but that they have enough. The advocates of the sufficientarian approach aim to establish a minimum threshold of the currency of justice in question that everyone should attain (for example, Casal, 2007; Frankfurt, 1987).

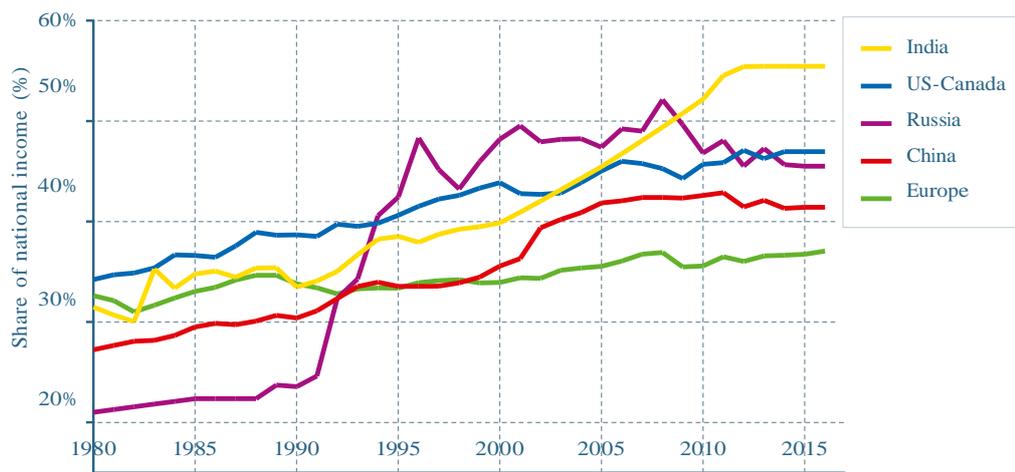
7.3 Trends and facts of inequality

In almost all OECD countries income inequality increased, but the timing and the trends differ considerably (WIR, 2018; OECD 2011). Anglo-Saxon countries already began to experience rising trends in inequality in the late 1970s and early 1980s. By the end of the 1980s, the phenomenon of rising inequality became more widespread, and by the 2000s, countries that were previously considered (more) egalitarian also became affected. High-income concentration

is also indicated by the development of top income shares (Piketty and Saez 2003, 2006). Since the 1980s, top income shares increased tremendously in Anglo-Saxon countries, and much of this increase was driven by a rapid rise in wage income and entrepreneurial income, whereas top shares in Continental European countries developed rather moderately (Alvaredo and Piketty 2009, Atkinson et al. 2011).

In recent decades, income inequality has increased in nearly all countries, but at different speeds, suggesting that institutions and policies matter in shaping inequality. Since 1980, income inequality has risen rapidly in North America, China, India, and Russia. Inequality has grown moderately in Europe (Figure 12 below). From a broad historical perspective, this increase in inequality marks the end of a post-war egalitarian regime which took different forms in these regions.

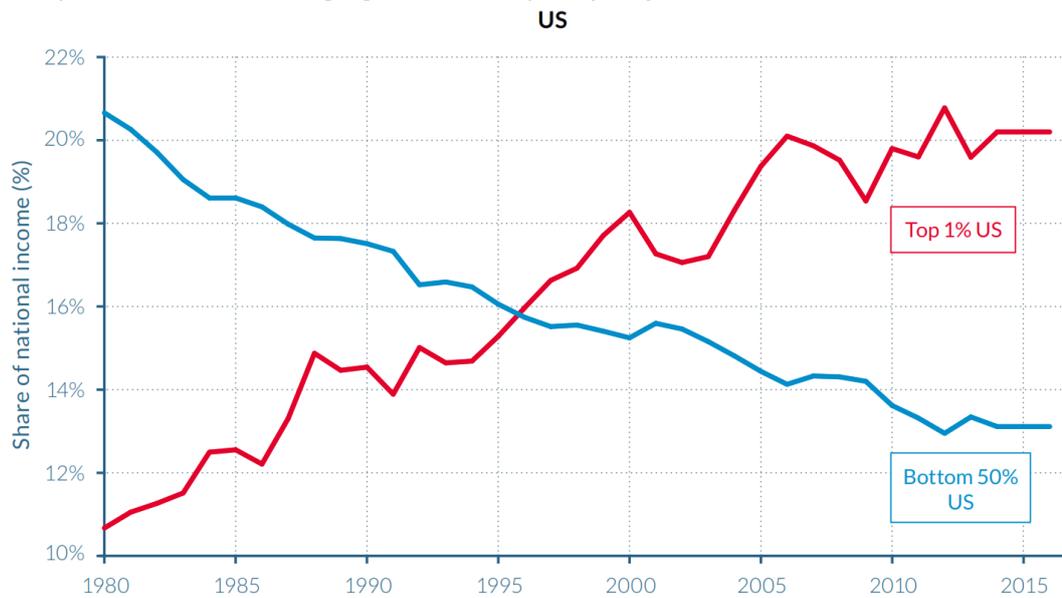
Figure 13: Top 10% income shares across the world, 1980 – 2016.



Source: WID world (2017). See wir2018.wid.world for data series notes. In 2016, 47% of national income was received by the top 10% in US-Canada, compared to 34% in 1980

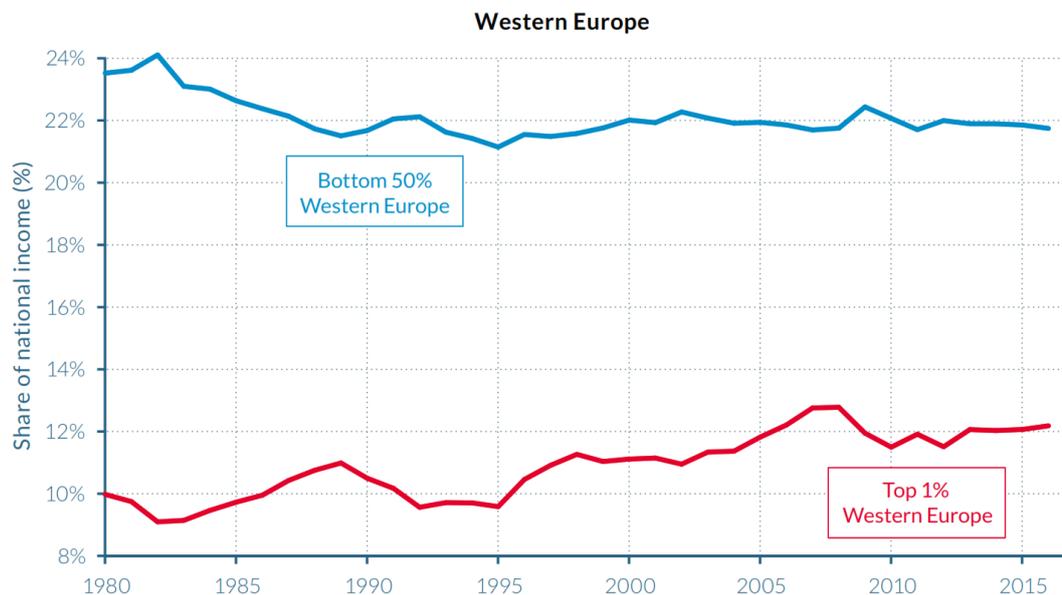
The divergence in inequality levels has been particularly extreme between Western Europe and the united states, which had similar levels of inequality in 1980 but today are in radically different situations. While the top 1% income share was close to 10% in both regions in 1980, it rose only slightly to 12% in 2016 in Western Europe while it shot up to 20% in the united states. Meanwhile, in the united states, the bottom 50% income share decreased from more than 20% in 1980 to 13% in 2016 (Figure 13 and 14 below).

Figure 14: Top 1% vs. bottom 50% national income shares in the US and Western Europe, 1980–2016: diverging income inequality trajectories.



Source: WID.world (2017). See [wir2018.wid.world](#) for data series and notes. In 2016, 12% of national income was received by the top 1% in Western Europe, compared to 20% in the United States. In 1980, 10% of national income was received by the top 1% in Western Europe, compared to 11% in the United States.

Figure 15: Top 1% vs. bottom 50% national income shares in the US and Western Europe, 1980–2016: diverging income inequality trajectories

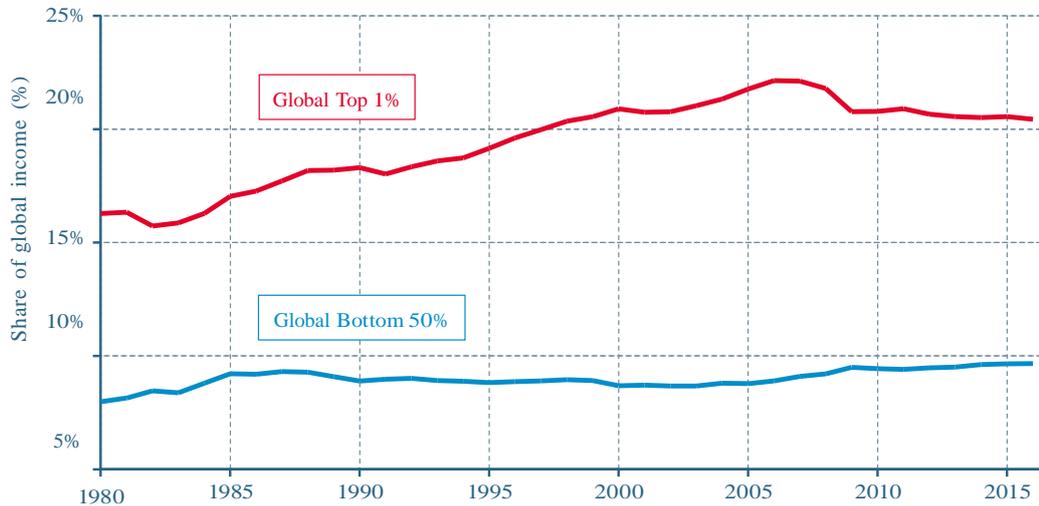


Source: WID.world (2017). See [wir2018.wid.world](#) for data series and notes. In 2016, 22% of national income was received by the Bottom 50% in Western Europe

The global top 1% earners have captured twice as much of that growth as the 50% poorest individuals. The bottom 50% has nevertheless enjoyed important

growth rates. The global middle class (which contains all of the poorest 90% income groups in the EU and the United States) has been squeezed (see figure 15 below).

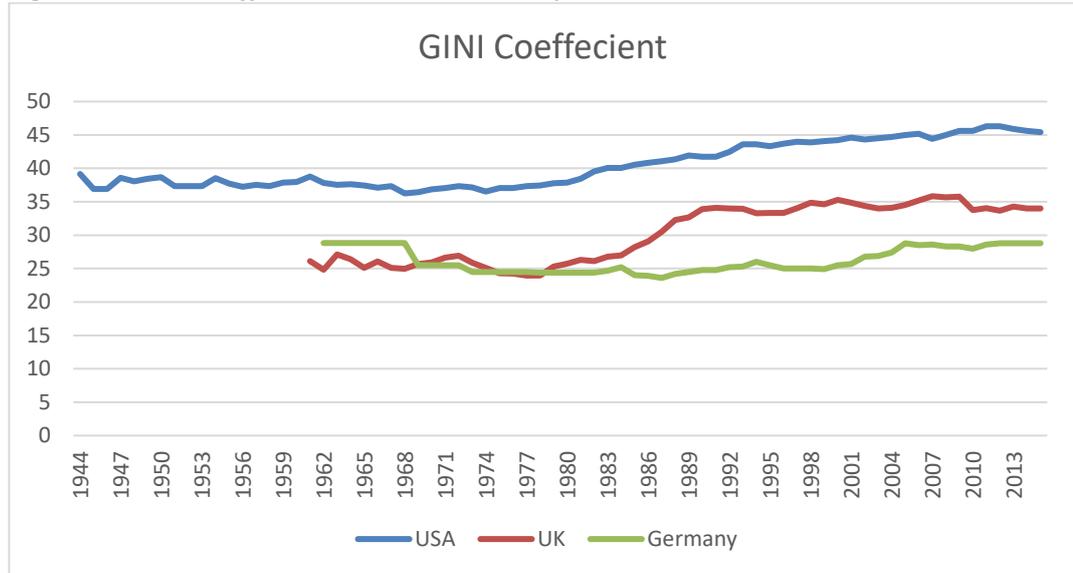
Figure 16: The rise of the global top 1% versus the stagnation of the global bottom 50%, 1980–2016.



Source: WID.world (2017). See [wir2018.wid.world](#) for data series and notes., In 2016, 22% of global income was received by the Top 1% against 10% for the Bottom 50%. In 1980, 16% of global income was received by the Top 1% against 8% for the Bottom 50%.

In term of inequality measurement, the most commonly discussed measures of income and wealth inequality is the Gini coefficient. It compares the income or (wealth) distribution of a population to a perfectly equal distribution—in which every citizen of a city or country has equal income or wealth. Gini coefficient is a summary statistic that measures the dispersion of incomes on a scale of zero (everyone has exactly the same income) to 1 (one person has all the income).

Figure 17: Gini Coefficient USA, UK, Germany 1944-2015



Source: OECD Database

The figure 16 above, shows the increase of Gini Coefficient in USA, UK, and Germany, particularly starting from the 1980s. And it shows inequality in the UK increasing from the 1980s to 1990s and then 'flat' since around 1990, with the decline since the global financial crisis. That is a reflection of the above graphs, where the Anglo-Saxons countries have experienced increase in income inequality starting the 1980s. That is after the rise of neoliberalism based on globalisation and financialisation, while Germany experienced a flat from 1960s to around 2000, with an increase from the introduction of the euro 2000 to 2006, and then flat afterwards.

However, the Gini coefficient has been criticised on the grounds that it is simple and unintuitive and relatively insensitive to the tails of the distribution, which are the most dynamic parts of the distribution Palma (2011). Palma noticed that in most countries, the middle class – defined as those in the fifth to ninth income deciles, or the 40%-90% – take in around half of the total income. "The (relative) stability of the income share of the middle is a strikingly consistent finding, for different data sets, countries and time periods," (Cobham and Sumner, 2013). Given that insight, there seems to be less reason in using the Gini ratio, which is sensitive to changes in the middle of the income spectrum but relatively blind to shifts at the extremes. The Palma ratio divides the income share of the top 10% by that of the bottom 40%, for instance, top 1 per cent, 10per cent, ratio

of top 10 per cent to bottom 10 percent. The result is a metric that is, in Cobham and Sumner's words, "'over'-sensitive to changes in the distribution at the extremes, rather than in the relatively inert middle." The Palma ratio has another advantage: its real-world meaning is easy to grasp. It is not the product of statistical wizardry, but simple division: the highest-earning 10% of the population make X times more than the lowest-earning 40%. The Gini ratio, Cobham and Sumner write, "yields no intuitive statement for a non-technical audience." The best we can do is something like: on a scale of 0 to 1, this country is 0.X unequal. This debate needs much further research which is out of the scope of this chapter.

To sum up, understanding the economics of inequality from different perspectives is an important matter in order to find the right policy levers that promote social justice and fairness not only for current generation but to the next one as well. In contrast, income inequality does not play a prominent role in mainstream discussions of crises.

7.4 Mainstream, Central Banker's and inequality

Central bankers, following neoclassical economics, view inequality as an outcome of the capitalist economy rather than an inherent component of it. That because neoclassical economics in its canonical form views income in terms of the returns to factors of production. Abstracting from questions of power, inequality thus arises from differing marginal productivities of labour and capital. Given different endowments of skills, talents, and scarce factors of production inequality, therefore, reflect one's ability to earn in the marketplace. In contrast, as I discuss in the following section, heterodox approaches view differences in power as an essential component of one's ability to earn income. Thus, it is not shocking the late and weak recognition of mainstream economics to this crucial phenomenon. That is so because of their beliefs on in free and self-adjusting market mechanisms, labour market flexibility and the major assumption of general equilibrium, and their ignorance of the nature and crucial role of money in a monetary production economy, and its impact on the real economy in the

short and long-run. Academic contributions such as Stiglitz (2012) and Piketty (2014) have fuelled debate on issues of inequality.

Furthermore, the role of macroeconomic policies in inequality, such as central banking policy, has been understated or even ignored by mainstream economists. The conventional monetary policy focus on inflation targeting ignores any link whatsoever with inequality. The increasing power of central banks and the use of unconventional monetary policy in the post-crisis period, have invigorated mainstream economists to question the impact of such policy on causing or worsening inequality. As a result of these unconventional policies, such as quantitative easing, the distributive consequences have become more prominent (Ertu"rk, 2014). Arguably, the increasing concern of inequality as a socioeconomic matter has remained very limited in the mainstream central banks' bank's intellectual apparatus. Usually, mainstream economics studies inequality at best within the scope of causes and impact on economic activities, for example, its role in declining economic growth, or negatively impacting consumption and spending, or the impact on price (Goda, 2013). The fact that inequality is not prominent in mainstream research can also be seen from the fact that the vast majority of DSGE models were based on one rational representative agent (with some exception such as the work from Kumhof and Ranciere (2010), and Kumhof et al. (2012)). That means that "there are no distributive issues [and] no scope for exploitation [because] what the worker loses through lower wages, he/she gets back in his/her role as 'owner' through higher profits" (Stiglitz, 2011, p.598). Furthermore, DSGE models normally disregarded the possibility of excess indebtedness, as no financial market was included in most models. In other words, according to the vast majority of mainstream theories and models, inequality will have neither a negative impact on aggregate demand nor will it lead to over-indebtedness. Even if capital markets are taken into account mainstream theories of consumption "...see no link between the inequality of (permanent) income and aggregate personal consumption, and hence no need for government action..." (van Treeck and Storn, 2012, p.1). The reason for this view is that households are expected to be able to smooth fluctuations in income with the help of financial markets. And that inequality is seen to be rather influenced by transitory changes (e.g.,

depending on the age of the individual) and not by permanent changes in lifetime income (Krueger and Perri, 2006).

More importantly, some mainstream economists have recently gone a step further by realising the impact of monetary policy in income distribution (Nakajima, 2015). These studies focused on the impact of interest rate policy and quantitative easing policy on the income distribution gap between the rich and the poor. However, their main argument was raised due to the low interest rate after the crisis that could deteriorate safe assets investments. For instance, these economists criticised quantitative easing policies (liquidity facilities) that went mainly to banks in replacement of their risky assets in order to restore their balance sheets and liquidity and restore their willingness to lending. But instead, they refused to do so because of the uncertainty and low confidence in the state of the economy, which deteriorate the economy further, increasing the income distribution gap. According to Nakajima (2015), monetary policy affects income distribution by two channels: first the inflation channel, where labour and low-income households hold mainly cash assets compared to high-income households (that hold financial assets?). Secondly, the income channel, through the impact of policy rate on employment (labour income) and the income of financial assets. However, he argued that these redistributive effects would average out (no impact) in the long run. For instance, the Survey of Consumer Finances (2014) identified that wealthier households receive a significant amount of financial and business income, whereas other households rely primarily on labour income or transfers. This survey indicated that "among working-age households in the U.S. the bottom 60 percent of the wealth distribution, "Main Street", receive virtually none of their income from financial assets, whereas "Wall-Street," the 5 percent wealthiest households, receive 41 percent of their income from financial assets".

Controversially, in most of central banks mission statements, they have to promote the 'social justice' and the 'good of the people' objectives. But mainstream economists view of the 'good of the people' is to be focusing on one 'nominal objective' a low and stable rate of inflation to generate financial and economic stability. Furthermore, these neoclassical economists have not even

allowed 'social justice' and distributive concerns to play a minimal role in their mandates. For instance, the BoE's mission is to promote 'the good of the people of the United Kingdom by maintaining monetary and financial stability'. For ECB, Article 3 of the Treaty on the Functioning of the European Union (the Lisbon Treaty) mention that the ESCB [European System of Central Banks] shall support the general economic policies in the Union. As long as it doesn't jeopardize the price stability objective and it explicitly mentions social justice as one such objective.

In addition to insufficient attention, the assumption of the long-term neutrality of money underpins mainstream and central bank approaches to the distributive impact of monetary policy. That is to say, even though generally central bankers generally accept that monetary policy could have some temporary redistributive effects in the short run, this does not hold in the long run. Moreover, the short-run distributive consequences are unintended and for which little can be done about. For example, BoE officials such as David Miles (2012) argued that any monetary policy action will have some distributional impacts. In the same vein, Ben Bernanke emphasizes that the effects are temporary:

"It is true that in the short run, some of the tools that we have involve changing asset prices, so higher stock prices and things of that sort, but we can't affect those things in the long run. It is only a short-run transmission mechanism that is involved there" (Miles, March 2012).

As discussed there are reasons to be doubtful of this. To repeat, the asymmetric nature of business cycles mitigates against any long-run corrections of short-run distributive consequences of monetary easing. As according to Nakajima (2015) there is a good chance that the redistributive effects do not average out because business cycles are known to be asymmetric. Thus more research is needed to identify these effects.

The global financial crisis has, however, shifted the debate. Most strikingly, post 2007-8 crisis central bankers almost uniformly recognize that the distributive effects of the unconventional monetary policy are not minor. The main mechanism identified is that the high level of asset purchases pushes up the

price of assets, which are disproportionately held by the wealthiest households (BoE, 2012). Carney (May 2014), governor of the BoE says: 'the distributional consequences of the response to the financial crisis have been significant'. However, they continued to argue that these effects are 'unintended and temporary'. For instance, ECB officials emphasize that the distributive effects of the unconventional monetary policy are 'unintended consequences', and Haldane (2014) from the BoE stresses that this policy 'was taken with the best of intentions'. 'collateral effects', or 'side effects', thus all these central banks share the idea that the effects are temporary and unintended.

Furthermore, they have also justified their actions in saving the global economy from collapse: 'Extraordinary times heralded truly extraordinary measures.' Further: '[A] central bank with a clear mandate to safeguard price stability needs to act forcefully when push comes to shove. These distributional side effects then need to be tolerated' (Fontan et al. 2016). In addition, central bankers stress that the post-2007 policies will not stay with us for long, revert to the pre-2007 policies soon. Carney from the BoE talks about 'extreme circumstances, such as in the wake of a financial crisis', and his colleague Haldane maintains that 'extra-ordinary monetary measures will of course not last forever' (Ibid). Arguably, major central banks argued that they cannot do much to address inequality. For instance, while emphasizing that the Fed cannot do much, Bernanke also gestures toward a sort of trickle-down effect: 'We can only hope to address the overall state of the labour market and hope that a rising tide will lift all ships, so to speak.' (Ibid)

In sum despite central bankers' recognition of the monetary policy consequences on inequality, they believe that fighting inequalities is not the mandate of any modern central bank and it doesn't fall within central banking scope. In contrast to mainstream, post-Keynesians have been concerned with the increased risk of income distribution to our economy long before the recent crisis.

7.5 Post-Keynesians and inequality

In his 'General Theory of Employment, Interest, and Money' Keynes (1936, p.372) states that one of "the outstanding faults of the economic society [is] its arbitrary and inequitable distribution of wealth and incomes".

Post-Keynesian economics, in contrast to mainstream, view inequality is as an inherent component of an unstable capitalist economy. The theories of John M. Keynes mainly inspire Post-Keynesian economics but "post-Keynesians [also] derive inspiration from a variety of [other] sources ... such as Marx, ... Kalecki, Kaldor, Leontief, Sraffa, Veblen, Galbraith, Andrews, Georgescu-Roegen, Hicks or Tobin, or from other disciplines (sociology, history, political science, psychology and anthropology)" (Lavoie, 2006, p.18). Further, "Issues of class, power and distribution of income and wealth are at the heart of [post-Keynesian] analysis." (Arestis, 1996, p.114).

In terms of income inequality, post-Keynesians distinguish between the functional and personal income distribution. The functional income distribution is a matter of class: it measures how much of the national income goes to workers (wage-share) and how much of the national income goes to capitalists and rentiers (profit-share); whereas the personal income distribution measures in how far the national income is equally distributed among individuals/households. Post-Keynesians argue that an increase in the functional income distribution tends to have negative impacts on the economy if the economy is wage-led (Onaran, 2014). Similarly, an increase in the inequality of the personal income distribution can have negative consequences for the stability of the economy because poorer segments of the population have a higher marginal propensity to consume than richer segments of the population. That is, an increase in income inequality is expected to lead to a decrease in aggregate consumption demand (Palley, 2002; Dutt, 2011; Stockhammer, 2012). Indeed, Keynes and Kalecki believed that an increase in inequality would lead to a weakened propensity to consume that in turn weakens demand for investment and consumption.

Furthermore, post-Keynesians argued that in a financialised economy inequality becomes more complex. Particularly, in theory, workers receive their income only out of wages, while capitalists receive their income out of profits, and rentiers receive their income through dividends, interest payments, rents, and capital gains. However, in reality many households occupy various contradicting class positions. e.g., capitalists and workers receive also rentier income, and managers are occupying the class position of capitalists (as they are executing power in firms), workers (as they are employed and receive wage income), and rentiers (through their stock options) at the same time (Stockhammer, 2004). Post-Keynesians found that the negative consequences of an increase in income inequality might not be immediately visible in a finance-dominated economy. In particular, the negative consequences of rising inequality may not be immediately apparent if the poorer segments of the population are able to accumulate debt to finance their consumption, due to greater availability of finance (such as mortgages) and because of rising asset prices (such as houses prices).

However, the debt-led consumption model is unsustainable. That means that in the long-run income is redistributed from poorer households to richer households and the consumption of poor households consequently will be constrained. Eventually, this will most likely lead to a debt-burdened recession (Palley, 1994; Bhaduri et al., 2006; Dutt, 2006, 2011). Or, instead, translate into a financial crisis if rising asset prices and financial innovation enable poor households to engage in Ponzi finance to keep their living standards constant (Hein and van Treeck, 2008; Bhaduri, 2011). Further, Stockhammer (2011) found that the crisis could be understood as a combined effect of deregulation and rising inequality.

Post-Keynesians, among other heterodox economists, draw on a wide range of income distribution theories. For instance, the Kaleckian approach of income distribution between labour and firms is based on the mark-up price power of firms as they protect their profit share (Goda, 2013). Furthermore, according to Barba and Pivetti (2009) that in "Production of commodities by means of commodities" Sraffa (1960) analyses the extent to which monetary authorities

can control the interest rate, recognizing the powerful position central bank has on improving banks' liquidity. Furthermore, they argued that Sraffa explained that conflict of interest among firms, policymakers and the political class could put at risk the economy's stability, giving place to even more conflicts among social classes. In addition, Sraffa identified that financial innovations accelerate when financial firms have liquidity problems and their growth is affected, and such acceleration makes monetary policy less effective and monetary authorities less influential. Sraffa's approach to money and banking serves of as the basis for the analysis of distributive variables at a particular economic period and is of particular use when looking to the effects of financialisation on income distribution.

To sum up, in contrast to mainstream dogma, post-Keynesians view inequality as a core element of the unstable capitalist economy, and they offer different approaches to understand this important matter. They view conflict among competing classes as a central component of distributive outcomes. Before these insights are integrated into our model, I first consider post-Keynesian approaches to interest rates and monetary policy.

7.6 Post-Keynesians interest rates and monetary policy

In contrast to neoclassical economics, post Keynesians focus more on the relation between interest rate and monetary policy, rather than on the relation of between the later and inflation. As discussed by Rochon/Setterfield (2007-8a, 2007-8b), the interaction between interest rate and monetary policy is approached in two different ways in the endogenous money approach. The activist approach, consider the interest rate to move counter-cyclically, in order to ensure strong growth and full employment. The 'parking-it' approach, on the other hand, proposed to set nominal or real interest rates and change them carefully and in moderation. In addition, this approach recognizes that changes in interest rate do not always have the desired effects on unemployment, growth, and capacity utilization. What is more, the utilization of interest rate for macro stabilization is rather seen as uncertain and fiscal policy is preferred for such purpose.

Nevertheless, given the importance of the interest rate has on affecting real variables there are three views on how to use such a powerful tool. The 'Smithin rule' proposes that central bank should keep interest rate as low, and as close to zero as possible. Similarly, the 'Kansas City rule' recommends a nominal interest rate equal to zero. In contrast, Pasinetti or Fair interest rule proposes to set the interest rate to a fair level, in relation to labour (Rochon, 2009).

In the Pasinetti rule the interest rate should be equal to the rate of growth of labour productivity, so when wage earners incur credit, they will always have a constant purchasing power, and rentiers are seen as a "necessary evil" (Lavoie, 1996). Furthermore, in an economy where the profit rate is constant the growth rate, and therefore the fair rate, will be equal to the growth rate of wages. When the economy is subjected to price inflation, then the fair rate will be equal to the average rate of wage inflation (Lavoie, 1999). In other words, the fair interest rate is the one which maintains purchasing power in relation to labour hours and money borrowed or lent and maintains the distribution of income between borrowers and lenders over time. From the fair rate perspective, central bank inflation targeting as currently practiced are not distributionally neutral in that they enable the capitalist class to take favourable financial positions.

Brancaccio and Fontana (2011) proposed an interest rate rule that takes into consideration the solvency conditions of macro agents involved in the production process. And interrelates the Keynesian analysis of income and employment with the Sraffian analysis of income distribution, while it explicitly shows the relationship between real and monetary variables and the role of credit in the economy. They have used the rule to show how households' unsustainable debt-financed consumption, along with increasing inequality on income distribution, led to the 2007 financial crisis in the USA. Central banks did not identify, nor addressed households' growing indebtedness. The latter is the result of the FED's policy that merely focuses on the financial sector's liquidity, and as Taylor pointed out, its refusal to treat this crisis as a solvency crisis rather than a liquidity one.

In addition, Moore (1989) analysed the effects of the interest rate as a distributive tool between industrial capital, financial capital, and labour, and he argued that if the increase of interest rate was temporary, it would not have affected mark-up price, as firms would have absorbed the change. However, a permanent increase in the interest rate may affect the production costs, which leads to an increase in the mark-up price, affecting distribution between wage and non-wage income. That will result in a transfer of income from industrial to financial capital, as well as a decrease in the wage share in the national income. Further, Epstein (1992) analysed the impact that social groups have on central bank policymaking. He identified three social groups affected by central bank policy: labour representing wage earners, industry representing firms, and finance representing the financial sector. Using a Kaleckian and Marxian analysis he studied the weight each sector has on central bank policymaking, and in order to do so, he analysed the relation between capital and labour, finance and industry, central bank and the state, and nation with the world, to then interrelate the results. The study has shown that the Kaleckian approach is more comprehensive and able to relate to the real world, than the Marxian model. In addition, he found that by using the interest rate tool, the central bank set its policy in favour of the financial sector, instead of firms and wage earners, serving in this way only to certain social groups rather than the society as a whole.

All the interest rate rules that are discussed above view the interest rate as a distributive variable and consider that monetary policy acts through changes in income distribution among wage earners and rentiers. As Lavoie (1996) has expressed "interest rate is an important determinant of the distribution of income between social classes and presumably between individuals". In such sense, monetary policy could contradict itself over time, depending on whether the distributional purpose of the policy is to maintain the rentier class or not.

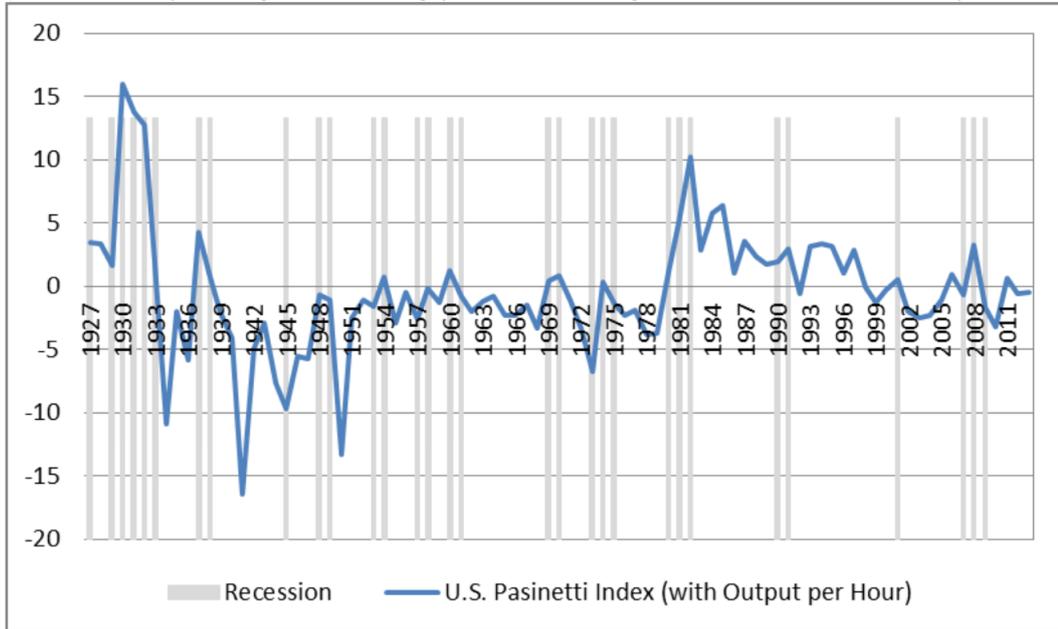
In terms of Keynes' own views, according to Lavoie et al. (2017), Keynes had originally planned a whole chapter not on the wage/profit relation but, instead, on the critical "Influence of Changes in the Distribution of Income between the Rentiers and Earners." (Keynes 1979, p. 63). Further, Keynes (1923) identified

that an economy is consists of 'the rentiers' or the "Investing Class" and the "Business Class" and the "Earning Class". He refers to the 'rentiers' as the "functionless investor" as a separate income class whose interests were fundamentally opposed to those whom he considered as the productive classes of capitalist entrepreneurs and workers. For Keynes, in contrast to the mainstream view of the interest rate as a simple cost of borrowing, interest rates played a much more crucial role via the income channel or what we could describe as the income distribution transmission mechanism (Lavoie et al. 2017). He further wrote that, through central bank intervention: "The monetary authority often tends in practice to concentrate upon short-term debts and to leave the price of long-term debts to be influenced by belated and imperfect reactions from the price of short-term debts ..." (Keynes 1936, p. 206; also see Seccareccia and Lavoie 2004, pp. 165-66) In that sense, monetary policy determined short-term rates and, in turn, representative opinion or rentier expectations of the future behaviour of the central bank would impact, albeit imperfectly, on the long-term rate of interest. Thereby making interest rates a "highly conventional" phenomenon instead of a "real" phenomenon determined by productivity and thrift, as in the loanable funds theory. Consequently, monetary policy decisions and conventions were at the very heart of interest rate determination.

Turning to empirical evidence, Lavoie et al. (2017) measure the intensity of the transfer between the rentier and non-rentier sectors historically, using the Pasinetti Index for the United States and Canada 1926-2013 (Here Pasinetti Index, as measured in percentage terms, as the gap between real long-term interest rates and labour productivity growth per person employed). As shown in Figures 17 and 18 there was, for instance, a massive transfer in favour of rentiers during the Great Depression, which eventually turned in the opposite direction in favour of the non-rentier sector by the early post-war years which, with only minor fluctuations, lasted until the late 1970s. As is evident from the two figures in both the US and Canada, the 1980s witnessed "the revenge of the rentiers" (Smithin, 1996) as the transfer persisted in favour of rentier income until the mid1990s. There was a subsequent decline during the late 1990s, but with some important fluctuations around a positive value until the

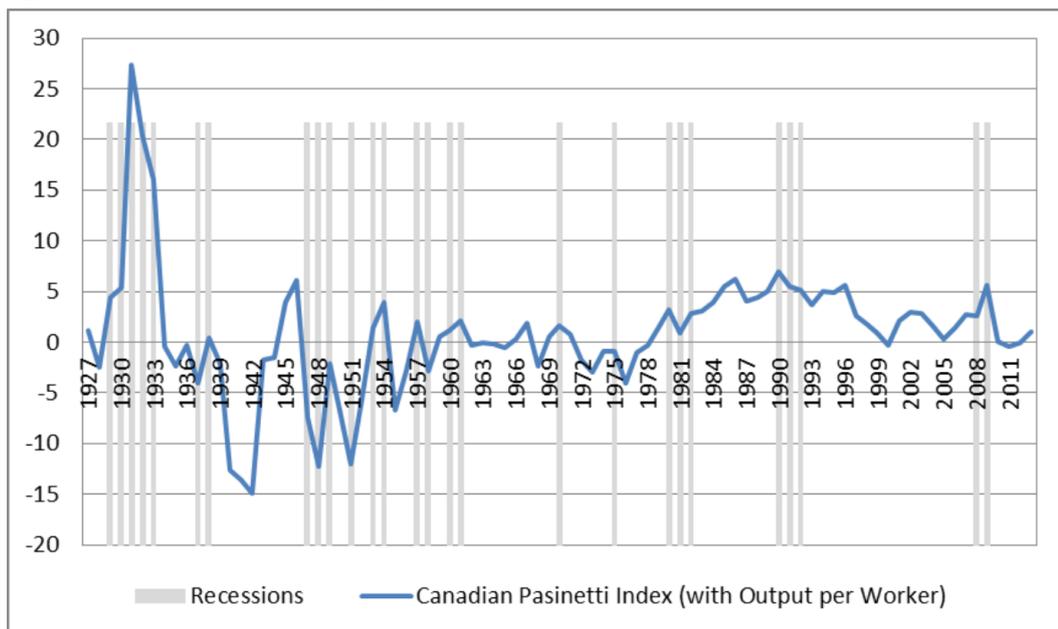
financial crisis. Broadly speaking, it appears that whenever the transfer in favour of rentiers was becoming positive, it would be associated with a recessionary environment.

Figure 18 The Pasinetti Index for the United States, 1926-2013



Source: (Lavoie & Seccareccia, 2017)

Figure 19: The Pasinetti Index for Canada, 1926-2013



Source: (Lavoie & Seccareccia, 2017)

To summarise so far, there has been a marked increase in inequality in recent years. Distributional factors have been of secondary importance within neoclassical economics, which also views monetary policy as having no effect

on inequality in the long-run. For post-Keynesians, in contrast, distributional conflicts play a central role in capitalist development. As outlined here, the interest rate and monetary policy play an important role in the competition for resources. The following section substantiates our claim of the centrality of monetary factors in distribution using a SFC model.

7.7 The SFC Model

As advocated by Lavoie (1996a) and Setterfield (2006b) setting the real rate of interest equal to productivity growth allows rentiers to participate in the real growth and keeps distribution between rentiers firms and labourers constant (Pasinetti's (1981) 'fair rate of interest'). Since I have abstracted from productivity growth in our model, these two rules are essentially the same. Therefore, there is the following monetary policy rule:

Equation 75:

$$r_{cb} = r_{pr} + P^e \quad \text{with } (r_{pr}) \text{ being given by medium-run productivity growth.}$$

Central banks will have to adjust their policy instrument, the nominal interest rate, so that a constant expected real rate of interest equal to medium run productivity growth emerges. That implies adjusting the nominal interest rate to expected inflation at the end of each period. Note that monetary policies in this approach should neither pursue an inflation target nor make any attempts at adjusting the employment rate to some target. Of course, monetary policies remain responsible for the orderly working of the monetary and financial system. The definition of credit standards for refinance operations with commercial banks (credit controls), the implementation of compulsory minimum reserves of different types to be held with the central bank, the role of a 'lender of last resort' in the case of systemic crises, and so on. Monetary policies by the central bank should neither aim at fine-tuning the economy in real nor in nominal terms. It should thus not interfere with the tasks of wage and fiscal policies, but should rather focus on stable distribution between rentiers, on the one hand, and firms and labourers, on the other hand in order to avoid destabilising distribution effects of changes in the interest rate. Coordination of macroeconomic policies

along these lines will be more promising for high employment and stable inflation rates than the NCM economic policy approach.

Now, I model the effect of implementing the fair rate of interest on inequality using SFC modelling, which is based on two tables: a balance sheet matrix (stocks) and a transactions matrix (flows). Table 14 gives the transactions matrix that describes monetary flows between the five sectors of the economy. Every row represents a monetary transaction, and every column corresponds to a sector, which is fragmented in a current and a capital account, except in basic cases such as the government and that of households. Sources of funds appear with plus signs and uses of funds with negative signs, so every row must sum to zero seeing that each transaction always corresponds simultaneously to a source and use of funds. The sum of each column must also be zero since each account (or sub-account) is balanced. Table 15 gives the balance sheet matrix of our economy. Symbols with plus describe assets and negative signs indicate liabilities. The sum of every row is again zero except in the case of accumulated capital in the industrial sector. The last row presents the net wealth of each sector.

It is important to note here that the main difference between the SFC model in this chapter compared to chapter 6, is the decomposition of household sector into two households (worker and capitalist). This to be able to differentiate the impact of monetary policy based on the fair rate of interest on income distribution between the two household's sectors. Furthermore, most of the rest of the equations are similar to the SFC model in chapter 6 with regard to firms, banks and government equations. In addition, I will highlight in bold font the main equations that are different compared to chapter 6.

Table 15: Balance sheet matrix

Sector/ Assets	Worker Households	Capitalist Households	Firms	Private banks	Government	Central Bank	Σ
Capital HPM			+ K				+ K
high powered money		+ H_{hc}		+ H_b		- H_s	0
Bank deposits	+ M_{dw}	+ M_{dc}		- M_s			0
Treasury Bills		+ B_h		+ B_b	- B_s	+ B_{cb}	0
Gov. Bonds		+ $BL_h \cdot p_{BL}$		+ $BL_b \cdot p_{BL}$	- $BL_s \cdot p_{BL}$	+ $BL_{cb} \cdot p_{BL}$	0
Equities		+ $E_{kh} \cdot p_e$	- $E_{ks} \cdot p_e$	+ $E_{kb} \cdot p_e$			0
Loans	- L_{hw}	- L_{hc}	- L_f	+ L_s			0
CB advances				- A_d		+ A_s	0
Net wealth	+ V_{hw}	+ V_{hc}	+ V_f	+ V_b	+ GD	0	+ K

7.7.1 Capitalist Households Equations

Our capitalist households model represents a financialised household. In equation (77) they earn income (Y_{hc}) which is based on paid wages by firms (W_c) in return to their supply of work, here mainly employees. And dividends paid by firms (F_{dh}), interest paid on deposits ($r_{m,-1} * M_{dc,-1}$) by banks, interest paid on treasury bills ($r_{b,-1} * B_{hd,-1}$), interest paid on government bonds ($r_{bl,-1} * p_{bl,-1} * BL_{hd,-1}$) minus interest paid for loans ($rl_{-1} * L_{hcd,-1}$) to banks. Equation (79) shows capitalist households disposable income (Y_{dc}) is earned income (Y_{hc}) net of taxes (T_c). However I added the changes of loans' demand minus repayments of loans ($\Delta L_{hcd} - Rep_{hc}$) as it is available for consumption and financial decisions as well. Then, households make their consumption decision (C_c), equation (80) depending on their propensity to consume (α_1) out of their expected disposable income (Y_{dce}), based on adaptive expectation equation (81), and (α_2) out of their previous wealth ($V_{c,-1}$). Household's wealth accumulation function (V_c) depends on his previous wealth (V_{-1}) and their savings out of their disposable income after consumption, a capital gain on equities will be added (cg_{hc}) to their wealth accumulation as well, equation (83).

Equation 76: Households income

$$Y_{hc} = W_c + F_{dhc} + r_{m,-1} * M_{dc,-1} + r_{b,-1} * B_{hd,-1} + r_{bl,-1} * p_{bl,-1} * BL_{hd,-1} - rl_{-1} * L_{hcd,-1}$$

Equation 77: capitalist Households wage share

$$W_c = c * W_s \text{ Where } c=0.45$$

Equation 78: Households' Disposable income

$$Y_{dc} = y_{hc} - T_c + \Delta L_{hcd} - Rep_{hc}$$

Equation 79 Households' consumption function

$$C_c = \alpha_1 * Y_{dce} + \alpha_2 * V_{c,-1} \quad \text{where } \alpha_1, \alpha_2 \text{ are coefficients parameters}$$

Equation 80: Households' wealth accumulation

$$V_c = V_{c,-1} + (Y_{dc} - C_c) + cg_{hc}$$

Equation 81: Expected disposable income

$$Y_{dce} = Y_{dc,-1}$$

Equation 82: Capital gain out of equities

$$cg_{hc} = \Delta p_e * E_{khc}$$

In the present financialised world, capitalist households have access to finance their consumption and financial investment, thus they are granted loans by banks based on their demand for loans. For simplicity, in equation (84), the demand for loans (L_{hcd}) is based on previous loans and a parameter (β) out of their consumption decision. The idea here is to present a consumption-debt-led behaviour, so households demand for loans is determined by their consumption level.

Equation 83: Capitalist households' demand for loans

$$L_{hcd} = L_{hcd,-1} + \beta * C_c \quad \text{where } \beta \text{ is a constant}$$

Equation 84: Capitalist households' loans repayments

$$Rep_{hc} = \beta_{hc} * L_{hcd,-1} \quad \text{where } \beta_{hc} \text{ is a constant}$$

Household's portfolio choice is very important in the model here, as it is crucial to the dynamics of the demand for financial assets in a financial economy. They hold cash (H_{hc}) and allocate their financial wealth (Vfa_h) between treasury bills (B_{hd}), government bonds (BL_{hd}), equities (E_{kh}) and deposits (M_{dc}). This allocation is based on some preference parameter (λ) and the rate of return to each financial asset.

Equation 85: Capitalist Households' demand for cash

$$H_{hc} = V_c - B_{hd} - p_{bl} * BL_{hd} - p_e * E_{kh}$$

Equation 86: Capitalist Households' financial wealth

$$Vfa_h = M_{dc} + B_{hd} + p_{bl} * BL_{hd} + p_e * E_{kh}$$

Equation 87: Capitalist Households' demand of treasury bills

$$B_{hd} = Vfa_{h,-1} * (\lambda_{20} + \lambda_{22} * r_{b,-1} - \lambda_{21} * r_{m,-1} - \lambda_{24} * r_{k,-1} - \lambda_{23} * r_{bl,-1} - \lambda_{25} * Y_{dc,-1}/V_c)$$

Where $\lambda_{20}, \lambda_{21}, \lambda_{22}, \lambda_{23}, \lambda_{24}, \lambda_{25}$ are constant parameters.

Equation 88: Capitalist Households' demand of government bonds

$$BL_{hd} * p_{bl} = Vfa_{h,-1} * (\lambda_{30} - \lambda_{32} * r_{b,-1} - \lambda_{31} * r_{m,-1} - \lambda_{34} * r_{k,-1} + \lambda_{33} * r_{bl,-1} - \lambda_{35} * Y_{dc,-1}/V_c)$$

Where $\lambda_{30}, \lambda_{31}, \lambda_{32}, \lambda_{33}, \lambda_{34}, \lambda_{35}$ are constant parameters

Equation 89: Capitalist Households' demand of equities

$$p_e * E_{kh} = Vfa_{h,-1} * (\lambda_{40} - \lambda_{42} * r_{b,-1} - \lambda_{41} * r_{m,-1} + \lambda_{44} * r_{k,-1} - \lambda_{43} * r_{bl,-1} - \lambda_{45} * Y_{dc,-1}/V_c)$$

Where $\lambda_{40}, \lambda_{41}, \lambda_{42}, \lambda_{43}, \lambda_{44}, \lambda_{45}$ are constant parameters

Equation 90: Capitalist Households' demand of deposits

$$M_{dc} = Vfa_{h,-1} - B_{hd} - p_{bl} * BL_{hd} - p_e * E_{kh} + L_{hcd} - Rep_{hc}$$

7.7.2 Worker Households Equations

In worker households I, workers earn income (Y_{hw}), as in equation (92) which is based on paid wages by firms (W_w) in return to their supply of labour, interest paid on deposits ($r_{m,-1} * M_{dh,-1}$) by banks, minus interest paid for loans ($rl_{-1} * L_{hwd,-1}$) to banks. Equation (93) shows worker households disposable income (Y_{dw}) is earned income (Y_{hw}) net of taxes (T_w). However I added the changes of loans' demand minus repayments of loans ($\Delta L_{hwd} - Rep_{hw}$) as it is available for consumption and financial decisions as well. Then, worker households make their consumption decision (C_w), equation (94) depending on their propensity to consume ($aw1$) out of their expected disposable income (Y_{dwe}), based on adaptive expectation equation (95), and ($aw2$) out of their previous wealth ($V_{w,-1}$). Household's wealth accumulation function (V_w) depends on his previous wealth ($V_{w,-1}$) and their savings out of their disposable income after consumption.

Equation 91: Worker Households income

$$Y_{hw} = W_w + r_{m,-1} * M_{dw,-1} - rl_{-1} * L_{hwd,-1}$$

Equation 92: Worker Households wage share

$$W_w = a * W_s \text{ where } a=0.55$$

Equation 93: Worker Households' Disposable income

$$Y_{dw} = y_{hw} - T_w + \Delta L_{hwd} - Rep_{hw}$$

Equation 94: Worker Households' consumption function

$$C_w = aw1 * Y_{dwe} + aw2 * V_{w,-1} \text{ where } aw1, aw2 \text{ are constants coefficients parameters}$$

Equation 95: Worker Households' wealth accumulation

$$V_w = V_{w,-1} + (Y_{dw} - C_w)$$

Equation 96: Worker Households' demand for deposits

$$M_{dw} = M_{dw,-1} + \Delta L_{hwd}$$

Equation 97: Worker's expected disposable income

$$Y_{dwe} = Y_{dw,-1}$$

In a financialised world, worker households have access to finance their consumption. Thus they are granted loans by banks based on their demand for loans. For simplicity, equation (99), the demand for loans (L_{hwd}) is based on previous loans and a parameter (β_w) out of their consumption decision. The idea here is to present a consumption-debt-led behaviour, so worker households demand for loans is determined by their consumption level.

Equation 98: Worker Households demand for loans

$$L_{hwd} = L_{hwd,-1} + \beta_w * C_w \quad \text{where } \beta_w \text{ is a constant}$$

Equation 99: Worker Households' loans repayments

$$Rep_{hw} = \beta_{hw} * L_{hwd,-1} \quad \text{where } \beta_{hw} \text{ is a constant}$$

Worker households do not hold financial assets; they only have deposits which is used for consumption purposes, which in somehow represents a real-world situation.

7.7.3 Firms Equations

Following the theory of monetary production economy, firms need credit for 'initial finance' in order for production to take place. In our model firms play an important role in terms of production, providing goods and services to all households (C) and the government (G) for consumption. However, in our growth model in equation (102), the demand of investment (I_d) function grows by the desired rate of accumulation (gr_k) out of a capital target stock (K_t) plus depreciation (Da). Equation (101) represents the capital accumulation function, equation (103) is the firms' profits (F_f) which is determined by output (Y) out of wages paid (W_s) to workers and employees. Which consists of the number of total workers (N_d) times wage (w), and interest payments for loans ($r_l * L_{fd}$). Then they retained (F_u) a proportion (s_f) of (F_f) and the rest is distributed (F_d) to capitalist households.

Internal finance determines the desired investment financing decision, consisting of undistributed profits (F_u) 'retained earnings', and external finance, which consists of loans (L_{fd}) granted by banks. The difference between the

desired investment (I_d) and the retained earnings (F_u) will determine the desired demand for loans (L_{fd}), equation (109).

Equation 100: Capital Accumulation

$$K = K_{-1} + I_d - Da \quad \text{where } Da = \delta * K_{-1} \quad \delta \text{ is a constant}$$

Equation 101: Desired Investment

$$I_d = gr_k * K_t + Da \quad \text{where } K_t = \kappa * Y_{-1} \quad \kappa \text{ and } gr_k \text{ are a constant}$$

Equation 102: Firms' profits

$$F_f = Y - W_s - r_{l,-1} * L_{fd,-1}$$

Equation 103: Wages paid to workers

$$W_s = w * N_d \quad \text{where } w \text{ is constant}$$

Equation 104: Demand for Labour

$$N_d = Y/pr$$

Equation 105: Productivity growth

$$pr = pr_{-1} * (1 + r_{pr})$$

Equation 106: Distributed profits

$$F_d = (1-s_f) * F_f \quad \text{where } s_f \text{ is constant}$$

Equation 107: Undistributed profits

$$F_u = F_f - F_d$$

Equation 108: Firms desired demand for loans

$$L_{fd} = I_d - F_u$$

Firms issue equities, equation (101), that grow depending on firms' decision on desired investments, and between distributing profits and retained earnings, which is also a way to raise capital in the market instead of demanding loans by banks.

Equation 109: Equities issues by firms

$$E_{ks} = E_{ks,-1} + (1-s_f) * I_{d,-1} / p_e \quad \text{where } s_f \text{ is a constant}$$

Equation 110: Equities issues by firms

$$E_{ks} = E_{ks,-1} + (1-s_f) * I_{d,-1} / p_e \quad \text{where } s_f \text{ is a constant}$$

Equation 111: Price to earnings ratio

$$PE = p_e / (F_f / E_{ks,-1})$$

Equation 112: Equilibrium condition, equities demand equals equities supply

$$E_{kd} = E_{ks}$$

Equation 113: Equities demand by capitalist households

$$E_{kh} = E_{kd} - E_{kb}$$

Equation 114: The rate of return of equities

$$r_k = F_d / (p_{e,-1} * E_{ks,-1})$$

Equation 115: Distributed profits to Banks

$$F_{db} = F_d * E_{kb} / E_{ks}$$

Equation 116: Distributed profits to capitalist households

$$F_{dh} = F_d - F_{db}$$

7.7.4 Banks Equations

Banks are the main actors in the credit market. Following post-Keynesian endogenous money theory banks issue loans to firms and households on demand. By issuing loans they also create deposits, and they accept deposits from households as per equations (119, 120, 121). Equation (118) represents banks' profit (F_b) which is being made up of dividends received by firms (F_{db}), interest received on treasury bills ($r_{b,-1} * B_{bd,-1}$), interest received on government bonds ($r_{bl,-1} * p_{bl,-1} * BL_{bd,-1}$), interest received on loans issued to firms ($rl_{-1} * L_{fd,-1}$) and to households ($rl_{-1} * L_{hd,-1}$). In addition to capital gains on holding equities (cg_b), subtracting interest paid on deposits to households ($r_{m,-1} * M_{s,-1}$).

Equation 117: Banks' profit

$$F_b = F_{db} + r_{b,-1} * B_{bd,-1} + r_{bl,-1} * p_{bl,-1} * BL_{bd,-1} + rl_{-1} * L_{fd,-1} + rl_{-1} * L_{sh,-1} - r_{m,-1} * M_{s,-1} + cg_b$$

Equation 118: Deposits to all households

$$M_s = M_{dc} + M_{dw}$$

Equation 119: Loans supply based on Loans demand by firms

$$L_{sf} = L_{fd}$$

Equation 120: Loans supply based on Loans demand by households

$$L_{sh} = L_{hcd} + L_{hwd}$$

In a monetary production economy, banks play an essential role in order for investment and production to take place. However, they issue loans after

analysis of the creditworthiness of the firms, by analysing expected production plans, expected cash flow, and the borrower's financial structure ability in making repayments. So, as mentioned in the firms' section, in our model banks issues loans based the borrower's risk (lr_f), and if ($lr_f = 0$) then firms finance the total amount of firms desired demand of loans as in the case of the 'horizontalists' view. When banks foresees firms' future profits then they will be willing to finance all the loans demanded, and if ($lr_f = 1$) then banks refuse to finance firms demand for loans. This investigation is made according to their confidence in the state of long-term expectations of yields on capital assets, influencing what Keynes referred to as 'animal spirits'. The state of confidence of banks is notably taken into account by an exogenous variable (γ_4).

Banks charge interest on loans issued to firms and households (rl) as per Equation (122), with a mark-up over central bank's policy rate (r_{cb}). And taking into consideration the lender's risk on firms' leverage (lr_b), equation (123) in addition to some fixed mark-up (add_1). Further, banks also pay interest on deposits to households (r_m) according to equation (124), based on central bank's policy rate (r_{cb}) subtracting a fixed parameter (sub_1). In addition, banks receive capital gains from holding equities (cg_b) as per equation (125).

Equation 121: linterest rate charged on loans issued

$$rl = r_{cb} + lr_b + add_1$$

Equation 122:

$$lr_b = \gamma_{lr_b} + \gamma_{lev_b} * (lev_{f,-1} - lev_c) \quad \text{where } \gamma_{lr_b}, \gamma_{lev_b} \text{ denote parameters, } lev_c \text{ leverage target, lender's risk}$$

Equation 123:

$$r_m = r_{cb} - sub_1 \quad \text{where } sub_1 \text{ exogenously determined interest paid on deposits}$$

Equation 124: Banks' capital gain on equities

$$cg_b = \Delta p_e * E_{kb}$$

Banks' portfolio choice is also important in our model, as it is vital to the dynamics of the demand for financial assets in a financial economy. They allocate their profit (F_b) between treasury bills (B_{bd}), government bonds (BL_{bd}), and equities (E_{kb}) according to equations (126, 127). This allocation is based on

some preference parameter (λ) and the rate of return to each financial asset. However, as per equation (128), the demand for treasury bills is also based on balance sheet equilibrium where assets should equate to liabilities. Where loans, bonds, and equities are in the banks' asset side, deposits and advances demanded by the central bank (equation 129) in addition to banks' net profit. Further demand for advances depends on banks liquidity ratio $((L_{sf} + L_{sh}) / B_{bd})$.

Equation 125: Banks' demand for government bonds

$$BL_{hd} * p_{bl} = F_{b,-1} * (\lambda_{60} - \lambda_{61} * r_{b,-1} - \lambda_{62} * r_{k,-1} + \lambda_{63} * r_{bl,-1}) \quad \text{where } \lambda_{60}, \lambda_{61},$$

$\lambda_{62}, \lambda_{63}, \lambda_{64}, \lambda_{65}$ are constant parameters

Equation 126: Banks' demand for equities

$$E_{kb} * p_e = F_{b,-1} * (\lambda_{70} - \lambda_{71} * r_{b,-1} + \lambda_{72} * r_{k,-1} - \lambda_{73} * r_{bl,-1}) \quad \text{where } \lambda_{70}, \lambda_{71},$$

$\lambda_{72}, \lambda_{73}, \lambda_{74}, \lambda_{75}$ are constant parameters

Equation 127: Banks' demand for treasury bills, a balance sheet equilibrium condition

$$B_{bd} = F_{b,-1} + M_s + A_d - L_{sf} - L_{sh} - p_{bl} * BL_{bd} - p_e * E_{kb}$$

Equation 128: Banks' demand for advances by central bank

$$A_d = A_{d,-1} + z_1 * (L_{sf} + L_{sh}) / B_{bd} \quad \text{where } z_1 \text{ a constant}$$

7.7.5 Central Bank Equations

Central banks set the monetary policy rate and, in contrast to the NCM inflation targeting rule, our model emphasizes the role of the central bank in income distribution. The central bank will consider productivity growth. Thus, the monetary policy interest rate (r_{cb}) function, equation (130) depends on a growth rate of productivity (r_{pr}) and taking into consideration expected inflation (P^e).

Equation 129

$$r_{cb} = r_{pr} + P^e$$

Equation 130

$$\dot{P} = (P - P_{-1}) / P_{-1}$$

Equation 131

$$P^e = P_{-1}$$

The central bank performs its lender of last resort function for both the government and the financial sector to ensure financial stability. Central banks accommodate government demand for spending purposes, and banks demand

on advances as in equations (133, 134, 135). The central bank will also hold treasury bills and government bonds which are not held by banks and households to ensure financial stability and its full control over its policy rate. And as the ultimate provider of currency, central bank issues currency on demand as encapsulated in equation (136).

Equation 132: Central bank's holding of treasury bills

$$B_{cb} = B_s - B_{bd} - B_{hd}$$

Equation 133: Central bank's holding of government bonds

$$BL_{cb} = BL_s - BL_{bd} - BL_{hd}$$

Equation 134: Central bank's supply advances to banks on demand

$$A_s = A_d$$

Equation 135: Central bank's supply currency on demand

$$H_s = H_h$$

Equation (137) describes the central bank's profit on holding treasury bills, government bonds and providing advances will be transferred to the government.

Equation 136: Central bank's profit

$$F_{cb} = r_{b,-1} * B_{cb,-1} + r_{bl,-1} * p_{bl,-1} * BL_{cb,-1} + r_{a,-1} * A_{s,-1}$$

Equation 137: Interest rate of treasury bills

$$r_b = r_{cb} + add_2 \quad \text{where } add_2 \text{ is mark-up}$$

Equation 138: Interest rate of advances

$$r_a = r_{cb} + add_3 \quad \text{where } add_3 \text{ is mark-up}$$

Equation 139: Interest rate of government bonds

$$r_{bl} = 1/p_{bl}$$

Equation 140

$$p_{bl} = p_{blpar} \quad \text{for simplicity we assume government bonds price is fixed}$$

7.7.6 Government Equations

The national income (Y) adds the household consumption (C), investment of the firms (I_d) and the public expenditure (G).

Equation 141: National income

$$Y = C + I_d + G$$

The government finances any deficit by issuing bills and government bonds so that the supply of treasury bills (B) and government bonds in the economy is identical to the stock of government debt. In other words, government's new issue of bills is the sum of the previous period stock of debt plus its current deficit (DG) subtracting the change on government bonds as in equation (143). The current deficit of the government includes the redemption of the national debt. We assume that private banks give limitless credit to the government at the long-term rate of interest.

Equation 142: Government's new issues of bills

$$B_s = B_{s,-1} + DG - \Delta BL_s$$

In the model, it is assumed that government expenditure (G) is always growing at a constant rate (gr_g), as per equation (144). Our model key element is the necessary coordination between the monetary and the fiscal policies, where the economy has a self-stabilizing tendency due to the coordination policy, through its impact on income distribution which leads to economic stability.

Equation 143: Government expenditure

$$G = G_{-1} * (1 + gr_g) \quad \text{government expenditure}$$

Government revenues come from collecting taxes (T) and central bank's profit (F_{cb})

Equation 144: Taxes

$$T = \theta * (Y_{hc} + Y_{hw})$$

Equation (146) shows the government deficit is the difference of government expenditure (G), interest paid on bills, repayment of matured bonds and the tax revenue (T) plus central bank's profit (F_{cb}).

Equation 145: Government deficit

$$DG = G + r_{b,-1} * B_{s,-1} + BL_{s,-1} - T - F_{cb}$$

Equation 146: Government debt

$$GD = B_s + BL_s$$

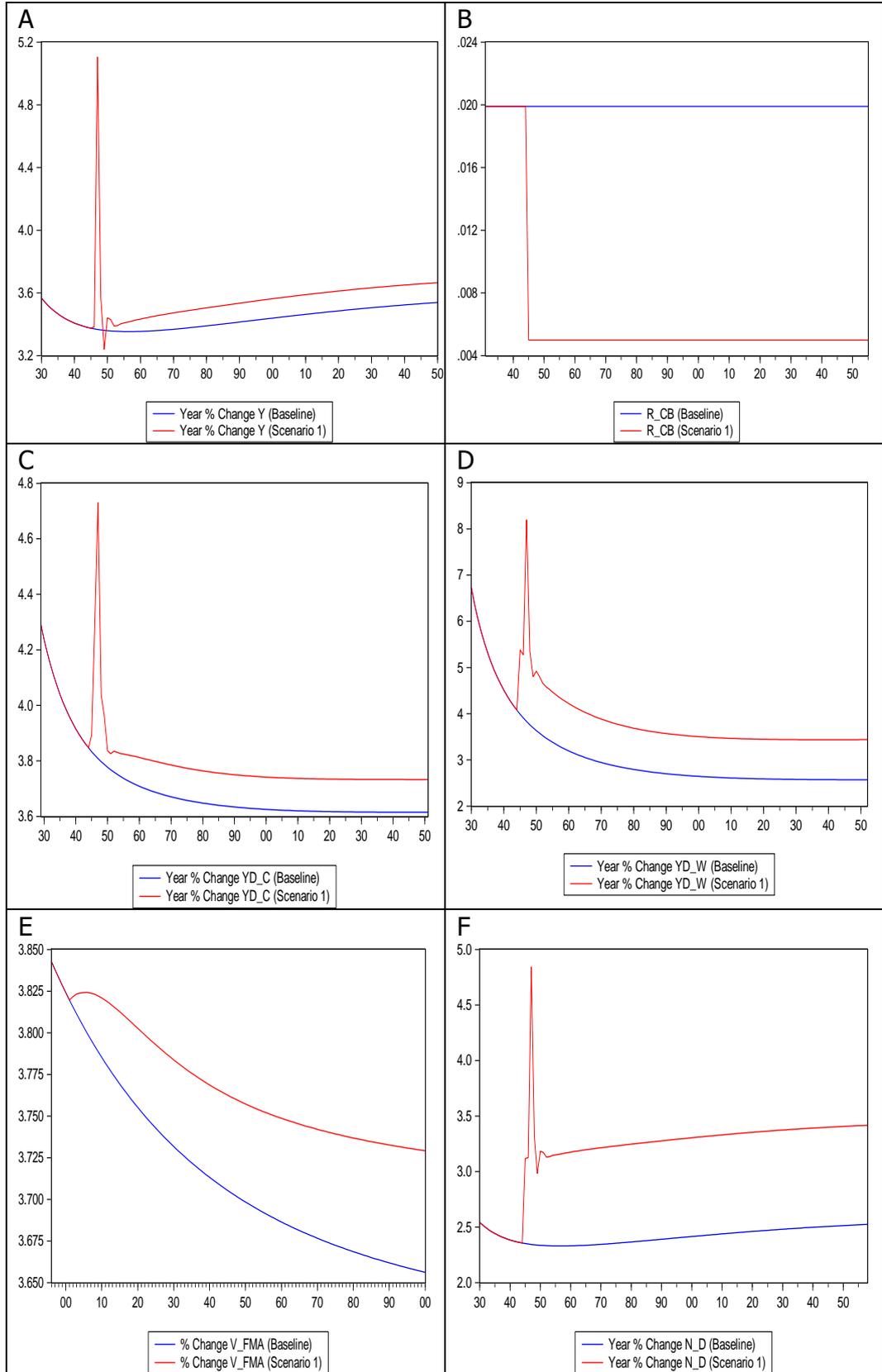
7.8 Model, Simulations, and shock

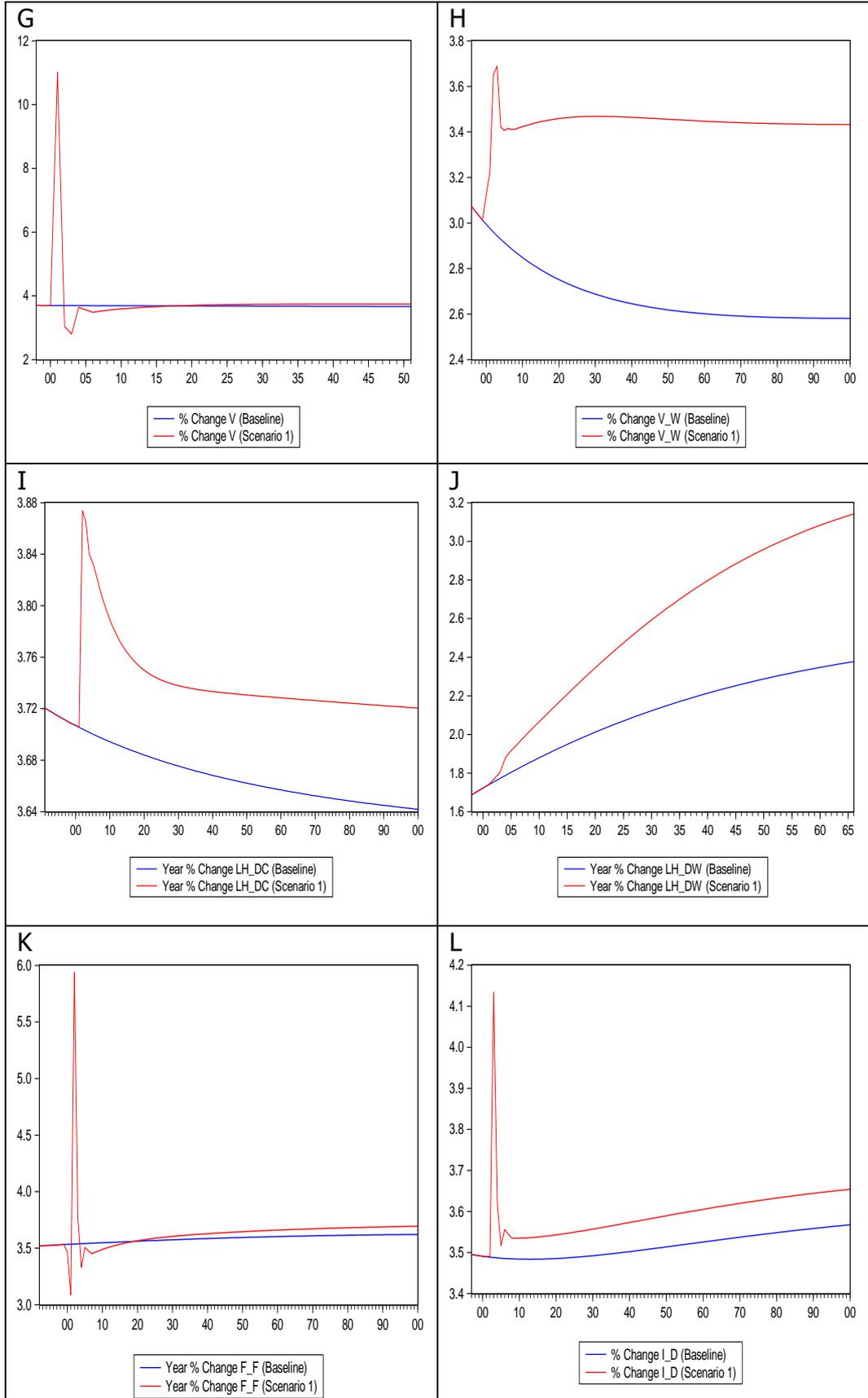
There are five sectors (with two households) in the modelled economy: Capitalist households, Worker households, firms, commercial banks, the government and the central bank. Tables 14 and 15 depict the balance sheet and the transactions matrix, respectively.

The capitalist households earn income (salaries) and get the distributed profits of firms and banks. They hold a portfolio for the part of their income not consumed, given that their propensity to consume is lower than capitalist household, that is saved in the form of deposits, bonds, equities and treasury bills. They also have access to loans for consumption and investment purposes. However, Worker households earn income (wages) and also have access to loans for consumption purposes, but they do not hold any portfolio as all their income goes for consumption due to their high propensity to consume. The macroeconomic model presented in the previous section was solved numerically using a plausible set of parameters values (see Appendix III) that is used in chapter 10 & 11 Godley & Lavoie (2007). I impose a negative productivity shock that reflects changes in income distribution based on the change of the interest rate of the central bank. Then explore the impact of this shocks on income distribution based on two scenarios: 1). Central bank follows the Pasinetti's 'fair rate of interest'. 2). Central bank follows 'Inflation targeting' rule.

7.8.1 First Scenario: A negative shock on productivity growth with a policy of fair rate of interest

Figure 20: Model simulation and shock S1



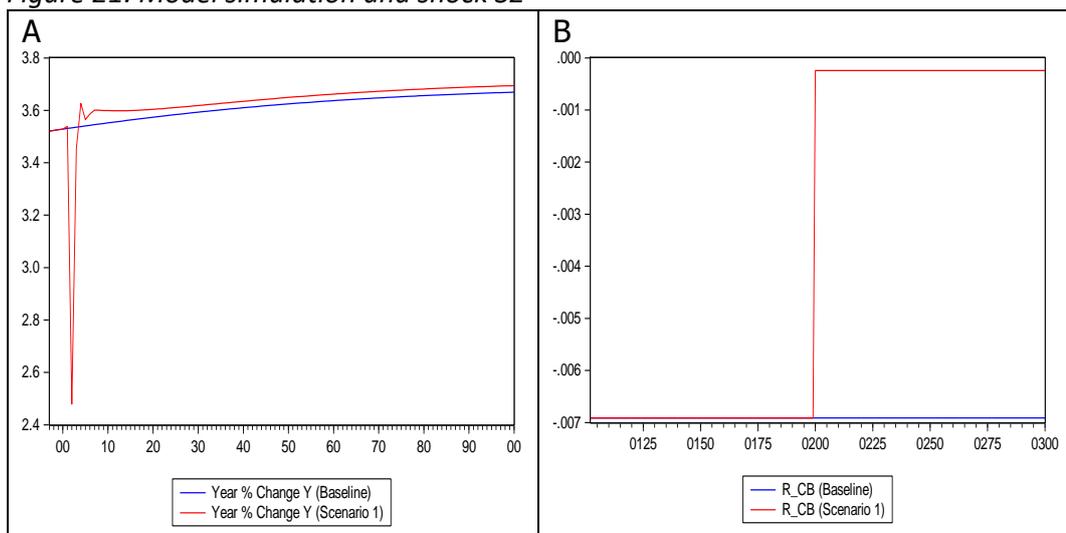


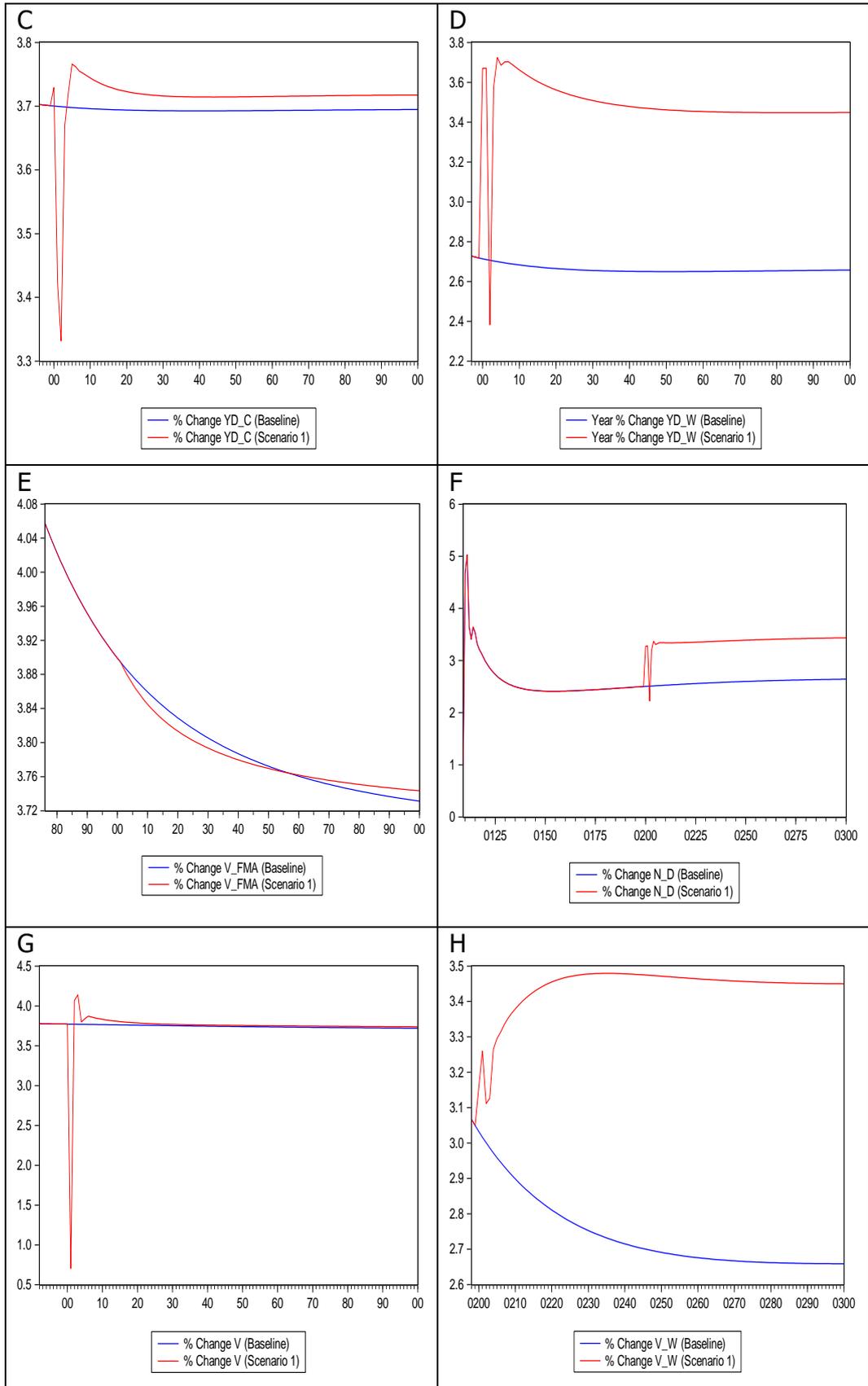
7.8.2 First Scenario: Results

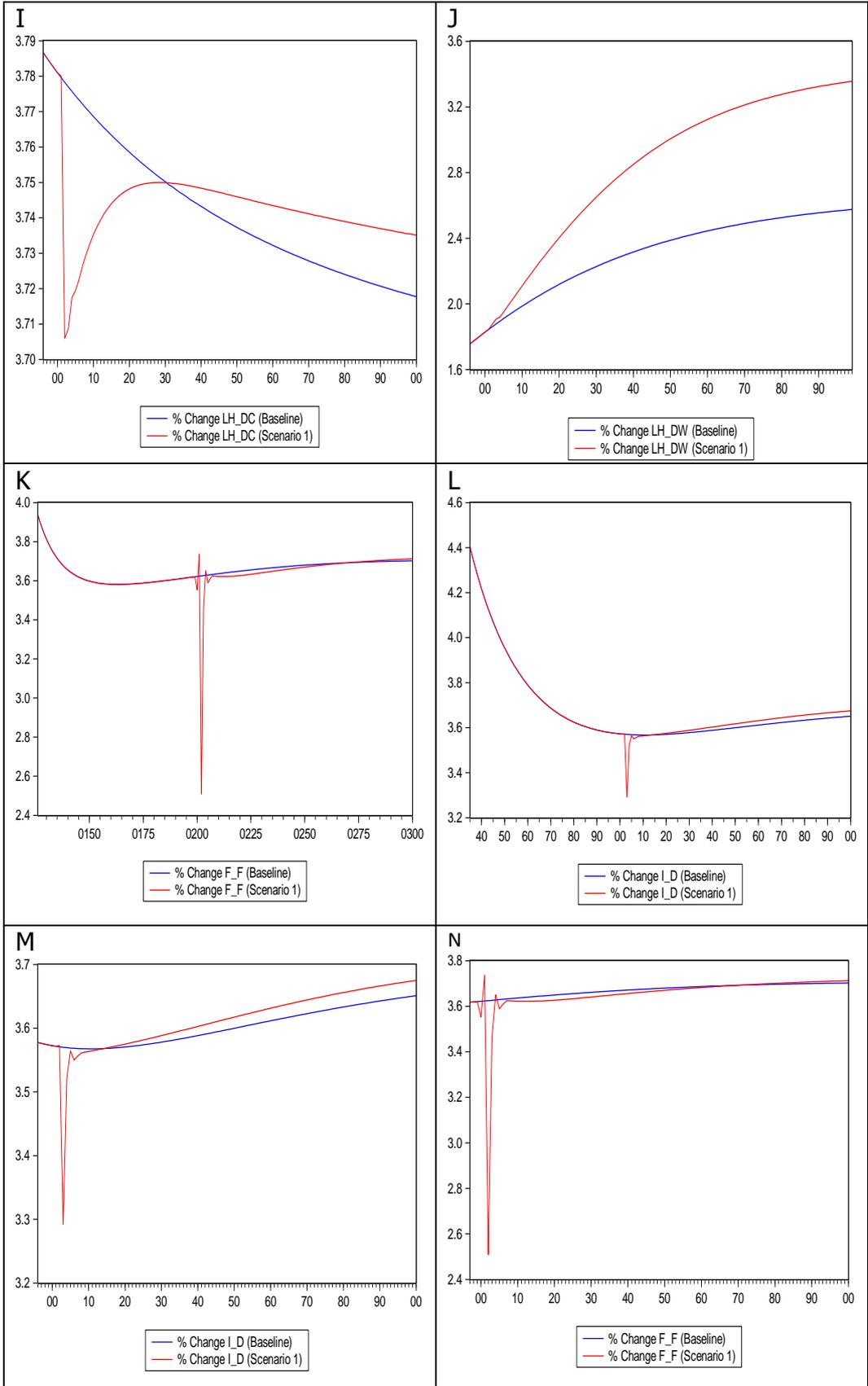
The above graphs (figure 19) show the stabilizing effect of a fair interest rate rule with respect to income distribution. A decrease in productivity growth initially decreases the policy interest rate, which could stimulate the economy. The cost of borrowing is lower. Thus firms would increase their demand for loans to maintain their level of output, by hiring more workers. Due to an increase in demand for labour that increases the disposable income for workers accompanied with the increasing demand for loans due to a decrease in interest rate, that increases the worker's consumption (high propensity to consume). Banks are willing to increase the supply of loans due to the increase in wages and increase in economic activity and private investment. Importantly capitalist wealth, firms' profits and banks' profits have some fluctuation after the shock. However they are stable in the long run which helps in reducing the income distribution gap. However, worker's wealth in term of deposits increases due to the increase in the disposable income for workers accompanied with the increasing demand for loans due to a decrease in interest rate. All that leads to increases GDP growth, and it stays higher in the long run than the baseline scenario.

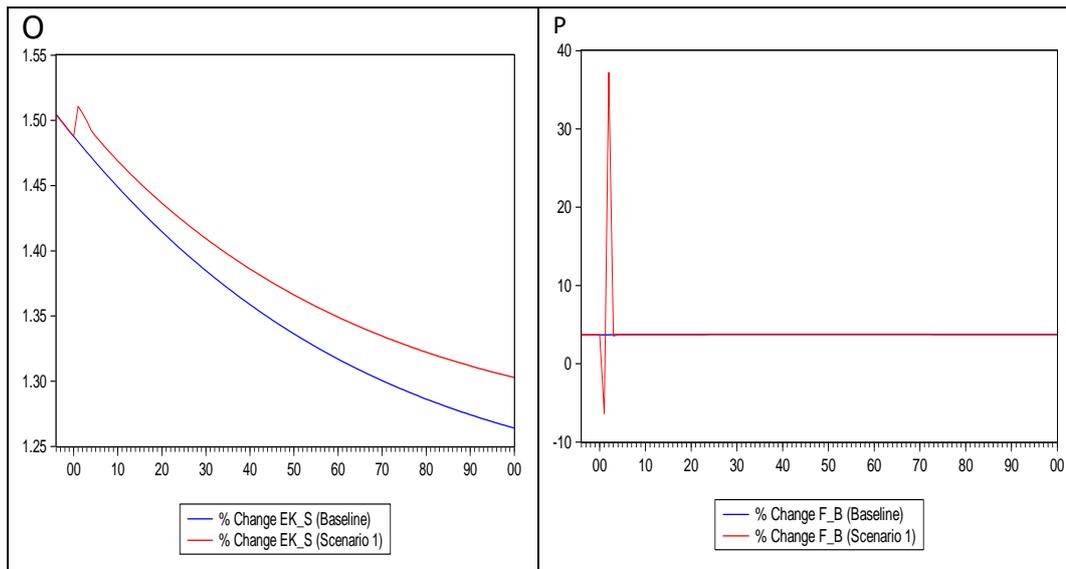
7.8.3 Second Scenario: A negative shock on productivity growth with a policy of Inflation targeting

Figure 21: Model simulation and shock S2









7.8.4 Second Scenario: Results

In contrast to scenario 1, the graphs above (figure 20) show that a negative productivity shock will deteriorate the economy if inflation targeting is used. As a decrease in productivity growth initially decreases GDP growth before it gets back to the initial baseline scenario in the long run, due to a decrease in consumption from both households and more particularly the capitalist households. In contrast to the capitalist, the worker households increase the demand for loans in order to maintain their consumption; this is due to the fact that the propensity to consume is higher for workers than capitalist households. Notably, the demand for loans decreased for both capitalists and firms due to the decrease in private investment in the short and the long-run, which results in lower firms' profit. Further, it appears that banks' profit is higher than the baseline, mainly because of the increase in demand for loans from workers households and demand for equity as well.

7.9 Discussion

Our model illustrates that in contrast to the inflation targeting objective which deteriorates the economic activity after a negative productivity shock. Which impacted all the economic agents, deteriorating workers wealth, firms' profits, and increasing the instability in the economy. The fair rate of interest helps to

restore economic activity and improve equality which leads to sustainable economic stability in the long-run.

The model simulation analysis shows that a decrease in interest rate (Inflation targeting policy) following a negative productivity shock increases income inequality in the short run to medium run. This happens primarily due to the reduction in the macroeconomic activity channel, a decrease in private investment and firms profits, a decrease in workers' wages. However, given that capitalist households have access to the equity market, they reallocate their portfolio to acquiring more equity (that was the case since the 2007-2008 financial crisis, see Dafermos and Papatheodorou (2016)). In this case, firms increase the dividend income of richer households. Furthermore, due to the increase of the indebtedness channel, workers households increase their demand for loans to maintain their consumption after the fall of wages, which deteriorates their income and wealth. However, that doesn't last for long, as gradually the macroeconomic activity channel prevails causing a reduction in unemployment that tends to reduce income inequality.

In contrast, that was not the case when following the fair rate of interest which is linked directly to productivity growth. The interest rate will fall immediately following the negative productivity shock. That would help firms to borrow at a lower cost in order to maintain their level of output by hiring more workers. That would lead to an increase in worker's disposable income, which in turn would rise consumption. That would lead that firms maintain their level of profits and workers to maintain their income and wealth, that then increases Macroeconomic activity at a later stage. In contrast to the inflation targeting policy, using the fair rate of interest as a policy rate causes a decline in capitalist households initially and stay at a lower level in the long-run. That mainly due to the reduction in interest income.

Nevertheless, the SFC model, I have built and used to investigate and analyse this problematic matter, has its limitations. Because of the use of plausible parameters and initial values (theoretical values). Also, the model is quite complex, probably building a more straightforward model could capture the

dynamic in a precise way. Thus, further research is required using more real data and assumptions based on the case will be studied.

7.10 Conclusion

The impact of central banking on income distribution has increasingly gained attention not only by mainstream economists but also by professionals. Within this framework, the interest rate is viewed as either being irrelevant or having on short-run effects on inequality. In contrast, post-Keynesians emphasized that interest rate is a distributive variable long ago. In this chapter, I have built a post-Keynesians SFC model dividing the households sector to workers and capitalists to identify the impact of the monetary policy interest rate on income distribution. Imposing a negative productivity shock in two scenarios (inflation targeting and fair rate of interest). In contrast to inflation targeting policy using the fair rate of interest, our findings and results are consistent with the post-Keynesians' views such as (Dafermos and Papatheodorou, 2013; 2016), which is related to the role of central banks as a social regulator stabilizer by affecting income distribution between workers and capitalist's households, without harming economic activity, but instead stabilizing economic activity. So, a central banking policy that incorporates income inequality matter in its mandate, such as fair rate of interest, will mitigate the negative impact that the unproductive rentier class has on the economy.

Here, I am not proposing a rule that fits all. Instead, I am contributing to the ongoing debate on inequality. My main argument is that central banks should view inequality as an urgent matter, and they must be doing something to solve it rather than fueling it with their inadequate policy. However, monetary policy cannot effectively address the increasing inequality without the help of the government. Thus a combined fair rate of interest with income policies and long-term public investment is vital to fight inequality.

7.11 Appendix III

Table 16: Capitalist household

PARAMETER	VALUE
τ_c	0.2
α_1	0.4
α_2	0.05
β_c	0.1
β_h	0.1
W_c	0.45
λ_{20}	0.35
λ_{21}	1.1
λ_{22}	2.2
λ_{23}	1.1
λ_{24}	1.1
λ_{25}	0.01
λ_{30}	0.15
λ_{31}	1.1
λ_{32}	1.1
λ_{33}	2.2
λ_{34}	1.1
λ_{35}	0.01
λ_{40}	0.4132
λ_{41}	1.1
λ_{42}	1.1
λ_{43}	1.1
λ_{44}	2.2
λ_{45}	0.01

Table 17: Worker household

PARAMETER	VALUE
τ_c	0.2
α_w	0.7
α_{w1}	0.02
β_w	0.05
β_{hw}	0.1
W_w	0.55
rep_{hw}	0.2

Table 18: The firms sector

PARAMETER	VALUE
$pr_{c,g}$	3
gr_{prg}	0.01
$W_{c,g}$	0.85
σ^T	0.9
δ	0.1
κ	1
γ_0	0.051
γ_1	0.05
γ_2	0.00515
γ_3	0.8
Npl_k	0.1
S_f	0.7
γ_{lr}	0.01
γ_{lev}	0.1
γ_q	0.01
lev_c	0.2

Table 19: Banks sector

PARAMETER	VALUE
γ_{lrb}	0.01
γ_{levb}	0.0035
lev_c	0.2
sub_1	0.01
add_1	0.01
z_1	0.1
λ_{60}	0.3
λ_{61}	1.1
λ_{62}	2.2
λ_{63}	1.1
λ_{70}	0.4
λ_{71}	1.1
λ_{72}	1.1
λ_{73}	2.2

Table 20: Government & Central Bank

PARAMETER	VALUE
g_{rg}	0.03
g_{rc}	0.03
rcb	0.025
r_n	0.02
add_2	0.001
add_3	0.002
ρ_{blpar}	20
β_1	0.02
β_2	0.01
Liq_c	0.4
$insolv_c$	0.2

Chapter 8: *Conclusion and Policy Reflections*

This thesis has focused on the central bank's responsibilities in the economy and its role as 'a government bank', as 'a banker's bank', and as 'a social regulator'. Summarizing here some of the key points: Chapter 1 provides a brief history of central banking in the advanced economies. It gives an understanding of the different stages of central banking's development in terms of functions, objectives, and roles. Particular attention is given to the relationship of central banks to governments, the banking sector, and the economy. Chapter 2 introduces the post-Keynesian perspective of central banking in contrast to the New Consensus Macroeconomics (NCM) paradigm that dominated in the era before the recent financial crisis. The first two chapters aim to provide a clear basis for understanding the current issues on central banking from a post-Keynesian perspective.

Coming to my contributions in this thesis: Chapter 3 provides some robust evidence in favor of the hypothesis that monetary policy has been less effective in the era of financialisation, particularly in the securitisation process. By using a panel VAR model focusing on the nine euro-area countries and the UK, I show how banks escaped policy interest rate tightening by speeding the securitisation process, thereby increasing their liquidity and profitability. Chapter 4 provides a theoretical survey of the competing theories on monetary-fiscal policy interaction. I show how FTPL, a branch of mainstream orthodoxy, has been regarded as unorthodoxy by giving fiscal policy more recognition as affecting the price level in cooperation with monetary policy. I show that even if this view could be seen as somehow consistent with the post-Keynesian perspective, post-Keynesian theory of monetary-fiscal policy interrelation provides a much more comprehensive view. Chapter 5 then offers a theoretical survey of the existing macro modelling techniques, with the aim to present the stock-flow-consistent (SFC) model that is used in the following chapters. Chapter 6 investigates monetary-fiscal policy cooperation utilising an SFC model. The model developed identifies the transmission mechanisms linking cooperative monetary-fiscal policy decisions with private agents, who lend, borrow, make portfolio decisions, and determine aggregate demand. Most notably, simulation results show that a

cooperative policy provides a much better outcome than a noncooperative one. Finally, chapter 7 explores how central banking has an impact on inequality. I use an SFC model and consider a post-Keynesian fair rate of interest as a policy solution to reduce inequality. Unsurprisingly, simulation results provide supportive evidence that when monetary policy uses a fair rate of interest that is equal to productivity growth, income inequality is reduced.

For the last ten years, many proposals have been put forward regarding the relationship between central banks and the banking sector. For instance, Basel III proposed a capital-adequacy ratio to be followed by stress testing, bank-testing models to be applied by banks, and regulations on banks' portfolios. These proposals are contained in what are called 'Macroprudential and Microprudential policies', which aim to achieve financial stability. An example is the BoE, for which the UK government explicitly introduced a dual mandate – price stability and financial stability. However, these proposals are still far from what the economy needs to promote a sustainable and stable financial market, as well as sustainable and stable economic growth. That is because they are still based on the free-banking-school paradigm in which the banking sector is inherently stable in a freely competitive market, and in which government and central bank actions and regulations are destabilising. Further, adopting the money-neutrality assumption, treating money as a medium of exchange, and focusing monetary policy on inflation targeting are still the norms in mainstream economics even though in a monetary production economy, the separation principle between monetary and real sectors (which underlies these ideas) is unrealistic. Moreover, with the power given to central banks through the controversial quantitative-easing tool, where central banks buy junky assets in exchange for safe liquid assets, fiscal policy is still put forward as unnecessary. Fiscal policy being impotent, the focus (in this view) should be on balancing the budget. More importantly, CBI principle is still treated as a crucial matter for central bankers.

While my thesis makes a contribution in bringing to light new aspects of central banking, it is definitely not the first to discuss the current state of central banking and central banking policy proposals in a modern economy. However, it is

distinctive in arguing that an alternative, post-Keynesian proposal on central banking should be put forward and thoughtfully considered, given that post-Keynesianism provides a more coherent, comprehensive, and realistic approach.

Such a proposal would recognise, first of all, that given that money is a social reality, the banking sector which is issuing money in response to society's demand for it (endogenous money) should act responsibly in doing so. However, given the inherent instability of the financial system, there is also the need for a central bank to perform its macro and micro functions in pursuit of financial stability. Not only is the central bank a crucial public entity that sits between government and the banking sector and other financial institutions, it also has an important social dimension. It should act with responsibility for the wellbeing of our whole society.

Let us start with the financial-stability responsibility, as it has been noted that banking crises frequently occurred in the period before the 'Keynesian era' or 'golden era' and in the new consensus era (see table 1, Appendix I), mainly due to the free-banking perspective and deregulation. Learning from history, central banks in the Keynesian era were able to set policies that were proven effective in terms of regulating the banking sector. To return to such wisdom, the separation between commercial banks and investment banks is a very important start, as it prevents commercial banks, who are able to issue money on demand, from engaging in risky and speculative activities to increase their short-term profitability. This is of particular importance when looking to megabanks ('too-big-to-fail banks') and their link to shadow banking activity, as the nonseparation was proven to be very dangerous to the whole economy.

Further, capital or liquidity requirements were proven by the financial crisis to be ineffective, as banks used financial innovations such as securitisation to escape these requirements. That means that central banks should go a step further in their relationship with the financial sector in acting on their micro functions. They should conduct micro analyses of banking, shadow banking, and financial innovations to keep themselves not only apprised of new products and practices, but of the nature of these products and behaviors, and to engage more effectively on matters of this changing banking system. That will also allow

central banks to run analyses to see the implications of such behavior for the health of the whole economy, and then conduct the necessary policies to meet the financial-stability objective. What is more, as in the Keynesian era, credit control measures at the banking level are crucial, as they would enable central banks to control the credit volume rather than merely controlling technical ratios. Central banks can use credit controls to shift the direction of credit creation toward more productive projects that serve macroeconomic goals and objectives. Therefore, a central banking authority should provide a general direction for national banking policy and enforce prudential practices when they are needed.

In terms of the lender-of-last-resort function, my position is critical of central banks' behavior during and after the crisis. They engaged in quantitative easing targeted at privileged financial institutions and directed at all sort of assets, safe and unsafe (like MBS), as well as acting to save banks with insolvency problems. I believe instead that a Bagehot-type rule should be followed, where central banks in times of crisis should act to help banks with liquidity problems but not with insolvency issues. That is consistent with the moral-suasion principle in the Keynesian era, where banks take responsibility for their actions. Central banks should cooperate with and help the responsible banks while punishing the irresponsible ones.

Looking now to the central bank-government relationship, this has also proven to be very crucial for macroeconomic stability, but it needs reform as well. Generally, central banks exist in the first place as governments' banks, initially to help in war time, and later to engage in developmental and economic matters in the Keynesian era in line with governments' policies. This relationship comes from the government's need for a central bank: government's spending decision comes first, and then credit creation is needed to finance this action. Much as central bank intervention as a lender of last resort is important to the banking sector to achieve financial stability, government interventions are very crucial in an economy that faces inherent instability and uncertainty. Government expenditure is important, as any increase in government deficit will lead to an increase in savings, which also leads to an increase in market investment and activities. 'Reinventing' fiscal policy as an active and permanent state

intervention to coordinate with monetary policy is vital to smooth and contain the inherent instability of the market system. Following Keynes (1936):

“It seems unlikely that the influence of [monetary] policy on the rate of interest will be sufficient by itself. I conceive, therefore, that somewhat comprehensive socialization of investment will prove the only means of securing an approximation to full employment.”

When the interest rate is zero, monetary policy is rather limited. Thus, there is a necessity for fiscal policy in order to reach economic stability and full employment, particularly at the time of a deep recession.

What is at least as important is to understand that government bond issuance is necessary for the central bank in its interest-rate stabilization operations. As a government bond is considered a safe asset, one that carries the treasury's risk-free rate, it provides an ultimate proxy to value all other market securities in the modern theory of finance. As I have shown in chapter 5, a coordinated and expansionary monetary-fiscal policy can restore confidence and reduce risk in the market, which also helps in achieving financial and economic stability. Furthermore, the function as lender of last resort to government is also crucial for the government to ensure confidence and stability in the economy.

To allow for such coordination, the CBI principle should be regarded as operational independence but not goal independence. As Keynes argued, a central bank is not a subordinate department of the treasury but is an organ of the government at the same level of authority as the treasury. Accordingly, a powerful central bank that issues money and manages government's debt and reserves should act with responsibility for the government's needs and goals. Thus, it should act as a 'government's bank'. Here it is important to note that an accommodating ECB, acting as a 'government's bank' for member states through having the power to make fiscal transfers across borders, is not only crucial, but it is also vital for the Euro-zone to survive.

Last but not least, the central bank is a national and a public institution that must follow the public interest rather than private interest, acting with

responsibility towards the society. Given the impact of central banking on inequality, it should include in its mandate the notion of social justice so that it serves to mitigate inequality and act as a 'social regulator'. Thus, the increasing inequality in our economy should be treated seriously by central banks. A proposal with such aim should be put forward. For instance, the 'fair rate of interest' proposal discussed and evaluated in chapter 7 would link interest rate to productivity growth in order to eliminate the unproductive rentier class.

Further, central banks could set quantitative targets on some measures of inequality (say, a value for the Gini index of wealth). A more radical proposal is to engage in a people's quantitative easing (similar to QE for banks) to allow people to repay their debt and increase their consumption level. Further, there is a need for coordinated central bank and government policies that promote full employment and other economic goals as well as social justice (while mitigating inequality). That could be done firstly by changing banking behavior and directing credit towards more productive and social investments such as healthcare, education, regional, and public-sector investments. Secondly the central bank could directly engage in 'social investments' by financing government policies and public investments, such as industrial, environmental, and regional investments, to create jobs, promote income equality, and promote economic growth. It can also directly support local and cooperative banking to fill the gaps left by the commercial banks. Thus, central banks must responsibly act as a 'social regulator' and promote social justice and fairness.

Finally, central banks should comprehend and recognize the changing structure of the financialised world economy. They must face the increasing complexity, interdependency, uncertainty, innovations, and technological challenges in our economy. They should understand that economics is not an exact science in which uncertainty can be calculated. Thus discretion rather than rule following should be the norm.

In sum, a modern central bank should act as a government's bank, as a banker's bank, and as a 'social regulator' in order to promote the well-being of our society. We need a new framework for central banking that fits our new era and incorporates all these roles.

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