Balancing work and family life: A study of mothers in the UK

by

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Abstract

The large increase in female labour force attachment observed in the UK over the last 30 years has largely been driven by mothers of pre-school aged children. The aim of this thesis is to examine the determinants and outcomes of mothers' work life balance decisions throughout the early maternal years.

This thesis is made up of three empirical studies. Maternity leave policies relax constraints on mothers' work life balance decisions by allowing attachment to the same job around childbirth. Thus, the first empirical study in this thesis examines the impact of taking maternity leave on the probability of employment throughout the early years of the child's life. The implications of part time employment (the most common outcome of the work life balance decision for mothers in the UK) are analysed in the subsequent two studies. The analysis in the second empirical study investigates the wage penalty associated with mothers' transition from full to part time employment. The third empirical study examines the well being implications of part time employment.

The results indicate that increasing access to maternity leave policy is consistent with greater motherhood employment. There is a tendency for groups of mothers to re-enter employment via part time work after childbirth. However, any movement from full time to part time employment which occurs over a career break is consistent with a large pay penalty; the motherhood pay penalty can be explained by such behaviour. The results find little evidence of any positive well being implications associated with part time employment. The conclusions of the analyses conducted in this thesis provide implications for the efficient usage of labour, for gender equality in labour market opportunities and outcomes, and for motherhood well being. The conclusions additionally provide insight into the extent that institutional factors constrain mothers' work life balance decisions.

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1 Introduction

1.1 Aims and Objectives

Female labour force participation in the UK has dramatically increased since the end of the 1970's; in 1981 60 percent of women were participating in the labour force in the UK, compared to 75 percent in 2008 table 1.1. Furthermore, it appears that increases in the labour force participation of mothers of young children is driving this phenomenon; in 1981 27 percent of mothers whose youngest child was under the age of 5 years were participating in the labour force, compared to 58 percent in 2008. Whilst the employment rate of all women increased by 15 percentage points over this period, that of mothers of children under the age of 5 years increased by 31 percentage points.

Table 1.4 indicates how female and mothers' labour force participation in the UK compares to that in other OECD countries. Female labour force participation is greater in the UK than in the Southern European countries (Greece, Italy and Spain), where due to strong cultural and religious traditions towards a male breadwinner / female housewife gender arrangement, the extent of females entering the labour force throughout the second half of the 20th century was smaller than in the Northern European countries, (Ruivo et al, 1998). The rate of female labour force participation in the UK slightly lags behind that of other Northern European countries (for example, Denmark, Finland, France, the Netherlands, Norway and Sweden) who, along with the UK, experienced similar strong cultural changes and periods of feminisation throughout the second half of the 20th century (Daune-Richard, 1998; Pfau-Effinger, 1998; Leth-Sørensen and Rohwer, 1997; and Burchell et al, 1997).

Figure 1.1 plots the relationship between the female employment rate and the motherhood employment rate for women of working age from a range of developed countries. Amongst this group of countries there is a strong positive

relationship between the proportion of females in employment and the proportion of mothers in employment. At one extreme, the southern European countries exhibit low rates of both female and motherhood employment, at the other extreme the Scandinavian countries display extremely high rates of female and motherhood employment. The rate of female employment in the UK is similar to that in Germany, Switzerland and the US, however slightly lower rates of motherhood employment are seen in the UK and the US, than are seen in Germany and Switzerland.

The motivation behind research which examines the mother's work life balance decision comes from two different sources. Firstly, motivation is provided by the labour market and well being outcomes of the time allocation decision (these motivations are discussed in sub-sections 1.2.3, 1.2.4 and 1.2.5), secondly this research is motivated by the existence of constraints which mothers face in making this decision (these motivations are discussed in sub-sections 1.2.1 and 1.2.2). The outcome of the work life balance decision will determine how many hours, if any, a mother will supply to the labour market. This will impact upon the overall employment rate and level of aggregate output in the economy. The outcome of the work life balance decision will additionally have an impact on gender equality in opportunities and outcomes in the labour market; the loss in work experience which occurs around childbirth determines the differences between male and female human capital accumulation, and also in their ability to maintain a good job match, and has therefore been shown to be one of the main source of gender inequalities in labour market outcomes (Anderson et al, 2002). Happiness and well being are also likely to be affected by the outcome of the time allocation decision; previous research has suggested that there is a link between spending time with the family relative to spending time at work and well being. Furthermore, having a more difficult work life balance and having little time to fully cope with the demands of family and work is additionally likely to impact on mothers' overall well being (Barnett and Gareis, 2000; and Greenhaus et al, 2003).

Constraints are implicit in a mother's labour force participation decision; young children require constant care, if this is not provided by the mother then it must be provided by a friend or relative (informal care) or purchased in the market (formal care). It has previously been suggested that for a high rate of motherhood labour force attachment to be made possible it is necessary that there exists some mechanisms which allow mothers to exercise control over the time allocation decision, so that such decisions can be made in a relatively unconstrained setting (European Foundation for the Improvement of Living and Working Conditions, 2006). The optimal amount of time a mother chooses to allocate between the labour market and childcare is that which the individual would ideally desire were there no constraints on the time allocation decision. This situation occurs when constraints (such as limited access to childcare) are relaxed and it becomes easier to reconcile work and family life. Being able to make fairly unconstrained decisions concerning the amount of time to dedicate to the labour market and to family life means that easier decisions concerning the work life balance can be made. Furthermore, the ability to make relatively unconstrained time allocation decisions will increase the probability that a mother is able to work in a job which is of as good quality as that done by their childless counterpart.

The first aim of this thesis is to examine which mothers are able to remain attached to employment throughout the early years of their child's life. The rest of the analysis in this thesis focuses solely on employed mothers; the wage and well being outcomes of the work life balance decision are examined for those mothers who do decide to enter employment. The first empirical study (chapter 2) examines how far maternity leave policy helps mothers to remain attached to the labour market throughout the pre-school years of their child's life, and whether this attachment is likely to be in the form of full time or part time employment. The ability of maternity leave policy to help generate less constrained work life balance decisions for mothers in the UK is examined because when compared to other

OECD countries (table 1.2 and table 1.3), maternity leave policy appears to currently be the most generous policy aimed at relaxing constraints on mothers in the UK who want to reconcile work and family life. The childcare constraints facing mothers in the UK are discussed below in section 1.2.2.

The second and third empirical studies of this thesis (chapters 3 and 4) examine the outcomes of the most popular work life balance strategy amongst mothers in the UK. With 60 percent of mothers working part time in the UK (ONS, 2010), part time employment is the most common method in which mothers in the UK balance work and family life. Furthermore, part time employment is usually carried out as an interruption to a full time career and the movement to part time employment commonly coincides with the first childbirth (Paull, 2008). The second empirical study (chapter 3) in this thesis examines the wage impact of the movement from full time to part time employment. Additionally, the wages of mothers who switched from full time to part time employment over childbirth are compared to those of mothers who remained in full time or part time employment over childbirth, in order to gain a greater understanding as to what may be driving the motherhood pay penalty. The aim of the third empirical study (chapter 4) of this thesis is to analyse the well being implications of part time employment. If working part time increases the well being of mothers relative to their full time counterparts this may act to offset any negative wage, or occupational implications of part time employment. The impact of working in part time employment on job satisfaction is examined for seven European countries, exploiting policy and cultural differences between the countries helps provide some understanding of the relationship between part time employment and job satisfaction. Additionally, the impact of working in part time employment on subjective life satisfaction and mental well being is analysed for a sample of British mothers.

1.2 Motivation behind research questions

The motivation behind research into the mother's time allocation decision comes from the constraints facing mothers in making their time allocation decision, and from the potential outcomes of this decision. The constraints include the long hours of work culture and increasing work intensification currently observed in the UK, as well as institutional and cultural constraints. The outcomes of the time allocation decision which motivate this research include efficiency outcomes, gender equality outcomes and motherhood and child well being outcomes.

1.2.1 Increasing work intensification and the long hours culture

In recent years, increasing competition in product markets and rapid technological progress has put increasing demands on workers' productivity. Green (2001) uses the 1998 Workplace Employee Relations Survey to indicate that a fairly strong trend of increasing work intensification has been seen in the UK. In the UK in 1992, 32 percent of workers 'strongly agreed' with the statement 'my job requires that I work very hard', however by 1997 this had reached 40 percent (Green, 2001). Furthermore, Felstead et al (2007) using data from the British Skill Surveys carried out over the period 1986- 2006, demonstrate an increase in job skill requirements over this period.

Alongside the trend of increased work intensification in the UK, longer hours of work and a greater proportion of employees working overtime has additionally been observed. The number of individuals reporting regularly working over 48 hours a week has risen from 10 percent in 1998, to around 26 percent (ONS, 2010). The EU average full time weekly working hours is 40.3, however this stands at 43.6 for full timers in the UK (Eurostat, 2010). Furthermore, 45 percent of British respondents to a major government work life balance survey reported that they were working more hours than their contracted hours (Hooker et al, 2007).

The large economic expansion experienced over 1992-1995, and subsequent expansions in output over 1996-2000 are likely to partially explain why

trends towards increasing work intensification and longer hours of work have been observed over this period. Increasing demand for output is likely to go hand in hand with demand on worker's productivity.

Increasing demands for greater productivity are subsequently likely to have put pressures on the labour market to become more flexible and to have led to decreasing employment protection and regulation (Cottinni and Lucifora, 2001), this in turn is likely to have contributed towards longer and longer hours of work. These pressures have been particularly great in the competitive UK and US economies, and have been exaggerated by the liberal welfare states; in 2008 the UK's score for the OECD's measure of employment protection (based on an increasing 0-6 scale) was 0.95, and 0.17 for the US, as compared to an OECD average of 2.11 (OECD, 2010). Furthermore, in 1985 the UK government spent 2.27 percent of GDP on active labour market policies (excluding benefits); however by 2008 this was just 0.32 percent (OECD, 2010). In the UK and the US the increased flexibility of the labour market and rise of non-standard working arrangements can partially explain the recent increases in hours of work and overtime.

The persistence of income inequalities in the UK may additionally be driving the long hours culture. Evidence from the DWP 'Households Below Average Income' study indicates that income inequalities have persisted since the mid 1990's; in 2007/2008 the top quintile of the income distribution received 43.1 percent of total income, whereas the bottom 20 percent of the income distribution earned just 7.1 percent (DWP, 2009). In 1994/1995 these figures were 40.3 percent for the top quintile and 7.7 percent for the bottom quintile (DWP, 2009). Furthermore, those in the bottom 10 percent of the income distribution have not experienced any growth in their real household income (after deducting housing costs) over the last 10 years, however the income of the top 10 percent of the income distribution has increased by just under 40 percent over the last 10 years (DWP, 2009). The fact that we see increasingly relatively large rewards for those at

the top of the income distribution, and no relative increase in income for those at the very bottom of the income distribution, means that the consequences of not competing to be towards the top of the income distribution are huge, however at the same time the rewards for doing so are increasingly beneficial.

Evidence suggests that the price of these rewards is the commitment to long hours of work. For example, the statistics presented in table 1.6 indicate that the longest hours of work are found towards the top of the occupational scale, on average full time managers and senior officials work 46 hours a week, whereas sales and customer service workers work on average for 39 hours a week, and elementary workers work on average for 42 hours a week. This suggests that those towards the top of the income distribution are incentivised by the rewards seen at the very top and work long hours in an attempt to gain such rewards (Cully et al, 1999); consistent with tournament theory (Lazear and Rosen, 1981) wages appear to be based on rank position within a firm, rather than marginal productivity. Long hours of work are additionally prevalent amongst operative workers who are situated further down the occupational scale, however the evidence suggests that the main reason these workers worked long hours was for additional income (Cully et al, 1999), which is not surprising given their position towards the bottom of the occupational and income distribution. On the other hand around 47 percent of managers and professional employees who worked long hours do so because of their commitment to the job (Cully et al, 1999). Evidence from the US additionally suggests that income inequalities have helped to fuel the long hours culture; a study by Bell and Freeman (2001) has found that employees engage in long hours in order to gain promotions and move up the income distribution, and the pay offs to this are greater in the presence of more unequal income distributions.

Even if it is not accepted that it is monetary benefits which are driving individuals to work longer hours, there remains a cultural trend towards the perception of hard work and being busy as a status symbol. Inglehart (1990) has

argued that the rise of post-materialism has established desires to maximise status via occupation prestige, a sense of accomplishment, and participation in meaningful work. This suggests a new form of elitism where being satisfied and fulfilled are indicators of status. A culture of long hours of work is produced in this environment since being busy becomes a status symbol of importance, and working longer hours indicates a satisfying and fulfilling career (Inglehart, 1990).

The long hours culture in the UK is currently more of a male rather than a female phenomenon. On average full time male workers in the UK work 44.4 hours a week, whilst female full time workers work on average 40.4 hours a week (Eurostat, 2010). However, between 2000 and 2008, the number of females in the UK working over 40 hours a week increased by 8 percentage points, so currently around 30 percent of working age female in the UK work longer than 40 hours a week (OECD, 2010). This suggests that a moderate proportion of women working in the UK have additionally experienced and responded to the increasing pressures to work for a longer number of hours. Pressure to work longer hours for any of the above reasons will act as a constraint on a mother's decision of how to balance their time between work and family life, by placing pressure on mothers to dedicate more time to their career and less to family life. In a time when there are mounting pressures to work extremely long hours, and when the work itself is becoming more and more intense, work life balance decisions become increasingly difficult.

If mothers do not feel constrained by the pressure to commit long hours to the labour market, and decide to balance work and family life by reducing their hours of work, the long hours culture is still likely to constrain mothers' labour market opportunities. Mothers who decide to reduce their hours of work are likely to be viewed as lacking in productivity and motivation in a society which emphasises long hours of work. Therefore, reducing hours of work, or moving to part time employment, is likely to lead to a poorer quality job where there are few opportunities for human capital development or career progression. Previous

research has indicated the segregation of part time employment into low skill level occupation groups (Dex and Bukodi, 2010; Manning and Petrongolo, 2008; and Connolly and Gregory, 2008), the statistics in table 1.5 indicate that part time jobs are over-represented in the lower level occupation groups, whereas full time jobs are over-represented at the top of the occupational distribution. Furthermore, previous work has shown that working in part time employment reduces the probability of receiving training (Chalmers and Hill, 2007), and reducing opportunities for promotion (Russo and Hassink, 2005). Therefore, the poor quality of part time jobs observed in the UK may be a result of the existence of the long hours culture.

1.2.2 Institutional and cultural constraints

Even if mothers of young children want to commit a large number of hours to the labour market and fewer to family life, the presence of societal and institutional constraints is likely to make this difficult. These constraints are likely to have a reverse impact on the mother's decision of how to balance work and family life relative to the pressure to work longer hours; they are likely to foster a culture of non-participation amongst mothers and reduced hours of employment. Policies which facilitate the combination of motherhood and paid employment help to increase the motherhood labour force participation rate (Kenjoh, 2005; and OECD, 2001), by allowing mothers to more easily choose their optimal level of labour supply. Furthermore, mothers in countries with less supportive policies are more likely to engage in part time employment and display weaker levels of labour market attachment than their childless counterparts (Gash, 2008).

The UK appears to lag behind many other developed countries in terms of policies which encourage the combination of work and motherhood. Given that children require care, if a mother wants to devote time to the labour market then they must find an alternative source of childcare; this can either be informal (friend or relative) or formal (market) childcare. Table 1.2 indicates the proportion of GDP

spent on day care services in a selection of OECD countries, as well as the proportion of children under the age of 3 years using formal childcare services in these countries. In 2000, the UK spent just 0.1 percent of its GDP on formal childcare services, compared to an OECD average of 0.4 percent. The incidence of formal childcare usage is lower in the UK than in other countries where females also have relatively strong labour market attachment. For instance, 34 percent of children in the UK under the age of 3 years used formal childcare services, compared to 48 percent in Sweden, 54 percent in the US, and 64 percent in Denmark. The relatively low rate of usage of formal childcare services in the UK is likely to be due to the high costs; full time childcare fees for a 2 year old attending accredited early-years care and educational services are 24 percent of the average wage, whereas the OECD average is just 17 percent of the average wage (OECD, 2008). Currently in the UK, just 12.5 hours of free early education is provided for all 3 and 4 year olds for 38 weeks of the year, no other childcare is freely provided. As a result, it appears that parents in the UK are largely assumed to take on the full burden of childcare responsibilities; this will act to increase the difficulty of the mother's work life balance decision.

Furthermore, in order to create an effective balance between work and family life, it is necessary that mothers' employment can fit around that of childcare or of the school day. In 2003 the Right to Flexible Working was introduced in the UK[1]. However, just over half of respondents (54 percent) to 'The Third Work-Life Balance Employee Survey' (conducted in 2006) reported that they would be able to work flexitime if they wanted to and nearly 60 percent of women who had the option of flexitime made use of this arrangement (Hooker et al, 2007). When the same respondents were asked about the main arrangement which their employer could provide to support working parents the majority (32 percent) reported that they did not know what this would be, 23 percent reported flexitime and 9 percent indicated

[1] This was introduced by The Employment Act 2002.

that no measures would be available (Hooker et al, 2007). This suggests that currently in the UK mothers are fairly constrained in the manners in which they can balance work and family life.

The majority of mothers in the UK choose to balance work and family life by working in part time employment. Currently 40 percent of all women, and 60 percent of mothers work part time in the UK (ONS, 2010). Although some research has suggested that the decision to work in part time employment is largely based on mothers' preferences for spending time with children (Hakim, 2000), Geyer and Steiner (2007) have suggested that, given the limited availability of quality childcare in the UK, the decision to work part time may reflect a 'self help' form of work life balance; with attachment to the labour market fitting around the child's schooling hours. Additionally, five potential reasons why women would accept a part time job which is below their own potential have been cited by Grant et al (2005), whilst only one of these relates to preferences, four of these are concerned with the constraints women face in balancing work and family life. These theories are complemented by evidence which suggests that mothers trade off a 'good' job and higher wage in order to spend more time with their children by working in part time employment (Waldfogel, 1997; and Davies et al, 2000).

The main difference between mothers and childless women's labour force participation is that mothers will commonly have a break from employment around childbirth. The introduction of Statutory Maternity Leave to the UK in 1976 has meant that mothers can have a break from employment and return to the same job at the end of the leave period. Maternity leave is additionally supplemented by maternity pay, with the maternity leave period usually lasting longer than the maternity pay period. Table 1.3 indicates the length of the paid maternity leave period, the proportion of the wage received throughout this period, the proportion of the wage received throughout a period of parental leave and the maximum amount of leave available to a woman around the childbirth period. The maximum amount of

leave is made up of the paid maternity leave period as well as any additional maternity leave, or the maximum amount of any additional parental leave which the woman is allowed to take. The statistics in table 1.3 illustrate that in the UK mothers are allowed to take a fairly generous amount of leave around the childbirth period. Furthermore, the period of paid leave is additionally relatively long. However the rate of reimbursement throughout this period is fairly low. It has been illustrated that the right to paid maternity leave speeds up the return to work (Ellingsæter and Ronsen, 1996). Additionally, longer levels of maternity leave are likely to coincide with a greater proportion of mothers in employment at the end of the leave period (Burgess et al, 2008; Berger and Waldfogel, 2004; and Rønsen and Sundström, 2002). Thus, by allowing a return to the same job after a leave period which is of a generous length, maternity leave in the UK is likely to act to relax constraints facing mothers regarding the work life balance decision.

Cultural attitudes concerning the traditional gender arrangement in the UK suggest that the male is the typical breadwinner whilst the female typically looks after the home and the children (Burchell at al, 1997). Furthermore, in the 1960's in the UK when women first began to enter the labour market in significant numbers, female employment was partly created with a view of allowing women to maintain family responsibilities as their main role (Burchell at al, 1997). If mothers in the UK feel obliged or constrained to adhere to the behavioural prescriptions for their gender identity (Akerlof and Kranton, 2000), this will apply pressure on mothers to devote more hours to family life and less to the labour market. We have already shown that the childcare burden is likely to fall on the parents, not on the state. The result of such cultural attitudes suggests therefore that the childcare burden is therefore more likely to fall on mothers, not fathers.

So far section 1.2 has outlined two conflicting constraints facing mothers and their time allocation decision. In the UK, many employed women are likely to have experienced the intensification of the working day and pressure to work longer

hours. These factors will constrain the time allocation decision between work and family life by emphasising the need to spend longer time at work and worsening the career prospects if women decide to relax their labour market attachment and reduce their hours of work. At the same time, the UK government does not appear to have introduced policies which facilitate or encourage the combination of long hours of work with motherhood. The maternity leave policies currently in place in the UK are fairly generous in length, as compared to such policies in other OECD countries. However, mothers in the UK appear to have fairly limited access to flexible working practices and very restricted access to childcare facilities. In a major work life balance study around 60 percent of mothers reported that they would prefer greater flexibility in working hours to longer levels of maternity leave (Hogarth et al, 2000), suggesting that the latter policy is more useful for the combination of work and motherhood.

Both of these constraints will lessen the degree of control which a mother has over the time allocation decision, and if mothers decide to opt for a reduction in hours of work this is likely to decrease the probability of attachment to a good quality job over the childbirth period. Research into mothers' work/life balance will provide some insight into how these constraints impact upon mothers' labour market behaviour and labour market outcomes, and what kind of policies will be effective in relaxing such constraints. Further motivations for this research stem from the outcomes of the mothers' work life balance decision and will be discussed in the following three sub-sections (1.2.3-1.2.5).

1.2.3 Efficiency outcomes

Labour market efficiency requires low levels of unemployment and good quality job matches; that there are low levels of skill mis-match between the job requirements and the employee's own level of skill. Recent work has indicated that if mothers are able to make unconstrained time allocation decisions then they are more likely to participate in the labour market (Kenjoh, 2005). Those with the

heaviest responsibilities at home, for instance mothers of very young children, are likely to be faced with fairly constrained work life balance decisions. Thus, research into mothers' work life balance decisions will have important implications for the overall employment rate and, therefore aggregate output.

Part time employment provides an efficient way of utilising the female labour force; mothers can maintain their labour market attachment whilst having more time available to spend with their children, than if employed full time. Furthermore, part time employment offers the possibility of increased flexibility, thus mothers can arrange their working hours around their child's schooling hours or around formal or informal childcare arrangements. Previous research has shown that the availability of part time job opportunities is likely to increase the number of mothers participating in the labour market (Kenjoh, 2005), indicating that part time opportunities may help to increase the overall employment rate and therefore increase labour market efficiency.

The statistics presented in table 1.5 indicate that part time women are over-represented in the personal services and sales and customer services occupations, and to a large extent in elementary occupations. The statistics presented in table 1.5 suggest that the occupations where part time jobs are particularly prevalent are situated towards the bottom of the occupational distribution. Furthermore, previous work has shown that the movement into part time employment is additionally associated with a large pay penalty and occupational downgrading (Dex and Bukodi, 2010; Neuburger, 2010; Connolly and Gregory, 2008; and Connolly and Gregory, 2009). Connolly and Gregory (2008) define occupational downgrading as a movement to a lower level occupational group, where occupations are ranked by the average level of qualifications. Dex and Bukodi (2010) utilise a similar definition of occupational downgrading, however in this instance occupations are ranked by the average level of pay. Throughout recent decades, women in the UK have substantially increased their educational attainment; in the early 1990's women

made up just under half of all university graduates, by 2008 this had risen to over 60 percent (Higher Education Statistics Agency, 2010). If, on movement into part time employment, women move into jobs which are below their own skill level, then there may be an under-utilisation of this increase in skill which is being supplied to the labour market, and will act to decrease labour market efficiency. Part time employment is effective in encouraging mothers to participate in the labour market but may not be efficient in using this increased supply of skill.

Furthermore, if working in poor quality part time jobs weakens mothers' labour market attachment the positive impact on the overall employment rate associated with part time employment may be diminished. For example, Gash (2008) has indicated that only a small proportion of women use part time employment as a bridge to a full time employment career, and a large proportion of part time working females end up leaving the labour force.

1.2.4 Gender equality

As the labour force becomes more and more diverse it is necessary to ensure the fair treatment of all who participate in employment. In 1981 just 27 percent of mothers of a child under the age of 5 participated in the labour force, by 2008 this had risen to 58 percent (Labour Force Survey). Given such changes in the demographic structure of the labour market in the UK, it is important to ensure that mothers have equal opportunities and receive equal treatment in the labour market. Gender inequality in labour market outcomes may suggest unequal opportunities or unequal treatment of mothers in the labour market.

A newborn child increases the financial and opportunity costs of entering the labour market, and such factors are likely to constrain the mother's labour market decision to a greater extent than the father's labour market decision. Therefore, the gender division in household duties remains unequal in most OECD countries, typically women devote more time than men to household tasks (OECD, 2001). Furthermore, in the UK, traditional ideas suggest a male breadwinner / female

homemaker gender arrangement is dominant (Burchell et al, 1997), and family policies in the UK are typically based on the assumption that the mother bears the majority of the childcare responsibility; for example whilst mothers can take up to a year of maternity leave, fathers can take just two weeks. These factors act to intensify the work life balance decision of women relative to that of their male partners. Allowing mothers to maintain a good quality job throughout the childbearing period is therefore essential in reducing gender inequality in labour market outcomes.

Currently, the gender wage gap in the British labour market is estimated at around 19 percent (Olsen et al, 2010). The gender gap in pay can partially be explained by individual characteristics, job characteristics, occupational segregation, as well as the characteristics of the workplace an individual is employed in (Mumford and Smith, 2007). However, substantial gender pay gaps remain unexplained, particularly to those further up the earnings distribution and in the private sector (Chzhen and Mumford, 2009). This suggests some gender inequality in treatment in the labour market, and that inequalities in career opportunities may also exist in the British labour market. An additional strand of research has shown that a pay penalty of around 9 percent to one child and 20 percent to two or more children remains for mothers in the UK, relative to their childless counterparts, after controlling for differences in human capital, unobserved heterogeneity and job characteristics (Waldfogel, 1998; Waldfogel, 1995; and Harkness and Waldfogel, 1999). Research has indicated that the motherhood pay penalty observed for mothers in the UK is greater than that observed for mothers in other developed countries (Davies and Pierre, 2005; and Harkness and Waldfogel, 1999). This is likely to be due to the fact that the institutional setting in the UK can exaggerate gender inequalities in career opportunities, particularly for mothers with young children (Davies and Pierre, 2005). For example, limited access to quality childcare may force mothers to have weaker attachment to the labour market, and to be more

financially dependent on their partner than their childless counterparts. The research carried out in this thesis investigates the outcome and implications of the time allocation decision for working mothers, this work will therefore provide implications for reducing gender inequalities in labour market opportunities and outcomes.

1.2.5 Motherhood and child well being

The ability for mothers in the UK to make unconstrained time allocation decisions, as well as the number of hours worked by mothers, will have implications for the incidence of stress and anxiety related illnesses, and for the mental well being of women in the UK. This is currently of importance as stress and mental health problems are becoming a huge burden on society. The Health and Safety Executive (HSE) found that in 2006/07 nearly half a million individuals in the UK believed that they were suffering from work related stress which was making them ill (HSE, 2007). This caused a loss, on average, of 16 days a year for each individual reporting such conditions. Furthermore, mental illnesses now constitute 5 of the 10 leading causes of disability in the world (Cottini and Lucifora, 2001).

Mothers whose work life balance decisions are subject to strong constraints may suffer lower levels of mental well being than those mothers who are able to make unconstrained time allocation decisions. Increased time pressures are likely to heighten stress levels, and may decrease an individual's satisfaction with how they spend their time. Recent work suggests that employed women who take on the majority of the household responsibilities are more likely to suffer from poorer mental well being than their male counterparts; the greater hours of unpaid work performed by working women, as compared to men, contribute towards women experiencing more stress than men (MacDonald et al, 2005). Therefore, it seems that increasing an individual's time constraints will increase the individual's levels of stress and decrease their mental well being.

Further research has indicated that women who face more acute work life balance decisions, or who supply a greater number of hours to the labour market, are more likely to be stressed and less satisfied with their lives. For example, amongst female full time workers 24 percent are highly stressed, as compared to just 9 percent of female part time workers (Smith et al, 2000). Furthermore, in a major Government work life balance survey 33 percent of flexible workers reported that they were satisfied with their lives, as compared to just over 20 percent of non-flexible workers (Hooker et al, 2007); the flexible workers reported that the most positive consequences of working part time were having more free time and being able to spend more time with their families. Thus, relaxing the constraints on a mother's work life balance decision, or by supplying fewer hours to the labour market, is likely to have positive implications for mothers' mental well being.

Child well being refers to the quality of a child's life in terms of economic conditions, peer relations, political rights and opportunities for development. A recent OECD study has shown that the UK's score over 6 attributes[2] of child well being ranks the lowest out of 21 OECD countries (OECD, 2008). A mother's time allocation decision may affect child well being in a number of ways. Mothers who undertake paid work will have less time available to encourage physical activity, prepare fresh home cooked meals, to encourage their child's development and supervise their child's activities, and to monitor their child's health status. Maternal employment will be detrimental to a child's development if the alternative (non-maternal childcare arrangements) is of an inferior quality. Furthermore, if long hours of work mean that a mother suffers from exhaustion then this may diminish the quality of the time a mother spends with her child, and may make it less likely that the mother will encourage her children to participate in physical activity. However, employment additionally determines the resources available to parents, thus we

[2] These six attributes are material well being, housing and environment, educational well being, health and safety, risk behaviours and quality of school life (OECD, 2008).

may expect that employed mothers have more resources to purchase healthy food, and resources to help stimulate the child's development, health, and security.

Some research has indicated that employment in the first year of the child's life may have a negative impact on child well being (Berger et al, 2005; Gregg et al, 2005; Baum, 2003; and Ermisch and Francesconi, 2000), although recent work has suggested this negative effect may be counteracted by usage of quality childcare (Brooks-Gun et al, 2010). Furthermore, Brown et al (2010) have found that the children of mothers who work in part time employment are less likely to watch television and are less likely to be overweight, than children of mothers who were not employed or who worked in full time employment. Therefore, any factors which act to constraint a mother's time allocation decision and put pressure on the mother to participate in the labour market for long hours in the early years of the child's life, may additionally have negative implications on child well being.

1.3 Structure and content of thesis

Chapters 2, 3, and 4 are empirical analyses of three separate issues relating to the aims and objectives and motivations set out above. Chapter 5 will conclude the thesis by providing a summary of the results and their implications, as well as by providing a discussion of the limitations of the thesis, and suggestions for further research.

1.3.1 Chapter 2

The analysis in Chapter 2 estimates the effectiveness of maternity leave policy in keeping mothers attached to employment throughout the early maternal years for a sample of British mothers. The motivation behind this analysis is firstly driven by the fact that institutional characteristics can act as constraints on the mother's work life balance decision, and therefore make it more difficult for mothers to combine work with family life. The availability of policies which aim to facilitate the combination of work and family life has a positive impact on the proportion of

mothers in employment (Kenjoh, 2005). Whereas the provision of and access to childcare facilities in the UK appears to lag behind that in other developed countries, the length of statutory maternity leave in the UK is relatively generous as compared to that in other developed countries. Therefore, the aim of this chapter is to assess the effectiveness of maternity leave policy in encouraging mothers to maintain a work life balance throughout the early years of their child's life. This research is further motivated by the fact that in encouraging a greater of number of mothers to remain in employment, maternity leave policy will encourage higher levels of employment and therefore increase labour market efficiency. The literature additionally suggests that mothers returning to employment soon after childbirth will have implications for motherhood and child well being. Gender equality arguments additionally motivate this research, if maternity leave policy is successful in helping mothers to remain attached to employment in the first few years after childbirth the scope of gender inequalities in labour market opportunities and outcomes will be limited.

The analysis in this chapter uses the Millennium Cohort Study (MCS) in order to analyse the probability that a mother is in full or part time employment when the child is aged 3 years and 5 years old, given that the mother returned to the same employer as when pregnant at the end of the leave period. The British Household Panel Survey (BHPS) is also used to estimate dynamic employment equations; these models are able to more consistently estimate the direct impact of having continuous employment for British mothers.

1.3.2 Chapter 3

Chapter 3 measures the wage penalty associated with the movement from full to part time employment. Part time employment is the most popular manner in which mothers combine family life and employment in the UK. Given the institutional setting in the UK, for instance the poor provision of quality childcare, it may be the case that some mothers are constrained into working in part time employment.

Recent work has suggested that part time jobs in the UK are typically of poor quality and that the movement from full to part time employment may have a negative impact on future career progression. Any negative wage effect associated with the movement from full to part time employment will either reflect a movement to a 'worse', lower quality job, a loss of firm-specific human capital, or the fact that those who move from full to part time employment send a signal of reduced productivity.

The existence of a long hours culture in the UK motivates this research. This culture means that who work in part time employment are likely to be viewed as lacking in motivation and productivity. The analysis undertaken in this chapter is also motivated by gender equality reasoning; if part time jobs are situated in low skill level occupation groups, are poor quality jobs, or if part time workers are viewed as having low levels of productivity, then part time workers are likely to receive fewer opportunities for human capital development and career progression. This will have a large negative impact on the future wages and career progression of part time workers (who are mainly female), relative to full time workers, acting to exaggerate gender inequalities in labour market outcomes. Labour market efficiency arguments additionally motivate this research, if part time jobs are segregated into low skill level occupations or mostly constitute poor quality jobs where there are fewer opportunities for human capital development and career progression then there is a danger that there is an under-utilisation of skill in the labour market.

The analysis in this chapter uses the BHPS in order to investigate the wage impact of switching from full to part time employment. This is done using OLS and fixed effects wage equations. Furthermore, variation in the motherhood pay penalty by employment behaviour over the childbirth period is identified. For example, the wages of those who switched from full to part time employment over childbirth are compared to the wages of those who remained in full time employment over

childbirth. This will provide some understanding of what is driving the motherhood pay penalty in the UK.

1.3.3 Chapter 4

Chapter 3 investigates the negative career and gender equality implications associated with part time employment. As a consequence the aim of chapter 4 is to investigate whether there are any offsetting positive implications on well being associated with part time employment. The analysis in this chapter is motivated by the fact that by relaxing the time constraints on mothers, and allowing more time to be spent with the family, part time employment is likely to reduce stress and increasing well being. This analysis is also motivated by the fact that mothers in the UK appear to be constrained by the institutional setting in making their time allocation decision. By comparing mothers' overall life satisfaction in part time and in full time employment, it is possible to analyse whether the movement to part time employment is a result of preferences or constraints.

The relationship between part time employment and job satisfaction is analysed for the UK, Germany, Denmark, the Netherlands, France, Finland and Spain using the European Community Household Panel (ECHP). The BHPS is used to measure the impact of working part time on subjective life satisfaction and mental well being for British mothers. The analysis uses pooled cross sectional ordered logit models, fixed effects ordered logit models, and generalised ordered logit models to estimate job and life satisfaction.

Table 1.1 Yearly employment summary statistics for females and mothers in the UK

Year	Proportion of all women employed (%)	Proportion of mothers of children under the age of 5 employed (%)
1981	60	27
1991	66	42
2001	73	54
2008	75	58

Notes:

1. Both columns are based on females aged 16 to 59. Data from the Labour Force Survey, 1981-2008.

Table 1.2 Childcare usage and cost information for a range of developed countries

Country	Proportion of children under 3 years of age using formal childcare[1]	Percentage of GDP spent on formal childcare[2]
Australia	15	0.2
Austria		0.4
Denmark	64	1.7
Finland	22	1.2
France	29	0.7
Germany	10	0.4
Greece	3	0.4
Italy	6	N/A
Netherlands	8	0.2
New Zealand	45	0.1
Norway	40	0.8
Spain	5	0.1
Sweden	48	1.3
Switzerland		0.1
United Kingdom	34	0.1
United States	54	0.1

1. Source: OECD (2001) 'Employment Outlook 2001', Chapter 4: 'Balancing Work and Family life: Helping Parents into Paid Employment'. The data covers the four following types of formal childcare: Group-care in childcare centres, residential care, childminders, care provided by a carer who is not a family member but frequently lives in with the family. Data for 1995 for the US, 1999 for Australia, 1998 for Denmark, Netherlands, New Zealand, Norway, Finland, Sweden, Italy, Austria and France, and 2000 for Greece, Spain, Germany and the UK. Data missing for Austria and Switzerland.
2. Source: Jaumotte , F. (2003) 'Female Labour Force Participation: Past Trends and Main Determinants in OECD Countries", OECD Economics Department Working Paper, No. 376. Data shows proportion of GDP spent on formal daycare, only including tax allowances (tax credits) if they are refundable. Data is given for 2000. Data missing for Italy.

Table 1.3 Information on the structure of maternity leave policy in a range of developed countries

Country	Length of paid maternity leave period (weeks)[1]	Rate of reimbursement in the paid maternity leave period (%)[2]	Rate of reimbursement in a parental leave period (%)[3]	Maximum length of leave available to woman (weeks)[4]
Australia	6	0	0	52
Austria	16	100	16	112
Denmark	18	100	100	50
Finland	17.5	96.6	23	173.5
France	16	100	19.9	159
Germany	14	100	66.9	162
Greece	17	100	0	28
Italy	21	76.2	30	47
Netherlands	16	100	0	29
New Zealand	12	50	0	12
Norway	9	100	80	57
Spain	16	100	0	162
Sweden	12	80	73.3	84
Switzerland	16	80	0	16
United Kingdom	39	23.8	0	52
United States	0	0	0	12

1. Source: OECD (2008) 'Family Database'. Data is given for 2006/2007.
2. Source: OECD (2008) 'Family Database'. Rate of reimbursement is the ratio between the full time equivalent payment and the corresponding entitlement in the number of weeks.
3. Source: OECD (2008) 'Family Database'. Rate of reimbursement is the ratio between the full time equivalent payment and the corresponding entitlement in the number of weeks.
4. Source: OECD (2008) 'Family Database'. The data shows the maximum number of weeks that a woman can take off from employment (with the right to return to the same job), this includes the paid maternity leave, any additional maternity leave plus the maximum amount of any parental leave which the woman is allowed to take. Data is given for 2006/2007.

Table 1.4 Summary statistics showing female and motherhood employment and part time employment rates for a range of developed countries

Country	Proportion of females in employment (%)[1]	Proportion of employed females working part time (%)[2]	Proportion of mothers of children under 16 years in employment (%)[3]
Australia	73	37	64
Austria	79	33	72
Denmark	83	28	81
Finland	82	12	81
France	77	28	73
Germany	74	39	69
Greece	61	13	58
Italy	60	26	56
Netherlands	78	74	78
New Zealand	73	34	65
Norway	84	23	N/A
Spain	63	9	61
Sweden	84	15	83
Switzerland	77	47	69
United Kingdom	75	40	68
United States	73	12	67

1. Proportion of females aged 25-54 years in employment in 2008, from OECD(2010)
2. Proportion of females aged 25-54 years in part time employment in 2008, from OECD(2010). Part time employment is based on a common definition of less than 30 hours a week.
3. Proportion of mothers of children under the age of 16 years who are aged between 25-49 years in employment in 2007, from OECD (2008) 'Family Database'. Data missing for Norway.

Table 1.5 Occupational composition of female full time and part time jobs

SOC group	Full time women (%)	Part time women (%)	All women (%)
Managers and senior officials	17.8	5.7	13.2
Professional occupations	16.6	10.0	14.1
Associated professional and technical	19.5	12.9	17.0
Administrative and secretarial	18.9	19.4	19.2
Skilled trades	1.6	2.1	1.8
Personal services	12.2	20.0	15.2
Sales and customer services	5.7	12.2	8.2
Process, plant and machine operatives	2.2	1.3	1.9
Elementary	5.4	15.9	9.4

Notes:

1. Data from Quarterly Labour Force Survey July-September 2009.

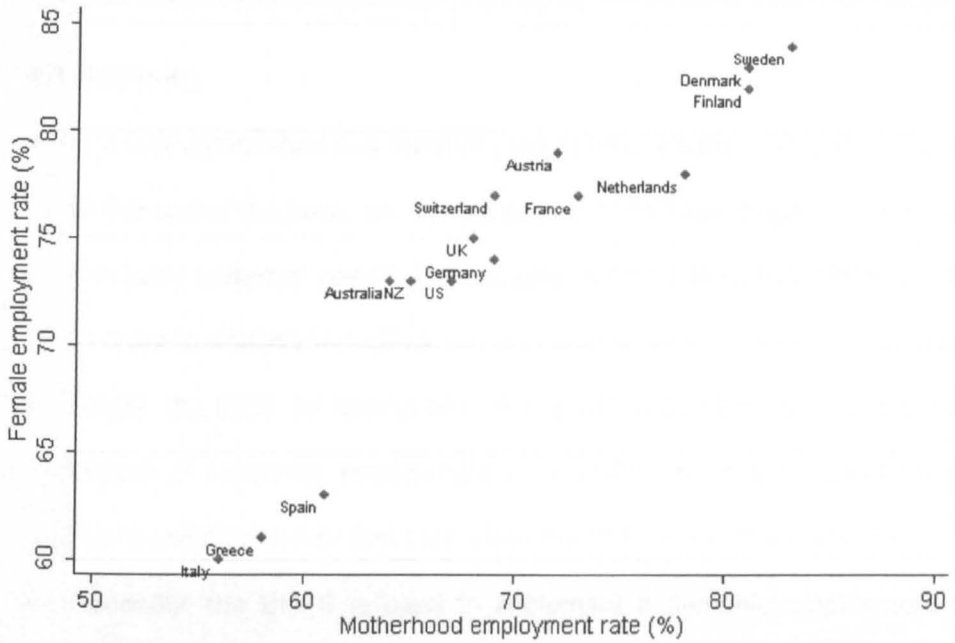
Table 1.6 Average hours of work by occupational group

SOC group	Mean number of weekly hours worked	Mean number of weekly hours worked by FT workers
Managers and senior officials	44.3	45.8
Professional Occupations	42.5	44.9
Associated professional and technical	38.6	43.2
Administrative and secretarial	35.1	39.9
Skilled trades	42.3	43.2
Personal services	30.9	39.6
Sales and customer services	29.9	39.4
Process, plant and machine operatives	42.2	43.8
Elementary	29.1	41.7

Notes:

1. Data from Quarterly Labour Force Survey July-September 2009.
2. The mean number of weekly hours worked includes any over-time.

Figure 1.1 Relationship between the female employment rate and the female part time employment rate



Notes:

1. The female employment rate is the proportion of females aged 25-54 years in employment in 2008, from OECD (2010).
2. The motherhood employment rate is the proportion of mothers of children under the age of 16 years aged 25-49 who were in employment in 2007, from OECD (2008) 'Family Database'.

2 The dynamic impact of maternity leave on mothers' employment

2.1 Summary

- It is well established that maternity leave encourages a return to employment at the end of the leave period, but does it encourage employment throughout the early maternal years? This chapter makes use of two different datasets in order to analyse this effect.
- Firstly, the MCS for babies born in the UK in 2000 is used to estimate the impact of resuming employment after childbirth on the probability of the mother working full or part time when the child is 3 and 5 years old.
- Secondly, the BHPS is used to implement a dynamic employment model which corrects for the endogeneity in the lagged dependent variable.
- The results show that remaining continuously employed over childbirth has a large positive impact on the probability of employment throughout the first 10 years after childbirth. Furthermore, this effect remains large even after accounting for endogeneity in the lagged dependent variable.
- There is a strong tendency for part time employment among those mothers retaining employment after childbirth in 2000 who have the characteristics of those who traditionally would have had a break in their labour market career over childbirth.

2.2 Introduction to the issue

The introduction of statutory maternity leave to the UK in 1976 has meant that mothers are spending less time out of the labour market over the childbirth period than was the case 30 years ago; remaining attached to employment over childbirth has become a much more common phenomenon (Macran et al, 1996; and McRae, 1991a). It has been well established that maternity leave encourages

employment at the end of the leave period, (Burgess et al, 2008; Berger and Waldfogel, 2004; and Rønsen and Sundström, 2002). This chapter aims to extend this work by investigating the dynamic process of mother's employment around childbirth. Two aspects of this issue are investigated. Firstly, the impact of remaining attached to the same employer over the childbirth period on the probability that a mother will continue to balance work with family life throughout the early years of the child's life is analysed. Secondly, the effect of having a continuous employment history on the probability of current employment is directly and consistently estimated for a sample of British mothers.

The motivation for the analysis carried out in this study is generated by an increasing numbers of mothers resuming employment at the end of the maternity leave period, in the UK 45 percent of mothers who worked whilst pregnant returned to employment in 1988, compared to 80 percent in 2002 (La Valle et al, 2008). Findings suggest that this increase was not purely driven by increases in access to and length of maternity leave policy (Hudson et al, 2003; and McRae, 1991a). However, this increase in labour market attachment around the childbirth period is likely to additionally be due to increasing relative wages, changing attitudes surrounding cultural norms, and higher educational attainments. Furthermore, whereas those who failed to resume work after childbirth were typically classed as socially and economically 'disadvantaged' (McRae, 1991a), this difference between returners and non-returners has narrowed over the previous decade (Hudson et al, 2003). A larger, more heterogeneous group of mothers are currently balancing employment with family life.

This chapter makes use of the benefits of two different data sets in order to investigate the dynamic process of mothers' employment in connection with childbirth and how maternity leave usage affects this process. Firstly the MCS for babies born in 2000 is used to estimate the probability that a mother is in full or part time employment at 3 and at 5 years after the birth given that they had returned to

their pre-birth employer at the end of the maternity leave period. This data set is useful because it contains a large heterogeneous group of mothers who gave birth around the same time. Furthermore, the mothers are firstly interviewed at 9 months after childbirth and are asked at this point whether they have returned to their pre-childbirth employer, this is of use since the mothers giving birth in 2000 were allowed 9 months of maternity leave. Therefore, the first part of the analysis in this chapter contributes to the literature by using a unique variable concerning resuming employment with the pre-childbirth employer which has not previously been available.

Previous experience of employment is likely to influence the current employment decision; state dependence is likely to play a large part in employment decisions (Heckman and Willis, 1977; Heckman and MaCurdy, 1980; Altug and Miller, 1998). Thus, in the second part of the chapter the BHPS is used to analyse the dynamic path of mothers' employment in the post-childbirth period, correctly controlling for endogeneity in the lagged value of the dependent variable (employment). This part of the analysis fulfils two objectives; the impact of mothers' continuous employment is directly and correctly estimated, and by carrying out simulations with the predicted employment values, it is possible to generate mothers' employment probabilities in the early maternal years, given the respondent's employment behaviour around childbirth. However, due to constraints associated with the underlying statistical model and unlike in the first part of the chapter, the full time versus part time decision is not estimated. Additionally, there is no information concerning whether the respondent returned to the same employer after childbirth.

These results will be compared to previous findings on this issue (Joshi et al, 1996; and Dex et al, 1998) which have used the 1958 National Child Development Survey (NCDS) birth cohort to analyse the impact of remaining attached to employment over childbirth for mothers who turned 33 in 1991. Mothers in the MCS

cohort had increased access to maternity leave, relative to those in the NCDS cohort, in the respect that they were only required to have been with the same employer for 1 year (as opposed to 2 years) before childbirth in order to qualify for maternity leave.

Both parts of this chapter contribute towards explaining how remaining attached to the labour market, and the same employer, over the childbirth period will affect the mothers' time allocation decision in the early years of the child's life. The first part of the chapter is able to highlight the effect of remaining with the same employer over childbirth, whilst the second part of the chapter attempts to estimate the employment effect of continuity in employment in a more consistent manner. Maternity leave policy should relax constraints on the mothers time allocation decision by negating the need for job search post childbirth. The ability for mothers to make unconstrained choices concerning their work life balance is crucial in promoting gender equality in the UK. Since differences in work experience can explain the majority of raw motherhood pay penalties (Anderson et al, 2002), by increasing access to continuous employment to mothers of young children, maternity leave policy is likely to help to reduce gender inequalities in career opportunities in the labour market. Furthermore, relaxing the constraints on a mother's work life balance decision is likely to encourage a higher degree of labour force participation and therefore have positive implications for the employment rate and aggregate output.

2.3 The economic consequences of maternity leave policy

In the UK, maternity leave gives mothers leave from work around the childbirth period with the right of return, to the same job and employer, at the end of the period. This is additionally supplemented by maternity pay; with the maternity leave period usually lasting longer than the maternity pay period. To the extent that maternity leave policy allows mothers to benefit from their pre-birth job tenure, their

good job match and to continue up the firm's career ladder, access to maternity leave should have a positive impact on mothers' human capital and pay; thus encouraging employment throughout the early maternal years.

Findings in the literature suggest that it is the case that being covered by maternity leave increases the probability of employment once the leave period has ended. McRae (1993), using a national postal survey of all women giving birth in December 1987 and January 1988 in Britain, and Waldfogel et al (1999) using data from the British Labour Force Survey (1993-1995) as well as data from the US and Japan, find being covered by maternity leave increases British mothers' employment probability by around 16 percentage points at one year after the birth. Furthermore, it additionally appears to be the case that the point of re-entry to the labour market is determined by the end of the maternity leave period, (Burgess et al, 2008; Berger and Waldfogel, 2004; and Rønsen and Sundström, 2002).

Endogenous selection into maternity leave coverage will occur if the characteristics which predict maternity leave coverage (for example, dedication to career and level of motivation) are positively correlated with the probability of motherhood employment. Burgess et al (2008) have attempted to correct for endogenous selection maternity leave coverage by creating a counterfactual distribution by limiting the sample to those mothers who did not qualify for maternity rights to those who seemed to not qualify because of exogenous reasons with respect to labour market commitment. Those who were covered by maternity leave were 25 percentage points more likely to return to employment at the end of the leave period than were those not covered by maternity leave.

A large amount of literature has considered the determinants of time taken to re-enter the labour market after childbirth. The previous research suggests that having higher levels of human capital increases the opportunity cost of remaining out of the labour force and therefore speeds up the return to employment; for example, the own wage offer (Dex et al, 1998; and Pronzato, 2007), the amount of

time spent working whilst pregnant (Rønsen and Sundström, 1996), higher levels of education (Rønsen and Sundström, 1996; Dex et al, 1998; and Macran et al, 1996) and the level of work experience (Gustafsson et al, 1996) all appear to reduce the length of the employment gap over childbirth.

However, Pronzato (2007) has shown that the impact of human capital characteristics on the employment gap over childbirth is smaller in countries where more generous parental leave arrangements are available. Therefore, it seems that being able to make relatively unconstrained work life balance decisions is more important in speeding up the return to employment after childbirth than is the individual's level of human capital.

The presence of a partner appears to affect the length of the employment gap; evidence from Britain suggests that the presence of a partner increases the employment gap over childbirth (Dex et al, 1998), a similar result is found for Sweden (Rønsen and Sundström, 1996). This may be the result of higher demands in the household, or may counteract the suggestions in the above paragraph by suggesting that having more income and therefore fewer constraints on the work life balance decision will actually delay the mother's return to employment.

Traditional attitudes concerning gender and mothering roles, as well as being more religious additionally appear to reduce the opportunity cost of remaining out of the labour force around childbirth and therefore slow down the rate of return to employment, (Rønsen and Sundström, 1996).

More recent evidence suggests that although most of the aforementioned differences still exist between those who make a return to the labour market at the end of the leave period and those who fail to do so, the extent to which such characteristics are associated with returners as opposed to non-returners has been reduced (Hudson et al, 2003).

The primary implication of taking maternity leave involves the impact on employment throughout the early maternal years. It has been recognised that

individuals who have experienced an event in the past (for example, employment) are much more likely to currently experience it; state-dependence. There are two reasons we see this phenomenon; structural dependence and spurious correlation (Heckman, 1981). Spurious correlation is a result of time-invariant unobserved attributes of the woman, such as ability or motivation, which determine the employment decision, (Heckman and Willis 1977). The structural dependence will partially act through the impact of accumulated work experience on future wages; accumulating an additional unit of human capital by participating in the labour force increases the wage and therefore encourages participation in subsequent periods (Heckman and MaCurdy, 1980; and Altug and Miller, 1998). By increasing wealth this will additionally increase the marginal value of time at full leisure throughout the life-cycle. Structural dependence may also occur if continuous employment acts as a positive signal to prospective employees.

The state-dependence property of employment explains why being able to resume employment after childbirth is likely to encourage continued employment throughout the early maternal years. Previous studies have confirmed this phenomenon; Joshi et al (1996) find that mothers who had a short break in employment over their first childbirth were 25 percentage points more likely to be in employment at age 33, and Dex et al (1998) find that for mothers who gave birth in their early 20's this phenomenon increased the probability of participation by 19 percentage points at age 33, for women who became mothers after the age of 25 having a short break in employment over children increased the employment probability by 25 percentage points at age 33.

Maternity leave policy will encourage reduced employment around the childbirth period; Rønsen and Sundström (2002) have shown that mothers entitled to maternity leave have a lower probability of resuming employment during the leave period. Maternity leave policy encourages labour market breaks, therefore reducing human capital. If these breaks in employment are around one year in

length previous analysis suggests that there will be significant human capital depreciation, Mincer and Ofek (1982). This has important implications for the extensions to maternity leave policy which took place in the UK in 2003.

If maternity leave promotes a longer break from the labour market than would otherwise have been the case then there may be a negative employment effect of maternity leave in the early maternal years. However, Rønsen and Sundström (2002) suggest that any negative employment effect as a result of human capital reductions associated with generous maternity leave policies will be offset by an increase in employment in the pre-childbirth period by mothers-to-be who wish to be eligible for maternity leave as well as an increase in employment in the post-childbirth period.

Access to maternity leave has important implications for gender equality in the labour market. Mothers not eligible for maternity leave lose the benefits of their accumulated job tenure and could suffer the interruption of a good job match, and therefore forced to find another job, possibly further down the career ladder. Giving mothers the opportunity to maintain their pre-birth job tenure, good job match and to continue up the career scale promotes equality in opportunities between mothers and their childless counterparts, and ultimately reduces gender inequality in labour market outcomes. Waldfogel (1998) finds that the wage premium associated with having access to job-protected maternity leave was large enough to offset the negative wage effect of children. Furthermore, if materntiy leave encourages a greater proportion of mothers to be employed throughout the early years of their child's life, this policy will have important implications for the overall employment rate.

This chapter aims to analyse whether resuming employment after childbirth helps to retain employment in the early years of the child's life. As compared to earlier analyses of this issue on average the women analysed in this chapter are more likely to resume employment at the end of the maternity leave period, and

those who do resume employment will be a more heterogeneous group of women in terms of their social and economic standing. Both parts of the chapter differ from previous studies which have examined the employment effect of continuity in employment over childbirth since the impact of having continuous employment over any birth period, not just the first birth period is estimated. Furthermore, in both parts of the chapter it is possible to directly observe the effect of having continuous employment over a childbirth period on the probability of subsequent employment at various stages throughout the early maternal years. Previous work has attempted to analyse the effect over time by including mothers' age at first birth. However, it is likely this will also capture the effect of other socio-economic factors associated with age at first birth. The second part of the chapter further adds to the literature by using a correctly specified dynamic model of mothers' labour force participation; correcting for endogeneity which arises as a result of including lagged dependent variables. Geyer and Steiner (2007) have previously used such a model to analyse mothers' employment around childbirth, however no previous applications to maternity leave policy have been made.

2.4 Econometric methods

2.4.1 The post-childbirth employment decision

This chapter examines mothers' employment throughout the early years of the child's life. The employment probability can be expressed as

$$y_{it} = CONTINUITY_{it}\beta_1 + CONTROLS_{it}\beta_2 + \eta_i + u_{it} \quad (2.1)$$

Where y_{it} is an indicator of employment status.

$CONTROLS_{it}$ are a set of observed human capital, demographic, household and economic characteristics which we hypothesise will affect the employment decision. η_i are individual level time invariant unobserved effects, u_{it} is the error term, and ε_{it} is the composite error term.

$CONTINUITY_{it}$ is the explanatory variable of interest. In the first part of the analysis (using the MCS), this variable indicates continuity in employment over childbirth, which is defined as working whilst pregnant and returning to the same employer within 9 months of childbirth (the mothers in this sample were allowed 9 months of maternity leave). In the second part of the analysis (using the BHPS), this variable is lagged employment, in order to analyse directly the employment impact of mothers' continuous employment.

2.4.2 Part 1: Multinomial logit models

The first part of the analysis in this chapter uses two cross sectional multinomial logit models to examine a mother's decision to participate in the labour market when their child is aged 3 then 5 years old,

$$\Pr(y_i = j) = \frac{\exp(X_i\beta_j)}{1+\sum_{j=1}^{J}\exp(X_i\beta_j)} + \varepsilon_{it} \qquad (2.2)$$

Where $j = \begin{cases} 0 \\ 1 \\ 2 \end{cases}$

y_i, the dependent variable in this analysis has 3 unordered response outcomes. The mother will either choose to remain out of the labour market ($j = 0$), to enter the labour market and work part time ($j = 1$), or to enter the labour market and work full time ($j = 2$). X_i is a 1 x K vector of variables (this will include the explanatory variables shown in equation (2.1) and β_j is a K x 1 vector of coefficients.

The multinomial logit model rests on the assumption that all error terms for each outcome for each individual are independent. This is called the independence of irrelevant alternatives (IIA) property, it suggests that adding in or deleting categories should not affect the probability odds among the remaining outcomes. By

these assumptions the probability ratio of choosing one outcome over another will take the form,

$$\frac{P(y_i = 2)}{P(y_i = 1)} = \exp\left(x'_{i2}\,\beta_j\right)$$

regardless of whether the third alternative exists.

It is likely that some aspects of working, such as social interaction, give mothers similar levels of utility regardless of whether they are working full or part time. However, it is also the case that full and part time work have different properties, leading to different utility values. For mothers, part time work allows more time spent with young children whereas full time work will usually mean that a higher income is being received and that a greater investment in work experience is being made. The robustness of the IIA assumption has been tested by examining results from multinomial probit models which relax the IIA assumption and by using a test proposed by Small and Hsiao (1985) (see appendix 2d for a description for the Small-Hsiao test).

The explanatory variables shown in equation (2.1) are those included in equation (2.2). η_i is defined as containing time invariant unobserved individual effects which are correlated with the dependent variable and with $CONTINUITY_{it}$; for example motivation, work commitment, or ideas on the role of a mother. Furthermore, structural dependence issues will be of concern here; a mother who experienced continuity in employment over childbirth will have higher levels of human capital and therefore will be more likely to be in employment than would her counterpart who had a longer break in employment over childbirth. These effects suggest that the dependent variable and $CONTINUITY_{it}$ are jointly determined. If this is the case $E(\varepsilon_{it}|CONTINUITY_{it}) \neq 0$ and β_j will be biased upwards. Instrumental variable techniques could be used to control for the endogeneity in the explanatory variable of interest ($CONTINUITY_{it}$). However, the absence of a

natural instrument generates a validity problem. As a result, in the following section the binary employment decision ($j=1$ and $j=2$ are combined into the same state; employment) is estimated and a lag of the dependent variable is included in the regression model to estimate the impact of continuous employment in the post-childbirth period. Structural dependence again will cause the lagged dependent variable to suffer from endogeneity problems, however in this setting (with the binary variable and a strict lagged dependent variable) techniques exist which allows this endogeneity to be consistently controlled for.

2.4.3 Part 2: The dynamic employment model

Previous literature has indicated that women's labour force participation follows a dynamic process (Heckman and Willis, 1977; Heckman, 1981). In order to account for the dynamic process in mothers' labour force participation this part of the chapter estimates the following equation,

$$y_{it} = y_{it-1}\beta_1 + CONTROLS_{it}\beta_2 + AGEY_{it}\beta_3 + \eta_i + u_{it} \quad (2.3)$$

y_{it}, $CONTROLS_{it}$, η_i, and u_{it} are as defined for equation (2.1). y_{it-1} is the lag of the dependent variable. $AGEY_{it}$ indicates age of the youngest child, this variable is included in the panel model in order to indicate the dynamic process of employment post-childbirth, independently of continuity in employment effects. β_1 is the adjustment (state-dependent) parameter, along with β_2 and β_3 these are the parameters to be estimated.

Both linear and nonlinear dynamic models are estimated in this part of the analysis due to the fact that both methods suffer potential weaknesses. The linear probability model has previously been used to estimate the dynamic path of employment (Geyer and Steiner, 2007). It can be considered as advantageous relative to nonlinear probability models because any nonlinear dynamic probability model which additionally allows for an endogenous initial condition also requires

making a restrictive distributional assumption on the individual specific fixed effects; that there is a linear relationship between the individual specific effect and the time-means of the explanatory variables within the model (Mundlak, 1978; Chamberlain, 1984). However, the drawback associated with using the dynamic linear probability model is that it allows predicted probabilities which are lower than 0 and greater than 1. 27 percent of the predicted probabilities in this analysis lie outside the 0 to 1 interval[3]. Firstly, the dynamic linear probability model is introduced. This model relies on the following assumptions;

i. After conditioning on y_{it-1}, $AGEY_{it}$ and $CONTROLS_{it}$ there is no remaining autocorrelation in u_{it}

$E(u_{it}u_{i,t-\tau}|y_{i,t-1}, AGEY_{it}, CONTROLS_{it})=0$, $\forall \tau > 0$, $i=1,...,N$, and $t=1,...,T_i$

ii. The fixed effect and time varying error are conditionally uncorrelated

$E(\eta_i u_{it}|y_{i,t-1}, AGEY_{it}, CONTROLS_{it})=0$, $i=1,...,N$, and $t=1,...,T_i$

iii. Strict exogeneity of $y_{i,t-1}$ is violated

$E(y_{i,t-1}, \varepsilon_{it}) \neq 0$, $i=1,...,N$, and $t=1,...,T_i$

iv. All other explanatory variables are either strictly exogenous, contemporaneously (weakly) endogenous, or predetermined.

$E(u_{it}AGEY_{i,t+s})=0$ and $E(u_{it}CONTROLS_{i,t+s})=0$, $\forall s > 0$, $i=1,...,N$, and $t=1,...,T_i$

Estimation of (2.3) by OLS will generate upwards bias in the estimation of β_1 and estimation of equation (2.3) by fixed effects will generate downwards bias in

[3] 23 percent of the predicted probabilities are greater than 1, and 4 percent of the predicted probabilities are less than 0. These predicted probabilities are those from the System GMM regression presented in table 2.5.

the estimate of β_1[4]. Therefore, first-differencing of (2.3) is used to eliminate the unobserved effect

$$\Delta y_{it} = \Delta y_{i,t-1}\beta_1 + \Delta AGEY_{it}\beta_2 + \Delta CONTROLS_{it}\beta_3 + \Delta u_{it} \quad (2.4)$$

However, $\Delta y_{i,t-1}$ and Δu_{it} are correlated and estimation of (2.4) by OLS would generate biased and inconsistent results. By instrumenting $\Delta y_{i,t-1}$ in (2.4) consistent estimates can be obtained. Given assumption (iii), it is possible to use the second-order lag ($y_{i,t-2}$) as well as higher order lags, which are uncorrelated with Δu_{it}, as instruments for $\Delta y_{i,t-1}$ for any individuals who have at least 3 time series observations ($T \geq 3$). The Hansen J statistic is used to test the validity of the instruments; the null hypothesis is that the instruments are not correlated with the error term in (2.4), Δu_{it}. Additionally, the presence of serial correlation in the error terms is tested. The model assumptions imply that the null hypothesis of no first-order autocorrelation should be rejected, however the null hypothesis of no second-order autocorrelation should not be rejected.

The appropriate lagged levels of the dependent variable are used to construct the GMM estimator, as suggested by Arellano and Bond (1991). However, lagged levels may not be appropriate instruments for first differences in the case of a highly persistent series, such as employment observations. Therefore, the System GMM estimator (Blundell and Bond, 1998) is additionally used in order to ensure consistency in the results. The System GMM estimator combines the moment conditions for the first differenced model with those from a model in levels which uses lagged differences as the instruments. The System GMM estimator has been shown to perform better when the series is particularly persistent (Blundell and Bond, 1998). The estimates are also compared to OLS and fixed effects estimates of equation (2.3) in order to check consistency.

[4] See appendix 2e for an explanation of the direction of these biases.

Because of the limitations associated with analysing the binary dependent variable in a linear setting equation (2.3) is additionally estimated using a random effects dynamic probit model. Stewart (2007) has introduced a Stata programme[5] which is based on the Heckman (1981) estimator of the random effects dynamic probit model and which allows an endogenous initial condition. The random effects model assumes that η_i is uncorrelated with the explanatory variables. However, in this case we adapt the Mundlak (1978) and Chamberlain (1984) approach, allowing η_i to be correlated with the observed characteristics in the model, as is allowed in the fixed effects framework. This is done by assuming a linear relationship between η_i and the time means of the explanatory variables,

$$\eta_i = \bar{x}_i \lambda_1 + \phi_i \tag{2.5}$$

where $x_i = (AGEY_i + CONTROLS_i)$, $\bar{x}_i = \sum_{t=1}^{T_i} \frac{x_i}{T_i}$

ϕ_i are normally distributed and are independent of $AGEY_{it}$, $CONTROLS_{it}$ and u_{it} for all t. Therefore equation (2.3) can be written as,

$$y_{it} = y_{it-1}\beta_1 + x_{it}\beta_4 + \phi_i + u_{it} \tag{2.6}$$

To simplify the notation the means of the explanatory variables ($\bar{x}_i$) have been subsumed into the x_{it} vector. The composite error term in equation (2.6) can be given as $v_{it} = \phi_i + u_{it}$. The random effects assumption implies that the correlation between the v_{it} in any two different periods will be the same,

$$\rho = Corr(v_{it}, v_{is}) = \frac{\sigma_\varepsilon^2}{\sigma_\varepsilon^2 + \sigma_u^2} \qquad t, s = 2,\ldots,T_i; t \neq s \tag{2.7}$$

In order to estimate the random effects dynamic probit model it is necessary to make assumptions about the initial observation (y_{i1}), and in particular its

[5] The 'redprob' command, as described in Stewart (2007).

relationship to the unobserved individual effect (ε_i). The Heckman (1981) estimator allows the existence of an endogenous initial condition by specifying an approximation to the reduced form equation for the initial value of the dependent variable,

$$y_{i1} = z_{i1}\pi + \alpha_i \tag{2.8}$$

z_{i1} is a vector of exogenous instruments which includes $AGEY_{i1}$ and $CONTROLS_{i1}$, as well as pre-sample variables[6]. α_i is correlated with ϕ_i, but uncorrelated with u_{it}.

$$\alpha_i = \theta\phi_i + u_{i1} \tag{2.9}$$

Allowing α_i to be correlated with ϕ_i relaxes the assumption of exogeneity of the initial condition which holds in the usual random effects setting. ϕ_i and u_{i1} are independent of each other, thus,

$$y_{i1} = z_{i1}\pi + \theta\phi_i + u_{i1} \tag{2.10}$$

As long as u_{it} is normally distributed, then the probability that individual i will be employed at time t, conditional on ε_i is given by

$$P[y_{it}|y_{it-1}, x_{it}, \phi_i] = \Phi[(y_{it-1}\beta_1 + x_{it}\beta_4 + \phi_i)(2y_{it} - 1)] \tag{2.11}$$

The joint probability for the binary observed sequence for individual i is given by

$$\prod_{t=2}^{T} \Phi[(y_{it-1}\beta_1 + x_{it}\beta_4 + \phi_i)(2y_{it} - 1)]\Phi[(z_{i1}\pi + \theta\phi_i)(2y_{i1} - 1)] \tag{2.12}$$

The likelihood to be maximised, for a random sample of individuals, is therefore given by,

$$\prod_i \int_{\varepsilon^*} \{\Phi[(y_{it-1}\beta_1 + x_{it}\beta_4 + \sigma_\varepsilon\phi^*)(2y_{it} - 1)]\Phi[(z_{it}\pi + \theta\sigma_\varepsilon\phi^*)(2y_{i1} - 1)]\} dF(\phi^*) \tag{2.13}$$

Where F is the distribution of the function $\phi^* = \phi/\sigma_\varepsilon$ and $\sigma_\varepsilon = \sqrt{\rho/(1-\rho)}$.

[6] An indicator variable which reflects whether the respondent's mother achieved further education qualifications (greater than O level standard) or a degree level qualification is one of these pre-sample variables. The other pre-sample variable used is an indicator variable which reflects whether the respondent's mother's main occupation was in the professional or managerial categories of the British Registrar General's Social Class grouping.

The estimate of β_1 from the dynamic random effects probit model is compared to that from a pooled probit and from a random effects probit model (both of which will contain a lagged dependent variable). The pooled probit model assumes that the individual specific unobserved effect (η_i) is uncorrelated with the explanatory variables; there is no within individual correlation in the error term between different periods. The random effects probit model allows the individual specific effects to be linearly related to the time-means of the explanatory variables[7], but takes the initial condition as exogenous. The random effects dynamic probit also allows the individual specific effects to be linearly related to the time-means of the explanatory variables and additionally assumes an endogenous initial condition. However, regression coefficients cannot be compared between the dynamic random effects probit and the pooled probit model because of differing normalisations.

The estimated parameter β_1 from equation (2.3) will indicate how continuous employment influences the probability of current employment for mothers in the UK. Furthermore, simulations with the predicted probabilities of employment generated by this part of the analysis are carried out in order to estimate the employment impact of working within 1 year before the birth and returning to work within 1 year after the childbirth at various points in the early years of the child's life. Because this part of the analysis makes use of a long panel throughout which maternity policies were changing we can only estimate the impact of returning to work within one year of the childbirth, not the impact of actually using maternity leave.

2.5 Data and samples

The first part of the chapter is carried out using data from the MCS. The MCS is a cohort survey of 18,818 babies born in the UK over a 12 month period

[7] By implementing the Mundlak (1978) and Chamberlain (1984) approach.

from September 2000 in England and Wales, and over 13 and a half months from late November 2000 in Scotland and Northern Ireland. The analysis in this chapter was able to make use of the first 3 waves of this survey. The first wave took place when the cohort was aged nine months, the second when the cohort members were 3 years old, and the third when the cohort members were 5 years old. The main respondent is the main carer of the cohort member. The study includes information about the socio-economic background into which the cohort members were born, information about the demographics of the mother and other household members, and information concerning the main respondent's work history.

Equation (2.2) is estimated using a sample of females between the ages of 21 and 50 who are the natural parent of the cohort member. The sample includes women who were and were not working whilst they were pregnant. This means the results are directly comparable with those presented by Joshi et al (1996) and Dex et al (1998). For consistency purposes, the results from the multinomial logit models are also estimated using a sample which includes only women who were employed whilst pregnant (table 2.9, appendix 2b); in order to eliminate the group of mothers who permanently remain out of the labour force as a comparison group, therefore limiting the scope of heterogeneity. However, this latter sample is likely to suffer from selection bias; mothers who were working whilst pregnant are likely to be a select group who have different observable and unobservable characteristics to those who were not in work whilst pregnant. The main results discussed are those estimated using the sample of all mothers, and the results just using the sample of mothers who work whilst pregnant are discussed as a consistency check (appendix 2b). After dropping observations with missing information on partner's income[8] we are left with 8975 observations at 3 years after childbirth, 4274 of which are

[8] This involves dropping 37 percent of observations at 3 years after childbirth and 32 percent of observations at 5 years after childbirth. The multinomial logit models have been estimated using a sample which includes those who do not report partner's income, the results show consistency with those discussed in section 2.8.1.

employment observations, and 9011 observations at 5 years after childbirth, 5055 of which are employment observations.

The dynamic employment models analysed in the second part of the chapter are estimated using waves 1-15 of the BHPS, a longitudinal survey which collects information on the socio-economic characteristics of individuals and households. Estimating the dynamic employment models using the MCS data would have been possible as three waves of data were available when this analysis was undergone. However, if the MCS data had been used it would only have been possible to estimate the pure effect of continuous employment at five years after childbirth, and only one instrument would have been available. Use of the BHPS data allows estimation of the impact of continuity in employment throughout the years subsequent to childbirth; furthermore the larger number of panels available allows a larger number of instruments to be used. The BHPS Consolidated Marital, Cohabitation and Fertility Histories (1991-2006) file has additionally been used in order to accurately infer when the women in the sample gave birth. Just the first 15 waves of the BHPS have been used because the latter dataset only includes information on the year and month of childbirths for any births occurring before the end of wave 15.

In order to estimate equation (2.3) a sample of mothers between the ages of 21 and 50 years old, whose youngest child is younger than 18 years of age, who additionally provided childbirth information to the BHPS Consolidated Marital, Cohabitation and Fertility Histories (1991-2006) file and who had their first birth before their wave 14 interview are used. Due to the structure of the dynamic panel data model used it is necessary to restrict the observations to those which are within a consecutive spell of observations for an individual which is at least as long as three waves. Imposing these constraints leaves 18,207 mother observations and 11,829 employment observations from 2034 individuals. However, since we are interested in observing the impact of mothers' employment behaviour over childbirth

the sample is further restricted to those who were observed before their most recent childbirth. This leaves just 7273 mother observations and 4152 employment observations, from 812 individuals. By restricting the sample to just these women it is possible to consistently simulate the impact of being in employment within one year before the childbirth and resuming employment within a year after childbirth. In order to check the sensitivity of the main results, equation (2.3) is additionally estimated using the larger sample of mothers (that which includes those who were and were not observed before childbirth) in appendix 2c.

2.6 Description of variables

In the first part of the analysis (MCS), the dependent variable has 3 possible outcomes, not employed, employed full time, or employed part time. A mother is classified as working part time if she works less than 30 hours a week[9]. In the dynamic employment models the event of being in employment is the dependent variable. The explanatory variables used in both analyses can be placed into six categories: human capital characteristics of the mother, mothers' employment over the childbirth period, the economic circumstances of the household, household demographics, attitudes of the mother and regional characteristics.

Mothers' age and its squared value proxy for years of work experience. The mother's highest educational qualification is categorised into degree level, A level and O level qualifications. The effect of having these qualifications is assessed relative to no qualifications[10]. Mothers with higher earnings have a larger opportunity cost of remaining out of the labour market and are better placed to afford quality childcare. Because wages are missing for those not in employment, an imputed log

[9] This definition is consistent with previous research (Connolly and Gregory, 2008; Manning and Petrongolo, 2008) and the OECD definition of part time employment. The number of hours of work reported excludes any overtime.

[10] In the MCS analysis this question was not asked in wave two thus the values of this variable are set to be identical in waves one and two for each respondent. In wave 3 the respondents were asked if they had gained any new qualifications since wave one. The variable is updated in wave 3 if any new qualifications have been attained.

wage (predicted by a log-linear Mincerian wage equation; appendix 2a) is included in the multinomial logit models and in the dynamic employment equations. In both samples the hourly wage has been adjusted for CPI inflation and is given at 2006 prices[11].

In the MCS analysis the explanatory variables of interest indicate whether a mother had continuous employment over childbirth (defined as working whilst pregnant and returned to the same employer within nine months[12]; specification A.1). A variable is additionally included which indicates whether the mother returned to work within nine months of the childbirth but to a different employer as when pregnant. The distinction between the two variables is an extension to previous work and highlights the pure impact of maternity leave policy; the impact of returning to the same employer as opposed to returning to a different employer after a short break in employment over the childbirth period. The base category is not working at nine months after the birth.

The explanatory variable of interest in the MCS analysis has additionally been interacted with the characteristics of those who were traditionally classed as non-returners. Due to a lack of information concerning the pre-childbirth jobs in the MCS dataset the characteristics used to identify traditional non-returners are whether they have achieved a degree level qualification and whether the birth was their first birth or a subsequent birth. In specification A.2 the variable indicating continuity in employment over childbirth is interacted with whether the mother has a degree level qualification or otherwise. Similarly, in specification A.3 continuity in employment over childbirth is interacted with whether this was the mother's first

[11] Selection bias is likely to affect these wage predictions. However, a good instrument for employment, which is not included in the main employment equations in this analysis, is difficult to find. In the wage equation estimated on the MCS data some proxies for ability are included in order to try to reduce this selection bias.

[12] Although it is likely that employers may have offered more generous leave arrangements than the statutory 29 weeks, I have made the assumption that a mother wanting to remain attached to the labour market over childbirth will have returned by nine months.

childbirth or whether it was a subsequent birth. Typically, those with more education were likely to return to make a quicker return to the labour market after childbirth, as were those having a subsequent, rather than a first childbirth (Hudson et al, 2003).

The corresponding explanatory variable of interest in the BHPS analysis is the lagged dependent variable, indicating the impact of continuity in employment. Furthermore, age of the youngest child is included in order to indicate the path of employment throughout the early years of the child's life. The variables included indicate whether the child was born in the previous 4 months, the child is 1-2 years old, the child is 3-4 years old, or the child is 5-12 years old. The effect of having a youngest child in these age groups is assessed relative to having a youngest child aged 13-18 years old.

The variables which reflect the economic circumstances of the household include the log of weekly income generated by a partner in the MCS analysis (income from a partner is set to zero if the mother does not have a partner or if her partner is not in the labour force), and the log of real yearly household income (minus the mothers' labour market earnings) in the BHPS analysis. In both samples household income has been adjusted for CPI inflation and is given at 2006 prices. The type of maternity pay received is included in the MCS analysis, this takes account of the fact that incentives to return to the labour market and financial help are likely to promote labour market attachment. Housing tenure variables are additionally used as indicators of wealth. In the MCS analysis these variables reflect whether the mother is in social housing or lives with parents. In the BHPS analysis this variable reflects whether the respondent does not own their home.

The household demographic variables include mothers' marital status and number of children in the household. The mothers' marital status will affect participation since marriage will increase the value of time spent in home production, additionally having a partner may generate more sources of informal childcare. The presence of more children indicates higher childcare costs and a

greater amount of time spent in home production. The number of working age adults in the household is included as a variable in the BHPS analysis. The geographical proximity of the mothers' mother has been shown to have a significant effect on mothers' participation, Del Boca et al (2005); the close proximity of a grandmother may be a source of informal childcare. A variable is included in the MCS analysis which indicates whether a mother lives within an hour's journey of her own mothers' residence.

The attitudes of the mother determine the value they place on spending time with their children. In the MCS and BHPS analyses, a variable indicates whether the respondent agrees that a pre-school aged child suffers if the mother works, relative to disagreeing or neither agreeing nor disagreeing. A variable is also included in the MCS analysis which indicates whether the mother considers themselves as belonging to a religion. Those who practice a religion may be more likely to have more traditional ideas concerning gender role ideals.

The structural constraints mothers face on re-entry to the labour market are indicated by the regional rate of unemployment (by Government Office Regioins, included in the BHPS analysis) and the average of people by each Government Office Region who report ever using formal childcare (included in the MCS analysis).

2.7 Descriptive statistics

The descriptive statistics from the MCS data at 3 and 5 years after childbirth are presented in table 2.1, and those from the BHPS dataset are shown in table 2.2. Table 2.1 and table 2.2 show the mean values of the explanatory variables conditional on the employment status of the respondents.

The descriptive statistics indicate that continuity in employment is an important predictor of current employment for mothers. The descriptive statistics in table 2.1 indicate that the mothers in employment at 3 and 5 years after childbirth

are much more likely to have had continuous employment over childbirth than are the mothers who are out of employment.

The descriptive statistics in table 2.1 show that graduate and non-graduate mothers who had continuity in employment over the childbirth are both more likely to be in employment than not in employment at both 3 and 5 years after childbirth. A greater proportion of the employed mothers at 3 and 5 years after childbirth who had had continuity in employment over childbirth had two or more children rather than one child. This suggests that mothers having a subsequent childbirth are better placed to retain employment in the early maternal years, or that the financial constraints of having more children mean that a mother is more likely to enter employment. Mothers having subsequent childbirths are likely to have had experience in arranging suitable childcare for their pre-school aged children, this effect appears to outweigh any negative employment effects associated with the increased time or financial pressures associated with having more children.

The descriptive statistics in table 2.2 show that giving birth in the previous year has a large negative impact on the probability of being in employment. Similarly, having a child who is of 0-2 years of age, or 3-4 years of age appears to have a negative impact on the incidence of employment. At pre-school ages, children require a large amount of costly childcare if the mother participates in the labour market. Furthermore, many mothers are likely to have strong preferences in favour of providing childcare themselves. When the child reaches school age, and therefore require smaller inputs of time devoted to childcare, mothers are more likely to be employed than otherwise. Furthermore, when the child is between the aged of 13-18 and therefore requires a very small amount of childcare, the mother is even more likely to be in employment.

The descriptive statistics in table 2.1 and table 2.2 suggest that mothers with a degree level qualification are more likely to be employed than not in employment; however the reverse appears to be true for those with lower level qualifications.

Furthermore, the mothers in employment have higher wages than those who have had wages imputed (not in employment). By increasing the opportunity cost of not participating in the labour market, human capital increases the probability of employment. The descriptive statistics shown in table 2.1 illustrate that by 5 years after childbirth the difference in the hourly earnings of those in and out of employment is smaller than at 3 years after childbirth; a more heterogenous group of mothers are likely to be in employment as their child starts school and their childcare responsibilities are decreased, than in the pre-school years. The larger proportion of mothers in work at 5 years after childbirth includes those who have lower labour market attachment, less work experience and therefore a lower predicted wage.

In some respects the descriptive statics indicate that employment is synonymous with having a larger amount of wealth, suggesting that wealth relaxes constraints on the work life balance decision. For example, the descriptive statistics in table 2.1 indicate that living in social housing increases the probability of not being employed. Similarly, table 2.2 shows that not owning your home increases the probability of not being in employment. Furthermore, the statistics in table 2.1 shows that having received additional as well as statutory maternity pay appears to have a positive impact on the probability of employment at 3 and 5 years after childbirth. However, in contrast, the descriptive statistics in both table 2.1 and table 2.2 indicate that those in employment receive lower levels of household income than do those who are not in employment. Therefore, it seems that at some level having a high level of household income allows the mother to provide childcare for her own children.

Employed mothers are more likely to be married or cohabiting than are non-employed mothers. Again, this suggests that some level of non-labour income is required in order for mothers to enter the labour market. Mothers who remain out of the labour market have on average more children in their household than do those

mothers who participate in the labour market. The presence of more children will serve to increase expenditure on childcare which has a negative impact on the labour supply of mothers. The descriptive statistics in table 2.2 further suggest that having access to more potential childcare providers (having more working age adults in the household) increases the probability of the mother's employment.

The descriptive statistics suggest that mothers who have more traditional attitudes concerning gender roles are more likely to not be in employment. The statistics presented in table 2.1 indicate that the regional availability of childcare appears to encourage mothers' participation in the labour market in the early maternal years.

2.8 Results

2.8.1 Results from part 1: Cross sectional multinomial logit models

The marginal effects of the parameters of the multinomial logit models (specification A.1) are presented in table 2.3. At 3 years after childbirth continuity in employment over childbirth means that a mother is 38 percent more likely to be employed than is a mother who had a discontinuous employment history over childbirth, and is 31 percent more likely to be in employment at 5 years after childbirth. The overall employment effect becomes weaker over time.

Having continuity in employment over the childbirth period has large positive impacts on the probability of working in both full time and part time when the child is 3 and 5 years old. Continuity in employment over childbirth appears to increase the probability of full time employment slightly more than the probability of part time employment. The impact of joining the labour market at nine months after childbirth but for a different employer as when pregnant has similar sized effects on the probability of full and part time employment. However, the magnitude of this is smaller than the effects from continuity in employment over childbirth.

Table 2.4 presents the results from specification A.2 of the multinomial logit models, interacting graduate status with continuous employment over childbirth. The overall employment effects at 3 and 5 years after childbirth are larger for non-graduate than for graduate women. Again, the magnitudes of the employment effects are large and decrease between 3 and 5 years after childbirth. The full time effect is smaller for non-graduates than for graduates. However, being a graduate and resuming employment within nine months of childbirth has no significant impact on the probability of part time work. Being a non graduate and having continuous employment over childbirth has a larger impact on the probability of part time work than on the probability of full time work in the early maternal years.

Table 2.4 additionally presents the results from specification A.3. The overall employment effect at 3 years after childbirth for mothers of 2 or more children is larger than the average effect shown in table 2.3, at 5 years this is of similar magnitude to that shown in table 2.3. The overall employment effect for mothers of one child (at both 3 and 5 years after childbirth) is comparable to the average effect shown in table 2.3. For both groups of mothers the overall employment effect falls over time. Having only one child and continuous employment over childbirth has an insignificant effect on the probability of part time work at 3 years after childbirth, this effect becomes significant, although small, at 5 years after childbirth.

The results from the other explanatory variables included in the multinomial logit regressions displayed in table 2.3 indicate that those with higher wages are less likely to enter into part time employment. Previous studies have found a negative effect of partner's earnings on female labour force participation (Sprague, 1988; Del Boca et al, 2005), the results presented in table 2.3 and table 2.4 suggest that mothers with higher earning partners are less likely to work full time, however this has an insignificant impact on the probability of part time employment. The presence of more children in a household has a negative impact on the probability of working.

The multinomial logit regression models have been tested for the violation of the IIA assumption by comparing the results on the explanatory variables of interest to those from multinomial probit models (table 2.9, appendix 2b). Using multinomial probit models (relaxing IIA assumption) provokes small changes in the coefficients, suggesting that the IIA assumption is unlikely to be violated in the multinomial logit regressions. The violation of the IIA assumption has also been tested using a test proposed by Small and Hsiao (1985)[13]. Table 2.3 reports the results of the Small-Hsiao test, the results show that the IIA assumption may be violated when part time work is the omitted category at 5 years after childbirth[14]. The imposition of the IIA assumption does not appear to greatly affect the results. The consistency of the cross sectional multinomial logit results has been tested by using a sample of mothers who were in work whilst pregnant. Table 2.9 (appendix 2b) shows that using this sample of mothers prompts only small changes in the estimated coefficients.

2.8.2 Results from part 2: Dynamic employment equations

Table 2.5 displays the regression coefficients from the OLS, fixed effects, GMM-differences, and GMM-system estimations of equation (2.3). The Hansen J statistic test (displayed at the bottom of table 2.5) indicates that the instruments are valid in the GMM-system model (however they are only valid at the 10 percent significance level in the GMM-differences model). The results indicate that the errors exhibit first-order autocorrelation, but not second-order, suggesting that the GMM-differences and GMM-system models are well specified. The GMM-system model is therefore chosen as the preferred specification.

Table 2.6 displays the regression coefficients from the pooled probit, random effects probit, and random effects dynamic probit estimates of equation (2.6). Table

[13] See appendix 2d for an explanation of the Small-Hsiao test

[14] Using Monte Carlo analysis, Cheng and Long (2007) have shown that the Small-Hsiao test (1985) is unsatisfactory for use with empirical work due to size distortion problems, furthermore different variations of the tests can produce inconsistent results.

2.12 in appendix 2f displays the regression coefficients from the reduced form equation in the structural random effects dynamic probit model estimation. The reduced form equation (equation (2.10)) predicts the probability of employment in the initial state, conditional on a vector of regressors (z_{i1}) which include all covariates from the structural equation as well as some pre-sample variables. The pre-sample variables used in the current analysis were two dummy variables; firstly, an indicator of whether the respondent's mother achieved a further education qualification (higher than GCSE or O level), or a degree level qualification, and secondly an indicator of whether the respondent's mother's main occupation throughout their working life was in the professional or managerial groups of the British Registrar General's social class grouping. The results displayed in table 2.12 (from the reduced form equation) indicate that only the former of these two variables is significant in the reduced form equation.

A consistent estimate of β_1 from equation (2.4) (first-differenced equation) should lie between that given by the OLS regression of equation (2.3) and that given by the fixed effects estimation of equation (2.3). The results in table 2.5 indicate that this pattern is found, however the difference between β_1 in the OLS and GMM estimations is a lot greater than that between the fixed effects and GMM estimations. The coefficients from the pooled probit model cannot be compared to those from the random effects probit models, however the coefficients from the random effects probit and random effects dynamic probit can be compared. Because the random effects probit does not allow for the endogeneity of the initial condition we would expect this model to overestimate the impact of previous employment on the probability of current employment, relative to the random effects dynamic probit. The results displayed in table 2.6 indicate that the random effects probit estimates a slightly larger impact of previous employment on the probability of current employment than does the random effects dynamic probit model.

The results from the GMM-system regression displayed in table 2.5 indicate that the employment probability for a mother who had been employed in the previous year is around 21 percentage points higher than that for a mother who had not been employed in the previous year. The results in table 2.7 present the marginal effects from the pooled probit and random effects probit models[15]. The maginal effects illustrate that the pooled cross sectional probit model over-estimates the impact of employment in the previous period on the current employment probability by ignoring any relationship between the individual specific effects and the explanatory variables. The random effects probit model shows that once a linear relationship has been imposed between the individual specific effects and the explanatory variables then the impact of being employed in the previous period is estimated to increase the current employment probability by around 42 percentage points. However, the regression coefficients presented in table 2.6 suggest that once the endogeneity of the initial condition is taken account of (in the random effects dynamic probit model) the impact of employment in the previous period on the probability of current employment is likely to be smaller than 42 percentage points. Thus, the results suggest that the effect of working in the previous period on the probability of employment in the current period lies between 20-40 percentage points.

The coefficients on the variables which indicate age of the youngest child presented in table 2.5 and table 2.6 demonstrate how the mothers' employment rate varies throughout the early years of the child's life. As expected, mothers with younger children are much less likely to be in employment. The probability of employment increases throughout the early years of the child's life. The employment rate of a mother whose youngest child is between the ages of 5 and 12

[15] There is no Stata routine available to compute the marginal effects after a user-written command such as the 'redprob' (Stewart, 2007) used here.

years does not significantly differ from a mother whose youngest child is between the ages of 13 and 18 years old.

Figure 2.1 plots the yearly averaged predicted rates of employment from the system-GMM regression (which range from -0.73 to 1.51) for all mothers throughout the first 2 to 12 years after childbirth alongside the predicted employment probabilities of mothers who had continuous employment over their most recent childbirth, and the predicted employment probabilities of those who had a break in employment over childbirth. Figure 2.2 shows the same information using the predicted values of employment from the random effects probit model[16]. Here, continuous employment over childbirth means that the mother was in work within 12 months before childbirth and returned to work within 12 months after childbirth, having a break in employment is defined as being out of the labour market for a longer period than this around the childbirth period. Because maternity policies changed throughout the sample period, and because of the structure of the dataset, it is necessary to use this broad definition.

Figure 2.1 and figure 2.2 show that the predicted employment rates of mothers who had continuity in employment over childbirth will remain above the average employment rate of mothers for at least 12 years after childbirth. However, the two figures show fairly different patterns of motherhood employment. Figure 2.2 indicates that the employment probabilities of those mothers who had continuity in employment over childbirth remain fairly stable between 2 and 4 years after childbirth, whereas the rates of those who had longer breaks in employment over childbirth are increasing over this period. This is as we would expect; those who have longer breaks are likely to re-join employment as their child nears school age. Figure 2.1 shows increasing employment probabilities over this period for both

[16] Because the 'redprob' (Stewart, 2007) Stata command, used to estimate the random effects dynamic probit model, is a user-written Stata command there is no routine available for generating the predict values from this regression. Instead those from the random effects probit model have been computed.

groups of mothers, and indicates that the steepest increase occurs around the starting school age. Both figures indicate that once the child has started school the gap in the employment probability between mothers who had continuity in employment over the childbirth period and mothers who had a break in employment over childbirth remains fairly constant. Both figures additionally indicate that the largest gap in the predicted probabilities between these two groups of mothers occurs very early on, when the child is around 2 years of age. Figure 2.1 suggests this employment gap is around 14 percentage points and figure 2.2 suggests this gap is approximately 24 percentage points. From around 6 years after childbirth and onwards figure 2.1 suggests that the magnitude of this employment gap will be around 7 percentage points, and figure 2.2 indicates this will be around 10 percentage points.

Table 2.10 in appendix 2c presents the regression coefficients from the OLS, fixed effects, GMM-differences, and GMM-system estimations of equation (2.3), using a sample of all mothers in the BHPS, not just those observed before their most recent childbirth. Similarly, table 2.11 in appendix 2c presents the regression coefficients from the pooled cross sectional probit, random effects probit and random effects dynamic probit models which have used the sample of all mothers. The results indicate small changes in the size of the coefficients, suggesting that the results displayed in table 2.5 and table 2.6 are robust.

2.9 Discussion

The results presented in table 2.3 indicate that continuity in employment over the childbirth period greatly helps to increase employment probabilities in the early maternal years, by 38 percent at 3 years after childbirth and 31 percent at 5 years after childbirth. However, it is likely that the results displayed in table 2.3 overestimate the impact of continuity in employment due to endogeneity bias. The predicted values of employment displayed in figure 2.1 have been corrected for the

endogeneity which is created by structural dependence issues surrounding the lagged dependent variable in equation (2.3), however the predicted values of employment in figure 2.2 have not been corrected for the endogeneity of the initial condition. Both figure 2.1 and figure 2.2 indicate that any mothers who were employed within 12 months before and 12 months after childbirth are more likely to be in employment than is the average mother throughout the early years of their child's life, the magnitude of these effects are smaller than those suggested by table 2.3. Therefore, maternity leave policy appears to be particularly helpful in allowing mothers to balance work with family life in the early years of their child's life.

The results in table 2.4 show that continuity in employment over the childbirth period has positive employment implications at 3 and 5 years after childbirth for the respondents who have the characteristics of those less likely to have had continuity in employment over childbirth in previous analyses of this issue. For example, the results in table 2.4 indicate that mothers of one child who have continuity in employment over childbirth are 21 percent at 3 years after childbirth, and 12 percent at 5 years after childbirth more likely than their counterparts who left the labour market over childbirth to be in employment. Therefore, the higher proportion and increased heterogeneity of mothers retaining employment post-childbirth in 2001 (Hudson et al, 2003) will translate into a higher proportion of mothers balancing work with motherhood in the early maternal years.

The results displayed in table 2.5, table 2.6, and table 2.7 show that after controlling for unobserved effects and the endogeneity of the lagged dependent variable, employment in the previous period increases the probabilities of employment in the current period, for a sample of mothers, by a fairly large magnitude; the direct effect of continuous employment on the probability of current employment is fairly large for this sample of mothers. Because maternity leave policy encourages mothers to resume employment at the end of the leave period, it is important in maintaining employment throughout the early maternal years.

However, it is important to recognise that the results in table 2.5 and the marginal effects in table 2.7 understate the impact of resuming employment at the end of the maternity leave period on the subsequent employment probability, as no information regarding whether the mother returns to the same employer is available. The BHPS results from the current chapter conclude that by encouraging mothers to resume employment at the end of the leave period, maternity leave will therefore increase the employment probability in the subsequent period by between 20-40 percentage points, and therefore in all subsequent periods, above that of a mother who did not resume employment at the end of the maternity leave period. This is particularly important in the very first years after childbirth where the results indicate that employment rates are much lower than when the child is older. For example the results indicate that a mother whose youngest child is aged 1-2 years has an employment probability which is 51 percentage points smaller than that of a mother whose youngest child is 13-18 years old. By allowing these mothers the right to return to the same job after childbirth, maternity leave policy relaxes the constraints on the work life balance decision for these mothers and appears to increase the probability of employment.

The results displayed in table 2.3 and the simulations in figure 2.1 and figure 2.2 suggest that the impact of continuity in employment over childbirth remains large for at least 10 years after childbirth. The results found in the MCS analysis complement the findings by Dex et al (1998) by showing a steady decline over the third and fifth years after childbirth of the employment participation impact of continuous employment over any childbirth. However, figure 2.1 and figure 2.2 using the predicted values from the BHPS analysis suggest that this effect slightly declines between around 2-5 years after childbirth and then remains fairly constant for the next 7 years. The results from the MCS analysis suggest that the decline in this effect occurs to a greater extent in part time than in full time employment. This result may occur because those who had broken employment careers over

childbirth are more likely to re-enter the labour market via part time, rather than via full time employment.

The results generated by the MCS analysis produce larger estimates of the impact of continuity in employment over childbirth on the subsequent employment probability than previous similar analyses. This is perhaps likely to be a result of shorter elapsed time since childbirth. For example, Dex et al (1998) find that at age 33 mothers who gave birth in their early 20's (around 9-13 years since childbirth at age 33) and had continuous employment over childbirth were 19 percent more likely to be in employment, for women who became mothers after the age of 25 (0-8 years since childbirth at age 33) and had continuous employment over childbirth the employment probability was 25 percentage points higher.

The BHPS analysis can be compared to previous work by Geyer and Steiner (2007) who have previously used a dynamic linear probability employment model to show that a woman in the UK who was in employment in the previous period has a current employment probability which is 32 percentage points higher than that of a woman who was not employed in the previous period. This result is estimated using the ECHP, and a sample of mothers and childless women and is of a comparable magnitude to the current results.

Table 2.4 shows that overall employment effects for non-graduates who had continuity in employment over childbirth are even greater than those for their graduate counterparts. However, a large proportion of non-graduates are more likely to move into part time employment than are their counterparts who left employment over the childbirth period; around 12 percent at 3 years after childbirth and 9 percent at 5 years after childbirth. In contrast, for graduate women the entire employment effect of having continuous employment over childbirth is made up by full time employment. Part time jobs are commonly found in low skill level occupational groups, (Blackwell, 2001; Dex and Bukodi, 2010; Connolly and Gregory, 2008; Manning and Petrongolo, 2008; Hakim, 1998; Stewart and

Greenhalgh, 1984), and Connolly and Gregory (2008) have found that approximately 25 percent women moving to part time work could suffer a movement to an occupational group which is consistent with a lower level of average education, whilst Dex and Bukodi (2010) suggest that there may be a 50 percent probability of moving to an occupational group which is associated with a lower level of average pay when moving from full to part time employment. This suggests that any mother moving into such a job will experience a loss of career building, human capital development and promotion opportunities (Russo and Hassink, 2005), this is likely to have a subsequent scarring impact on future wages and career progression. The high propensity of part time work among non graduates who had continuous employment over childbirth is not as likely to be as effective in utilising the skill supplied to these jobs, maintaining labour market attachment and increasing mothers' human capital as are any increases in full time work as a result of continuity in employment over childbirth.

The findings from this study have important policy implications. Firstly, by facilitating continuity in employment, maternity leave significantly improves the chances of a mother being in full time and part time employment for at least 12 years after the birth. This suggests that maternity leave policy is important in successfully relaxing constraints on the mothers' time allocation decision and therefore encouraging the probability of employment. By successfully promoting uninterrupted career progression, maternity leave policy will increase gender equality in career opportunities. The results suggest that maternity leave policy will additionally increase the overall employment rate and therefore labour market efficiency. Secondly, it seems that a more heterogeneous group of mothers having continuity in employment over childbirth results in the average employment impact of maternity leave in the early maternal years remaining strong. Thus, increasing access to maternity leave increases the actual number of mothers in employment in the early maternal years and therefore enhances the positive implications of

maternity leave policy. The extension of maternity leave to 52 weeks in 2003 should allow even greater access to maternity leave by bringing the actual leave period closer to the desired leave period. The results from the current chapter suggest that this increase in access should increase the number of mothers in employment in the early maternal years, as long as there is no negative human capital effects associated with a longer leave period.

The results in table 2.3 suggest that the effect of remaining attached to the labour market over childbirth will be even greater after resuming employment post-childbirth if there is a return to the pre-childbirth employer. Returning to the same employer illustrates the impact of being covered by maternity leave policy; being able to return to the same employer. The difference between the magnitude of the coefficients for continuity in employment over childbirth and for returning to work within 9 months to a different employer as when pregnant indicates that policy should encourage a return to the pre-childbirth employer after childbirth.

The results found in this chapter suggest a high prevalence of part time work in the early maternal years for some of those mothers who were not likely to have had continuity in employment in 1991 but do so in 2000. Given that part time jobs are situated in low skill level occupational groups (Blackwell, 2001; Dex and Bukodi, 2010; Connolly and Gregory, 2008; Manning and Petrongolo, 2008; Hakim, 1998; Stewart and Greenhalgh, 1984), where mothers have limited access to career development, human capital development and promotion opportunities (Russo and Hassink, 2005), any re-entry via part time employment will decrease the effectiveness of maternity leave policy in maintaining a mother's human capital development and career progression in the early maternal years and therefore in encouraging increased gender equality and labour market efficiency. Furthermore, if poor quality part time jobs result in low levels of labour market attachment the positive implications of maternity leave policy on the employment rate may be diminished. Additionally, if part time jobs are situated in low skill level occupational

groups then it is likely that there will be an inefficient under-utilisation of the skills of those who resume employment via part time work. The analysis carried out in the subsequent chapter aims to provide a greater understanding of this issue by analysing the subsequent career implications associated with the movement into part time employment over childbirth.

The results also suggest that mothers who have discontinuous employment histories over the childbirth period are likely to move into part time work rather than full time work when they rejoin the labour market. This implies that mothers with lower labour market attachment will be disadvantaged in the early maternal years if part time jobs offer fewer human capital development, career progression and promotion opportunities as compared to full time jobs. These results suggest that the nature of and occupational classification of part time jobs needs to be reformed so that mothers with lower labour market attachment and strong preferences for providing childcare themselves are not at disadvantaged in the labour market throughout the early maternal years.

2.10 Concluding remarks

The results presented in this chapter contribute to the growing literature on mothers' labour force participation which has highlighted the positive implications of maternity policy in helping mothers make easier work life balance decisions throughout the early years of their child's life (Waldfogel et al, 1999; Gregg et al, 2007; and Berger and Waldfogel, 2004). The results provide evidence that being able to return to the same job at the end of the maternity leave period succeeds in relaxing constraints on mothers' work life balance decisions throughout the early maternal years, and therefore increases the probability that a mother will be in full time and part time employment. The results show that this effect will last for at least the first 12 years after childbirth. This effect decreases for the first 5 years after childbirth, but remains fairly constant between 5 and 10 years after childbirth. The

impact of being in employment in the previous period, or having continuous employment over childbirth, additionally remains large once the endogeneity in the lagged dependent variable has been accounted for. The effect of continuity in employment around childbirth appears to be of particular importance to British mothers who suffer low labour market attachment as a result of childbirth; the results from the dynamic employment model indicate that a mother whose youngest child is 1-2 years old has an employment probability which is 51 percentage points lower than that of a mother whose youngest child is 13-18 years old.

The impact of continuity in employment over childbirth remains large despite the increased proportion of mothers having continuity in employment over the childbirth period in 2000. This supports recent revisions to increase the accessibility of maternity leave; the results suggest that resuming employment in the same job at the end of the maternity leave period will relax constraints on the mothers' work life balance decision throughout the early maternal years for a wide heterogeneous cross section of mothers. This study contributes to the literature by illustrating that being able to remain with the same employer at the end of the maternity leave period appears to relax constraints on the mothers' work life balance decision throughout the early years of their child's life to a much greater extent than does being able to resume employment in any job at the end of the maternity leave period.

The results imply that those mothers who had broken employment careers over childbirth are most likely to enter employment in the first 5 years after childbirth via part time work. Furthermore, even though non-graduates were much more likely to have continuity in employment over childbirth in 2000 than in 1991, these mothers have a strong tendency to work part time in the early maternal years. Current research illustrates that there is a part time pay penalty, and that the transition from full to part time employment is associated with occupational downgrading, (Manning and Pentrongolo, 2008; Dex and Bukodi, 2010; Connolly

and Gregory, 2009 and Connolly and Gregory, 2008). This indicates that those mothers who had discontinuous employment careers over childbirth, and non-graduate mothers who did have continuity in employment over childbirth, are more likely to experience occupational downgrading and pay penalties throughout their careers subsequent to childbirth. As a consequence the next chapter in this thesis will examine the wage implications associated with the transition to part time employment over childbirth. This analysis will provide a greater understanding of the inequalities in labour market outcomes which are synonymous part time employment, and transitions into part time employment.

Table 2.1 Mean scores of variables in the MCS data

	Mean Scores			
	Child 3 years		Child 5 years	
	Employed	Not Employed	Employed	Not Employed
Employment over the childbirth period				
Continuous employment over childbirth	0.67	0.41	0.61	0.20
Continuous employment-graduate	0.25	0.17	0.27	0.08
Continuous employment- non graduate	0.36	0.24	0.34	0.12
Continuous employment- one child	0.27	0.23	0.28	0.11
Continuous employment- 2 or more children	0.34	0.18	0.33	0.09
Worked nine months after the birth but for a different employer	0.11	0.13	0.10	0.06
Human capital characteristics				
Age	33.07	32.63	35.28	33.05
Degree	0.37	0.32	0.39	0.32
A level	0.12	0.12	0.12	0.09
O level	0.43	0.45	0.42	0.48
Predicted hourly wage*	10.21	9.34	10.11	9.88
Economics circumstances				
In social housing	0.08	0.11	0.08	0.24
Live with parents	0.01	0.01	0.01	0.01
Weekly income from partner*	573.75	667.67	617.92	675.05
Maternity pay plus additional pay	0.44	0.32	0.41	0.15
Maternity pay	0.30	0.33	0.28	0.16
Household demographics				
Married or cohabiting	0.78	0.78	0.87	0.75
Number of children in household	0.96	1.13	1.16	1.68
Mother lives within an hours journey away	0.58	0.59	0.68	0.63
Attitudes				
Agree that child suffers if mother works	0.11	0.24	0.54	0.27
Religious	0.45	0.48	0.52	0.49
Structural characteristics				
Average number reporting to have ever used formal childcare	0.48	0.43	0.48	0.30
Observations	4274	4701	5055	4033

* Real values, given at 2006 prices

Table 2.2 Mean scores of variables in the BHPS data

	Mean Scores	
	Employed	Not Employed
Employment over the childbirth period		
Employed in the previous period	0.87	0.12
Years since childbirth		
Youngest child born within previous year	0.03	0.15
Youngest child 1-2 years old	0.10	0.21
Youngest child 3-4 years old	0.09	0.15
Youngest child 5-12 years old	0.38	0.32
Youngest child 13-18 years old	0.27	0.15
Human capital characteristics		
Age	31.05	31.28
Degree	0.42	0.26
A level	0.10	0.11
O level	0.33	0.37
Predicted hourly wage *	9.09	8.61
Economics circumstances		
Do not own home	0.18	0.41
Yearly household income*	27560.94	29460.80
Household demographics		
Married or cohabiting	0.82	0.76
Number of children in household	1.84	2.22
Number of working age adults in household	2.30	2.14
Attitudes		
Agree child suffers if mother works	0.25	0.40
Structural characteristics		
Regional rate of unemployment	0.02	0.03
Observations	4152	3121

* Real values, given at 2006 prices.

Table 2.3 Estimated marginal effects from multinomial logit models

	Child 3 years		Child 5 years	
	Full time	**Part time**	**Full time**	**Part time**
Continuous employment over childbirth period	0.204*** (0.128)	0.177*** (0.088)	0.178*** (0.112)	0.141*** (0.085)
Worked nine months after the birth for a different employer	0.143*** (0.154)	0.157*** (0.106)	0.101*** (0.141)	0.102*** (0.106)
Age	0.021** (0.103)	0.008 (0.080)	0.000 (0.001)	0.061*** (0.001)
Age-squared	-0.002** (0.001)	-0.010 (0.001)	-0.002 (0.409)	-0.007*** (0.332)
Degree	0.034 (0.415)	0.044 (0.320)	-0.015 (0.042)	0.139** (0.063)
A level	0.037 (0.279)	0.064 (0.205)	-0.021 (0.250)	0.083* (0.200)
O level	0.031* (0.177)	0.079*** (0.110)	0.002 (0.133)	0.106*** (0.099)
Log of weekly income from partner	-0.005*** (0.000)	-0.004 (0.000)	-0.008*** (0.000)	-0.003 (0.000)
Maternity pay plus additional pay	0.009 (0.127)	0.031 (0.096)	0.010 (0.115)	0.046** (0.093
Maternity pay	0.001 (0.127)	0.044** (0.092)	-0.013 (0.115)	0.056*** (0.086)
In social housing	-0.051*** (0.163)	-0.058*** (0.099)	-0.065*** (0.148)	-0.042* (0.098)
Live with parents	0.019 (0.379)	0.047 (0.305)	-0.007 (0.395)	0.010 (0.336)
Married or cohabiting	0.009 (0.136)	0.063*** (0.085)	0.010 (0.162)	0.125*** (0.088)
Number of children in household	-0.039*** (0.064)	-0.046*** (0.043)	-0.044*** (0.061)	-0.053*** (0.043)
Predicted log hourly wage	0.110* (0.654)	-0.049 (0.521)	0.180** (0.688)	-0.178* (0.556)
Live within an hours journey of mother	-0.001 (0.082)	0.037*** (0.064)	0.005 (0.081)	0.047*** (0.064)
Agree that child suffers if mother works	-0.089*** (0.132)	-0.136*** (0.079)	-0.082*** (0.110)	-0.071*** (0.072)
Religious	-0.012 (0.0799)	-0.001 (0.062)	-0.022** (0.075)	0.006 (0.060)
Regional proportion of people ever used childcare	-0.270*** (0.444)	0.165** (0.322)	-0.225*** (0.380)	0.257*** (0.279)
Observations	8769	8769	8873	8873
P Value Small-Hsiao Test- full time as omitted category	0.532		0.404	
P Value Small-Hsiao Test- part time as omitted category	0.478		0.005	

* Significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors in parentheses.

Notes:

1. The results in the table are the marginal effects from estimating equation (2.2) using the MCS data, specification A.1.
2. Standard errors are robust and correct for intra-individual correlation.

Table 2.4 Estimated marginal effects from multinomial logit models.

	Child 3 years old		Child 5 years old	
	Full time	**Part time**	**Full time**	**Part time**
Specification A.2				
Continuous employment- graduate	0.244***	0.050	0.179***	0.024
	(0.175)	(0.133)	(0.148)	(0.114)
Continuous employment- non graduate	0.141***	0.186***	0.118***	0.138***
	(0.159)	(0.10)	(0.129)	(0.091)
Observations	8769	8769	8873	8873
Specification A.3				
Continuous employment- one child	0.209***	0.018	0.073***	0.053**
	(0.139)	(0.103)	(0.116)	(0.094)
Continuous employment- 2 or more children	0.274***	0.141***	0.188***	0.138***
	(0.146)	(0.105)	(0.121)	(0.095)
Observations	8769	8769	8873	8873

* Significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors in parentheses.

Notes:

1. The results in the table are the marginal effects from estimating equation (2.2) using the MCS data. All explanatory variables included in table 2.3 have additionally been included in these regressions.
2. Standard errors are robust and correct for intra-individual correlation.

Table 2.5 Estimated regression coefficients from the dynamic employment linear probability models

	OLS	Fixed effects	GMM-differences	GMM-system
Lag of employment	0.485***	0.175***	0.188***	0.205***
	(0.016)	(0.016)	(0.031)	(0.036)
Child born within previous	-0.597***	-0.878***	-0.837***	-0.847***
12 months	(0.052)	(0.069)	(0.200)	(0.253)
Youngest child 1-2 years	-0.149***	-0.253***	-0.444***	-0.506**
old	(0.046)	(0.054)	(0.140)	(0.206)
Youngest child 3-4 years	-0.063	-0.033	-0.195	-0.345*
old	(0.044)	(0.050)	(0.130)	(0.208)
Youngest child 5-12 years	0.105**	0.283***	-0.058	-0.111
old	(0.043)	(0.049)	(0.128)	(0.201)
Age	-0.045***	-0.133***	-0.026	0.065
	(0.010)	(0.019)	(0.049)	(0.083)
Age-squared	0.004***	0.001***	0.001	-0.001
	(0.000)	(0.002)	(0.005)	(0.001)
Degree	0.167***	0.519***	0.304*	0.633
	(0.032)	(0.089)	(0.166)	(0.565)
A level	0.098***	0.344***	0.205	0.261
	(0.029)	(0.086)	(0.143)	(0.590)
O level	-0.010	-0.072	0.0106	-0.105
	(0.024)	(0.083)	(0.130)	(0.483)
Log of yearly household	-0.040***	-0.024**	-0.008	-0.105
income	(0.008)	(0.009)	(0.010)	(0.082)
Do not own home	-0.074***	-0.031	-0.003	0.050
	(0.015)	(0.027)	(0.033)	(0.283)
Married or cohabiting	0.050**	0.036	0.018	0.014
	(0.020)	(0.026)	(0.031)	(0.265)
Number of children in	0.080***	0.182***	0.077	0.156
household	(0.010)	(0.025)	(0.089)	(0.115)
Number of working age	0.020*	0.028**	0.038*	0.013
adults in household	(0.011)	(0.014)	(0.020)	(0.157)
Predicted log hourly wage	0.711***	1.793***	1.199***	0.767**
	(0.057)	(0.127)	(0.299)	(0.347)
Agree child suffers if mother	-0.105***	-0.059***	-0.026	-0.298*
works	(0.013)	(0.018)	(0.020)	(0.154)
Regional rate of	-0.005***	-0.123	0.082	-0.032
unemployment	(0.080)	(0.018)	(0.084)	(0.013)
Individuals		780	764	790
Observations	6681	6681	6186	6681
Hansen J Statistic test (p value)			0.097	0.260
AR1			0.000	0.000
AR2			0.134	0.497

* Significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors in parentheses.

Notes:

1. The results in the table show the regression coefficients from estimating equation (2.3) using the BHPS data
2. Standard errors are robust and correct for intra-individual correlation.

Table 2.6 Estimated regression coefficients from the dynamic employment nonlinear models

	Pooled probit	Random effects probit	Random effects dynamic probit
Lag of employment	1.570***	1.328***	1.294***
	(0.040)	(0.053)	(0.088)
Child born within previous 12 months	-1.896***	-2.731***	-2.279***
	(0.245)	(0.351)	(0.476)
Youngest child 1-2 years old	-0.396*	-0.763**	-0.811**
	(0.233)	(0.309)	(0.369)
Youngest child 3-4 years old	-0.174	-0.258	-0.289
	(0.231)	(0.299)	(0.341)
Youngest child 5-12 years old	0.316	0.541*	0.446
	(0.229)	(0.297)	(0.337)
Age	-0.082**	-0.310***	-0.211*
	(0.036)	(0.069)	(0.114)
Age-squared	0.001	0.004***	0.002*
	(0.000)	(0.001)	(0.001)
Degree	0.251**	1.169***	0.646
	(0.105)	(0.299)	(0.435)
A level	0.122	0.848***	0.528
	(0.093)	(0.306)	(0.432)
O level	0.075	-0.261	-0.023
	(0.074)	(0.275)	(0.376)
Log of yearly household income	-0.166***	-0.094**	0.066
	(0.029)	(0.042)	(0.073)
Do not own home	-0.290***	-0.109	-0.178
	(0.050)	(0.099)	(0.166)
Married or cohabiting	0.241***	0.190*	0.233
	(0.068)	(0.102)	(0.157)
Number of children in household	0.136***	0.363***	0.398**
	(0.034)	(0.094)	(0.168)
Number of working age adults in household	0.084**	0.116*	-0.003
	(0.042)	(0.060)	(0.081)
Predicted log hourly wage	1.784***	3.957***	2.925***
	(0.204)	(0.451)	(0.800)
Agree child suffers if mother works	-0.432***	-0.299***	-0.088
	(0.043)	(0.072)	(0.114)
Regional rate of unemployment	-0.006**	-0.030	0.007
	(0.063)	(0.071)	(0.053)
Individuals		790	
Observations	6907	6907	7399

* Significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors in parentheses.

Notes:

1. The results in the table show regression coefficients from estimating equation (2.6) using the BHPS data.
2. The random effects probit and random effects dynamic probit additionally include the time-means of all covariates as explanatory variables.
3. Standard errors in the pooled cross sectional probit are robust and correct for intra-individual correlation.

Table 2.7 Estimated marginal effects from the dynamic nonlinear models.

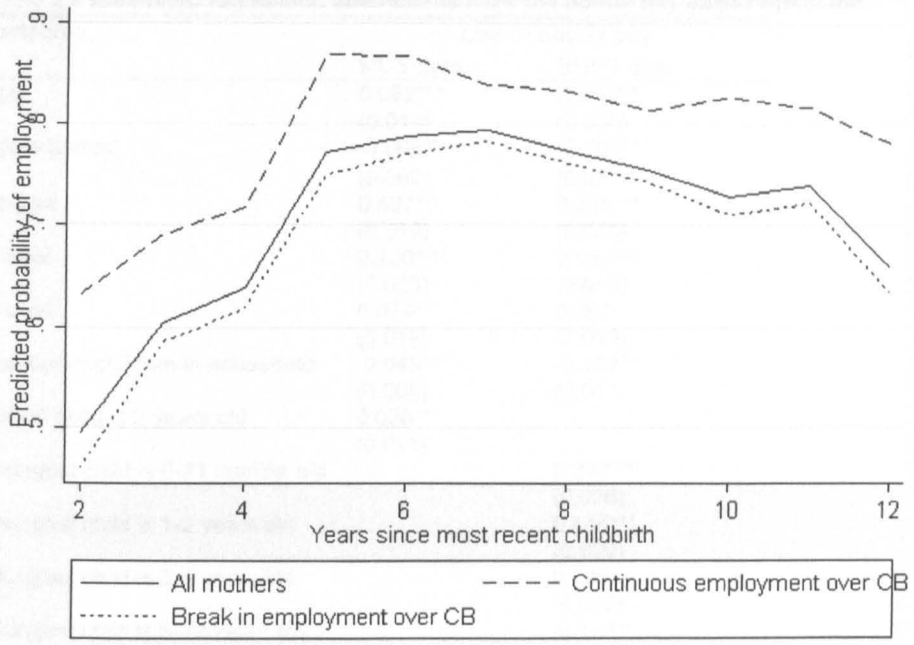
	Pooled probit	Random effects probit
Lag of employment	0.563***	0.417***
	(0.012)	(0.018)
Child born within previous 12 months	-0.622***	-0.754***
	(0.048)	(0.036)
Youngest child 1-2 years old	-0.155*	-0.294**
	(0.091)	(0.116)
Youngest child 3-4 years old	-0.068	-0.100
	(0.091)	(0.117)
Youngest child 5-12 years old	0.120	0.198*
	(0.085)	(0.102)
Age	-0.032**	-0.118***
	(0.014)	(0.026)
Age-squared	0.000	0.001***
	(0.000)	(0.000)
Degree	0.098**	0.433***
	(0.041)	(0.101)
A level	0.048	0.328***
	(0.037)	(0.111)
O level	0.029	-0.100
	(0.028)	(0.106)
Log of yearly household income	-0.065***	-0.036**
	(0.011)	(0.016)
Do not own home	-0.114***	-0.042
	(0.020)	(0.038)
Married or cohabiting	0.095***	0.074*
	(0.027)	(0.040)
Number of children in household	0.053***	0.138***
	(0.013)	(0.036)
Number of working age adults in household	0.033**	0.044*
	(0.016)	(0.023)
Predicted log hourly wage	0.692***	0.510***
	(0.079)	(0.171)
Agree child suffers if mother works	-0.169***	-0.116***
	(0.017)	(0.028)
Regional rate of unemployment	-0.004**	-0.008
	(0.025)	(0.016)
Individuals		790
Observations	6907	6907

* Significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors in parentheses.

Notes:

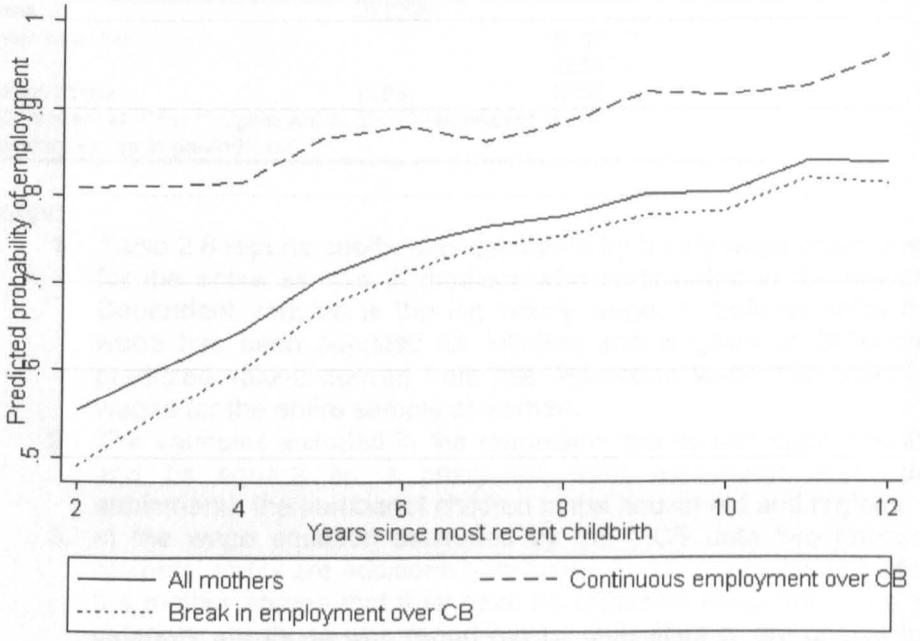
1. The results in the table are the marginal effects from estimating equation (2.6) using the BHPS data.
2. The random effects probit and random effects dynamic probit additionally include the time-means of all covariates as explanatory variables.
3. Standard errors in the pooled cross sectional probit are robust and correct for intra-individual correlation.

Figure 2.1 Yearly averages of predicted probabilities of employment from the GMM-system estimation of the dynamic linear probability model.



Source: BHPS 1991-2005.

Figure 2.2 Yearly averages of predicted probabilities of employment from the random effects probit estimation of the dynamic nonlinear probability model .



Source: BHPS 1991-2005.

Appendix 2a

Table 2.8 Estimated regression coefficients from the hourly log wage regression.

Variables	Log of hourly pay	
	MCS data	BHPS data
Age	0.082***	0.094***
	(0.013)	(0.010)
Age-squared	-0.008**	-0.009**
	(0.002)	(0.001)
Degree	0.527***	0.329***
	(0.019)	(0.039)
A level	0.250***	0.188***
	(0.023)	(0.043)
O level	0.074**	0.061
	(0.019)	(0.039)
Number of children in household	-0.045***	-0.122**
	(0.006)	(0.011)
Cohort child is 3 years old	0.026**	
	(0.011)	
Youngest child is 0-11 months old		0.347***
		(0.036)
Youngest child is 1-2 years old		0.115***
		(0.029)
Youngest child is 3-4 years old		0.006
		(0.032)
Youngest child is 5-12 years old		-0.148**
		(0.030)
Non-white		0.038
		(0.021)
Can easily work out change when paying for things	0.094**	
	(0.045)	
Has no problems filling out forms	0.096*	
	(0.039)	
Union member		0.201***
		(0.017)
Observations	9088	3896

* Significant at 10%; ** significant at 5%; *** significant at 1%.
Standard errors in parentheses.

Notes:

1. Table 2.8 reports coefficients estimated by hourly wage equations (in logs) for the entire sample of mothers who participated in the labour market. Dependent variable is the log hourly wage, in both samples the hourly wage has been adjusted for inflation and is given at 2006 prices The predicted values derived from this regression were then used to predict wages for the entire sample of women.
2. The variables included in the regression are human capital controls (age and its square as a proxy for work experience and educational attainment), the number of children in the household and regional controls.
3. In the wage equation estimated by the MCS data two proxies for the mothers' ability are additionally included. The first variable reflects whether the mother agrees that they have no problems filling out forms, the base category are those who report having difficulties or are unable to do this. The second proxy for ability indicates whether a mother can easily work out if they have the correct change in a shop, again the base category is those mothers who have difficulty or are unable to do this. I do not expect these variables to be very good indicators of ability as only 2.6 percent report having problems or are unable to work out change and only 4 percent report having difficulties or being unable to fill out forms.
4. The educational variables estimate the impact of having each qualification as the highest educational attainment relative to having no qualifications.

In the BHPS analysis having a youngest child in any of the categories displayed in table 2.8 is assessed relative to the having a youngest child who is between 13-18 years old.

5. A full set of regional controls has been included in both regressions.
6. All standard errors are robust and correct for intra-individual correlation.

Appendix 2b

Table 2.9 Marginal effects from various validity tests on the multinomial logit models.

	Continuous employment over the childbirth period, effect at 3 years after childbirth.		Continuous employment over the childbirth period, effect at 5 years after childbirth.	
	Probability of working full time	Probability of working part time	Probability of working full time	Probability of working part time
Using all mothers in the sample	0.204***	0.177***	0.178***	0.141***
	(0.128)	(0.088)	(0.112)	(0.085)
Observations	8769	8769	8873	8873
Using mothers who were	0.216***	0.148***	0.160***	0.119***
employed when pregnant	(0.146)	(0.091)	(0.120)	(0.088)
Observations	5312	5312	5762	5762
Multinomial probit models	0.214***	0.182***	0.181***	0.133***
	(0.087)	(0.071)	(0.080)	(0.068)
Observations	8769	8769	8873	8873

* Significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors in parentheses

Notes:

1. The results in the table show the marginal effects from various estimations of equation (2.2) using the MCS data. Specification A.1 is used.
2. The first row replicates the results displayed in table 2.3. The second row uses a sample of women who were employed before childbirth.
3. The final row shows estimated coefficients from estimating equation (2.2) using the multinomial probit model, which relaxes the IIA assumption.
4. All standard errors are robust and correct for intra-individual correlation.

Appendix 2c

Table 2.10 Estimated regression coefficients from the dynamic linear probability models using a larger sample of mothers.

	OLS	Fixed Effects	GMM-Differences	GMM-system
Lag of employed	0.599***	0.251***	0.185***	0.189***
	(0.010)	(0.012)	(0.023)	(0.032)
Child born within previous 4 months	-0.447***	-0.463***	-0.496***	-0.778***
	(0.021)	(0.032)	(0.161)	(0.280)
Youngest child 1-2 years old	-0.101***	-0.144***	-0.479***	-0.645***
	(0.014)	(0.022)	(0.161)	(0.194)
Youngest child 3-4 years old	-0.099***	-0.087***	-0.258	-0.382*
	(0.012)	(0.018)	(0.163)	(0.196)
Youngest child 5-12 years old	-0.029***	0.002	-0.166	-0.145
	(0.008)	(0.011)	(0.130)	(0.161)
Age	0.017***	0.035***	0.082**	0.174
	(0.004)	(0.009)	(0.032)	(0.109)
Age-squared	-0.002***	-0.003***	-0.001**	-0.002*
	(0.005)	(0.001)	(0.004)	(0.001)
Degree	0.039**	0.159***	0.069	-0.254
	(0.015)	(0.048)	(0.082)	(0.661)
A level	0.013	0.100**	0.051	-0.081
	(0.014)	(0.045)	(0.063)	(0.675)
O level	0.008	-0.053	0.060	-0.046
	(0.011)	(0.043)	(0.062)	(0.592)
Log of yearly household income	-0.023***	-0.012**	-0.003	-0.044
	(0.004)	(0.006)	(0.007)	(0.070)
Do not own home	-0.070***	-0.045**	-0.023	0.123
	(0.009)	(0.018)	(0.025)	(0.254)
Married or cohabiting	0.060***	0.050***	0.044**	0.030
	(0.010)	(0.0176)	(0.022)	(0.270)
Number of children in household	-0.003	-0.0265*	-0.061	0.193
	(0.004)	(0.0148)	(0.064)	(0.166)
Number of working age adults in household	0.003	-0.00243	0.003	-0.030
	(0.005)	(0.00599)	(0.008)	(0.115)
Predicted log hourly wage	0.205***	0.427***	0.067	0.058
	(0.023)	(0.0490)	(0.117)	(0.148)
Agree child suffers if mother works	-0.068***	-0.0322***	-0.018*	-0.090
	(0.007)	(0.00987)	(0.011)	(0.146)
Regional rate of unemployment	-0.007*	0.011	0.034	-0.025
	(0.087)	(0.026)	(0.022)	(0.049)
Individuals		2027	1991	2018
Observations	16250	16250	14222	16250
Hansen J statistic test (p value)			0.422	0.558
AR1			0.000	0.000
AR2			0.885	0.079

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

Notes:

1. The results presented in table 2.10 show estimated coefficients of equation (2.3), using the BHPS. Equation (2.3) is estimated using OLS, fixed effects, GMM-differences and GMM-system methods.
2. The results in table 2.10 have been estimated using all mothers in the BHPS, not just those observed before the most recent childbirth.
3. All standard errors are robust and correct for intra-individual correlation.

Table 2.11 Estimated regression coefficients from the dynamic non linear probability models using a larger sample of mothers.

	Pooled probit	Random effects probit	Random effects dynamic probit
Lag of employed	1.585***	1.369***	1.310***
	(0.038)	(0.037)	(0.055)
Chlid born within previous 4 months	-1.967***	-2.766***	-2.385***
	(0.093)	(0.154)	(0.252)
Youngest child 1-2 years old	-0.526***	-0.948***	-0.935***
	(0.070)	(0.111)	(0.174)
Youngest child 3-4 years old	-0.484***	-0.649***	-0.566***
	(0.063)	(0.097)	(0.146)
Youngest child 5-12 years old	-0.152***	-0.131**	-0.056
	(0.044)	(0.065)	(0.089)
Age	0.078***	0.072**	0.115**
	(0.018)	(0.034)	(0.048)
Age-squared	-0.001***	-0.001	-0.001*
	(0.000)	(0.000)	(0.001)
Degree	0.248***	1.242***	-0.904***
	(0.078)	(0.212)	(0.286)
A level	0.092	0.625***	-0.479*
	(0.063)	(0.189)	(0.247)
O level	0.009	-0.362**	-0.170
	(0.049)	(0.168)	(0.218)
Log of yearly household income	-0.122***	-0.052*	0.067
	(0.023)	(0.029)	(0.043)
Do not own home	-0.309***	-0.156**	-0.180
	(0.038)	(0.077)	(0.115)
Married or cohabiting	0.303***	0.200***	0.146
	(0.048)	(0.074)	(0.105)
Number of children in household	-0.023	0.030	0.101
	(0.017)	(0.061)	(0.106)
Number of working age adults in household	0.0169	0.007	-0.069
	(0.023)	(0.0329)	(0.042)
Predicted log hourly wage	1.098***	2.902***	2.675***
	(0.117)	(0.273)	(0.392)
Agree child suffers if mother works	-0.334***	-0.173***	-0.108*
	(0.030)	(0.048)	(0.065)
Regional rate of unemployment	-0.003	-0.004	0.002
	(0.019)	(0.038)	(0.057)
Individuals		2025	
Observations	16253	16253	16207

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

Notes:

1. The results presented in table 2.11 show estimated coefficients of equation (2.6), using the BHPS. Equation (2.6) is estimated using cross sectional pooled probit, random effects probit, and random effects dynamic probit methods.
2. The random effects probit and random effects dynamic probit additionally include the time-means of all covariates as explanatory variables.
3. The standard errors in the cross sectional pooled probit model are robust and correct for intra-individual correlation.

Appendix 2d

The Small-Hsiao Test

The Small-Hsiao (1985) test statistic for the IIA assumption takes the form,

$$\Delta = -2\left[L_1^B\left(\hat{\theta}_0^{AB}\right) - L_1^B(\hat{\theta}_1^B)\right]$$

Where

$$\theta_0^{AB} = (1/\sqrt{2})\hat{\theta}_0^A + \left[1-(1/\sqrt{2})\right]\hat{\theta}_0^B$$

The Small Hsiao test is based on splitting the sample into 2 halves; A and B refer to two different random samples. $\hat{\vartheta}^{AB}$ is the weighted average of the coefficients from the two samples, $\hat{\theta}_1^B$ refers to the estimates from a restricted sub-sample of B, which is comprised of all those without a given value of the dependent variable, these estimates are derived using the likelihood function L_1^B.

The Small-Hsiao test tests the null hypothesis that the probability of one event occurring relative to another event is independent of the existence of a third event. The test statistic has a chi-squared distribution; the null hypothesis is rejected if the computed test statistic is greater than the critical value. The critical value is given by the chi-squared distribution and is dependent on the chosen level of significance and degrees of freedom.

Appendix 2e

Bias in OLS and fixed effects estimations of the dynamic panel model

The dynamic panel model takes the format

$$y_{it} = y_{it-1}\beta_1 + \eta_i + u_{it} \tag{2.14}$$

Estimation by OLS

From equation (2.14) it must be the case that

$$E(y_{it-1}\eta_i) > 0$$

Since,

$$y_{it-1} = y_{it-2}\beta_1 + \eta_i + u_{it-1}$$

Substituting for y_{it-2} gives,

$$y_{it-1} = (y_{it-3}\beta_1 + \eta_i + u_{it-2})\beta_1 + \eta_i + u_{it-1}$$

By continuously substituting for y_{it-x} we arrive at the following equation

$$y_{it-1} = \eta_i\left(\sum_{j=0}^{\infty}\beta_1^{\,j}\right) + \varepsilon_{it}$$

Therefore,

$$y_{it-1} = \frac{\eta_i}{1-\beta} + \varepsilon_{it}$$

Since $0<\beta<1$ the bias in β_1 in equation (2.14) when estimated by OLS will be positive.

Estimation by fixed effects

The covariance estimator for β_1 is given by,

$$\hat{\beta}_1 = \beta_1 + \frac{\sum_{i=1}^{N}\sum_{t=1}^{T}(y_{it-1} - \bar{y}_{it-1})(u_{it} - \bar{u}_i)\Big/NT}{\sum_{i=1}^{N}\sum_{t=1}^{T}(y_{it-1} - \bar{y}_{it-1})^2\Big/NT} \tag{2.15}$$

The estimator for β_1 is consistent if the numerator of the second term in equation (2.15) converges to zero. By continuous substitution,

$$y_{it} = u_{it} + \beta_1 u_{it-1} + \ldots + \beta_1^{t-1} u_{i1} + \frac{1-\beta_1^t}{1-\beta_1}\eta_i + \beta_1^t y_{i0}$$

Summing y_{it-1} over t gives

$$\sum_{t=1}^{T} y_{i,t-1} = \frac{1-\beta^T}{1-\beta} y_{i0} + \frac{(T-1)-T\beta_1+\beta_1^T}{(1-\beta_1)^2}\eta_i + \frac{1-\beta_1^{T-1}}{1-\beta_1} u_{i1} + \frac{1-\beta_1^{T-2}}{1-\beta_1} u_{i2} + \ldots + u_{iT-1}$$

When N tends to infinity

$$\underset{N\to\infty}{p\lim} \frac{1}{NT} \sum_{i=1}^{N}\sum_{t=1}^{T} (y_{it-1} - \bar{y}_{it-1})(u_{it} - \bar{u}_i)$$

$$= - \underset{N\to\infty}{p\lim} \frac{1}{N} \sum_{i=1}^{N} \bar{y}_{it-1}\bar{u}_i$$

$$= -\frac{\sigma_u^2}{T^2} \cdot \frac{(T-1)-T\beta_1+\beta_1^T}{(1-\beta_1)^2}$$

By similar manipulations the denominator of equation (2.15) becomes

$$\frac{\sigma_u^2}{1-\beta_1^2}\left\{1 - \frac{1}{T} - \frac{2\beta_1}{(1-\beta_1)^2} \cdot \frac{(T-1)-T\beta_1+\beta_1^T}{T^2}\right\}$$

If T is fixed then equation (2.15) will be an inconsistent estimator of β_1. The asymptotic bias of β_1 is given by,

$$\underset{N\to\infty}{p\lim}(\hat{\beta}_1 - \beta_1) = -\frac{1+\beta_1}{T-1}\left(1 - \frac{1}{T}\frac{1-\beta_1^T}{1-\beta_1}\right)\left\{1 - \frac{2\beta_1}{(1-\beta_1)(T-1)}\left[1 - \frac{1-\beta_1^T}{T(1-\beta_1)}\right]\right\}^{-1}$$

This bias in β_1 is caused by having to eliminate the unobserved individual effect (η_i) from each observation, this creates a correlation of order $(1/T)$ between the explanatory variables and the residuals in the differenced model. Because $\beta_1 > 0$ the bias will always be negative for small T, (Hsiao, 2003).

Appendix 2f

Table 2.12 Estimated regression coefficients from the reduced form equation for the probability of initial state employment.

	Probability of employment in initial state Probit
Child born within previous 12 months	-29.13
	(664.0)
Youngest child 1-2 years old	-27.55
	(664.0)
Youngest child 3-4 years old	-27.79
	(664.0)
Youngest child 5-12 years old	-25.71
	(664.0)
Age	-1.050
	(0.691)
Age-squared	0.016
	(0.011)
Degree	-0.568
	(1.259)
A level	-1.701
	(1.312)
O level	-0.147
	(1.053)
Log of yearly household income	-0.484**
	(0.238)
Do not own home	0.373
	(0.520)
Married or cohabiting	1.248**
	(0.568)
Number of children in household	0.516
	(0.674)
Number of working age adults in household	-0.219
	(0.350)
Predicted log hourly wage	3.008
	(2.291)
Agree child suffers if mother works	0.631
	(0.422)
Regional rate of unemployment	-22.57
	(53.89)
Resp. mother further education or degree	0.965**
	(0.393)
Resp. mother manager or professional	0.378
	(0.390)
Observations	7399

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

Notes:

1. Table 2.12 shows the regression coefficients from the reduced form probit model predicting the probability of employment in the initial state (equation 2.10).
2. The results from this model are used to estimate the structural random effects dynamic probit model (equation 2.6). The regression presented in table 2.12 additionally includes the time-means of all variables as explanatory variables.
3. All standard errors are robust and correct for intra-individual correlation.

3 Maternal movements to part time employment: what is the penalty?

3.1 Summary

- 60 percent of employed mothers in Britain work part time; this usually involves a transition from full time employment around the time of the first childbirth.
- It has previously been shown that part time jobs are often situated in lower level occupational groups, and are typically associated with lower levels of human capital development and opportunities for future career promotion. Therefore, there is likely to be a negative wage effect associated with the movement from full to part time employment.
- Using the BHPS, this study investigates the wage impact of switching from full to part time employment. Furthermore, the motherhood pay penalty is analysed by the mothers' employment behaviour over their most recent childbirth. The analysis investigates how far factors such as transitions to part time employment over childbirth, or the length of the employment gap over childbirth can account for the motherhood pay penalty.
- The results show that moving from full to part time employment generates a pay penalty of 7 percent, simultaneously moving down the occupational scale increases this penalty to 15 percent.
- Mothers who moved from full to part time employment over their most recent childbirth receive large pay penalties, relative to childless women, for at least 10 years after the birth. However, those mothers who had a short break in employment over their most recent childbirth and remained in either full time or part time employment experience no significant pay penalty relative to their childless counterparts.

3.2 Introduction

The aim of this analysis is to investigate the wage loss associated with the transition from full to part time employment, and whether the hours of work choices made by new mothers can help provide a greater understanding of the motherhood pay penalty.

The institutional setting in the UK largely reflects the male-breadwinner gender arrangement; currently women are entitled to 52 weeks of maternity leave whereas paternity leave is available for just 2 weeks. The welfare state is additionally based on liberal principals. For instance, there is limited access to quality childcare in the UK; full time childcare fees for a 2 year old attending accredited early-years care and educational services are 24 percent of the average wage, whereas the OECD average is just 17 percent of the average wage (OECD, 2008). Furthermore, in the UK, traditional cultural ideals and social norms reflect the idea that a mother should remain at home in the early years of their child's life in order to provide care (Burchell et al, 1997). The factors outlined in this paragraph each act to intensify the work life balance decision of full time working mothers. As a result, part time employment is often entered by mothers in the UK, either so that mothers can spend time with their children and adhere to their traditional gender role, or in order to relax constraints on the mothers time allocation decision.

Currently 60 percent of employed mothers in Britain are working part time (ONS, 2008). Mothers' part time employment commonly occurs as an interruption to a full time employment career, and a movement from full time to part time employment often occurs around the timing of the first childbirth. Paull (2008) has shown that 43 percent of mothers in the UK, who worked full time before their first childbirth, over the period 1991-2004, moved from full time to part time employment over their first childbirth.

The focus on the negative wage effect of the transition from full time to part time employment is motivated by findings which have highlighted the poor quality of

part time jobs in the UK. Figure 3.1, alongside recent analysis (Manning and Petrongolo, 2008; and Connolly and Gregory, 2009) confirms the presence of a large wage penalty associated with female part time employment in the UK. This pay penalty has increased over recent decades, using the New Earnings Survey, Manning and Petrongolo (2008) show that in 1975 there was a 13 percent pay gap between full time and part time women, but by 2001 this was 25 percent. The part time pay penalty is likely to be a result of the segregation of part time jobs into low skill level occupational groups, (Manning and Petrongolo, 2008). Furthermore, a positive probability of occupational downgrading (moving to an occupation which is associated with a lower level of average education or average pay) on entry into part time employment has been identified (Dex and Bukdoi, 2010; and Connolly and Gregory, 2008). The negative wage and career implications of working in part time employment may be viewed as a cost associated with being able to make easier work life balance decisions; a compensating differential.

This chapter analyses whether there is a negative wage effect associated with relaxing constraints on the work life balance decision and moving from full time to part time employment. Additionally, this chapter extends the literature on the motherhood pay penalty by examining how far differences in employment behaviour over childbirth can account for the motherhood pay penalty. The mother's employment behaviour over the most recent childbirth is used to explain the existence of, and differences in, the motherhood pay penalty. This latter part of the analysis in this study will provide some understanding as to whether a pay penalty to becoming a mother exists independently of mothers' employment behaviour. Previous work (Connolly and Gregory, 2009) using the New Earnings Survey Panel Dataset, has found that moving from full time to part time employment reduces the wage by 7 percent. However, due to the usage of administrative data no demographic or household characteristics are included in these wage equations, which this chapter is able to do. Neuberger et al (2010) have additionally identified a

negative wage effect associated with a reduction in the hours of work after childbirth, however the current analysis assesses the impact of a wider range of employment behaviours over childbirth on the subsequent wage.

Given that only 9 percent of working men were in part time employment in 2008, compared to nearly a half of employed women (ONS, 2008), a negative wage effect generated by the movement to part time work will serve to increase gender inequalities in the labour market. The negative wage effect of moving to part time employment will have further implications for gender inequality in labour market outcomes, due to the high proportion of mother moving into part time employment over childbirth (Paull, 2008). Analysis of the wage penalty due to movement into part time employment additionally has implications for inefficient usage of labour. If the negative wage effect associated with moving to part time work is a result of occupational downgrading, then women in part time employment may be in occupations below their own skill level, suggesting an under-utilisation of human capital.

3.3 Background literature

The theory of segmented labour markets sets the background for the current analysis. Reich et al (1973) have suggested that different groups of workers appear to operate in different labour markets, where they receive different working conditions, wages, and promotional opportunities. In particular they recognise the difference between segmentation into primary and secondary job markets. Primary job markets develop stable careers and allow good opportunities for career development. However, jobs in secondary labour markets are subject to lower wages, less stable working conditions, and poorer access to career ladders. If part time jobs are segregated into secondary labour markets, then it is likely that the transition from full time to part time employment will go hand in hand with a loss of stable working conditions, or career opportunities, and a decrease in the wage.

The time allocation decision, (Becker, 1965) provides the appropriate theoretical background for analysis of mothers' hours of work choices. Women maximise their utility by allocating their time between hours of leisure and hours spent in the labour market; the time allocation decision is made in leisure/consumption space. Because for mothers leisure time means being able to spend time with their children then we may expect mothers to have greater preferences for leisure time relative to time spent in the labour market than their childless counterparts do. However, children increase the financial burden on families. These two factors will have opposite effects on the labour supply of mother. The discussion in chapter 1 indicates that the mother's time allocation decision is likely to be a constrained decision. Factors such as traditional ideas on a woman's role, and limited access to childcare are likely to decrease mothers' labour supply. However, the long hours culture, and pressure to have a fulfilling career, are likely to act to increase mothers' labour supply. Furthermore, the wage and career opportunities which are available to mothers throughout the entire hours of work distribution are likely to constrain mothers' hours of work choices.

The analysis in this chapter builds on two strands of literature; that concerning the negative wage and occupational effects of switching to part time employment and that concerned with the motherhood pay penalty.

Differences in work experience due to childbearing can explain the majority of the raw motherhood wage gap (Anderson et al, 2002). Similarly, continuity in employment (a gap of less than a year over childbirth) appears to be consistent with no significant wage penalty to motherhood (Lundberg and Rose, 2000 and Joshi et al, 1999). Davies and Pierre (2005) find that motherhood pay penalties in Britain are being driven by younger mothers (those who had their first childbirth before age 25), with older mothers experiencing no significant pay penalties. This latter result suggests that interrupting the career building process is damaging to future wages,

however interrupting a career which is already established appears to have an insignificant impact upon the wage.

For British women, the remaining unexplained hourly pay penalties to motherhood (after controlling for human capital, job, household and personal characteristics, and unobserved effects) have been estimated at around 9 percent to one child and 20 percent to two or more children (Waldfogel, 1998; Waldfogel, 1995; and Harkness and Waldfogel, 1999). The pay penalties to having children in Britain are larger than those found for a large number of other developed countries (Harkness and Waldfogel, 1999; and Davies and Pierre, 2005) and it has been argued that the larger penalties observed in the UK are a result of the liberal welfare state which emphasises individual freedom but acts to intensify work life balance decisions (Davies and Pierre, 2005). For instance, the child is seen as the responsibility of the family, and state provision of childcare allowing full time maternal employment is limited. Poor access to childcare places mothers at a disadvantage relative to those without care responsibilities, and forces behaviour which is likely to result in lower levels of pay.

Other explanations for the existence of the motherhood pay penalty include a compensating differential argument; that mothers exchange wages for mother-friendly working conditions and less intensive work life balance decisions (Gash, 2008). This theory can explain mothers' dominance in low paid sectors and in low paid part time flexible employment. Booth and Van Ours (2009) have found that British women in part time employment are more satisfied with their job in terms of hours worked than are full time women. Possibly suggesting that the transition into part time employment around childbirth is largely a result of mothers' preferences. However, the discussion in the previous paragraph, regarding the liberal welfare state in the UK, suggests that it may be the case that societal and institutional constraints force mothers into working in these low paid more flexible or less demanding jobs.

A large amount of previous literature has focused on the occupational segregation of female part time employment. Blackwell (2001) has found women switching from full time to part time work over childbirth are more likely to be in occupations where there is a higher proportion of the female than of the male workforce, and are more likely to experience occupational downgrading. Furthermore, Connolly and Gregory (2008) find that at least 14 percent of women who switch to part time work, and probably around 25 percent of these women will experience a movement to an occupation where there is a lower average level of education, whereas Dex and Budoki (2010) have found that around 50 percent of those moving from full to part time employment will move to an occupation where there is a lower level of average pay. This occupational downgrading substantially increases if there is movement between employers (Connolly and Gregory, 2008; Manning and Petrongolo, 2008 and Blackwell, 2001). Manning and Petrongolo (2008) find that employers are often unwilling to allow women to switch to part time hours. Furthermore, Blundell et al (2005) have shown little evidence of hours flexibility within jobs, suggesting that any occupational downgrading effects associated with moving to part time employment will typically be enhanced due to the increased probability of a job change. Furthermore, part time employment is more likely to be associated with poorer workplace characteristics, for example, part time jobs are more likely to be in workplaces which are not experiencing increasing market demand, offer fewer family friendly policies, and are less likely to have a formal equal opportunities policy (Mumford and Smith, 2009). These studies highlight the marginalisation and segmentation of part time employment in the UK, and suggest that part time employment will be particularly damaging to career and wage progression.

The part time switch is likely to act negatively upon the wage over and above the impact of current part time status via a loss of firm specific human capital and interruption of a good job match if this switch is accompanied by a job change

(Jovanovic, 1979), and via loss of career building, promotional and human capital development opportunities which occurs due to the occupational segregation of part time jobs in the UK (Russo and Hassink, 2005). A reduction in career building and human capital development opportunities will promote a scarring impact on wages (Chalmers and Hill, 2007; and Russo and Hassink, 2005). Connolly and Gregory (2009) find that switching to part time employment involves a pay penalty which is 7 percentage points lower than the average female wage and persists over time; any switch which is combined with a movement down the occupational scale generates even larger pay penalties. Neuburger et al (2010) show that relative to those who remained in full time employment over childbirth, those who reduced their hours of work receive a pay penalty of 10 percent at 3 years after childbirth, and of 14 percent at 5 years after childbirth. However, these wage effects disappear if the mother remained with the same employer over childbirth, indicating the positive career implications associated with being able to stay in the same job over the childbirth period.

The probability of switching to part time employment appears to be largely predicted by the timing of the first childbirth; 43 percent of women in the UK, observed over the period 1991-2004, who were in full time employment before the birth switched to part time employment after the first childbirth. However, at any full time employment observation 25 percent of mothers not having births and 15 percent of childless women will switch to part time employment (Paull, 2008). Furthermore, results presented in chapter 2 suggest that those with lower levels of human capital who remained continuously employment over childbirth, and those who had discontinuous employment over childbirth, will largely re-enter employment via part time work subsequent to childbirth. Therefore, the marginalisation of part time employment in the UK referred to in the previous paragraphs, is likely to hinder mothers' labour market opportunities in terms of career progression, relative to that of childless women's (Harkness and Waldfogel, 1999; and Ellingsæter, 1992). The

increased propensity for mothers to work part time means that current part time status and part time experience can explain a large portion of the motherhood wage penalty and gender inequality in the labour market; Davies et al (2000) and Waldfogel (1997) find that current part time status is the largest source of lost earnings for mothers. Waldfogel (1997) shows that years previously spent in part time work additionally have a significant impact on the motherhood wage penalty. Significant pay penalties to part time status and motherhood are independent, suggesting that working part time nearly doubles the negative wage effect of having one child (Waldfogel, 1995). The current chapter aims to extend this work by analysing the extent to which new mother's hours choices are driving motherhood pay penalties.

3.4 Methodology

The chapter will investigate the wage implications of transitions to part time employment using traditional Mincerian earnings functions. Equation (3.1) identifies the wage effect of moving to part time employment, the dependent variable is the log of gross real hourly pay (w_{it})

$$\ln w_{it} = CH_{it}\beta_1 + PT_{it}\beta_2 + SWITCH_{it}\beta_3 + DG_{it}\beta_4 + CONTROLS_{1it}\beta_5 + u_{it} \qquad (3.1)$$

CH_{it} is a vector of variables which indicates the presence of one or of two or more children; PT_{it} is a dummy variable indicating current part time status; $SWITCH_{it}$ records whether the individual has switched from full time to part time employment since the previous employment observation; DG_{it} indicates that there has been a movement down the occupational scale since the previous employment observation; $CONTROLS_{1it}$ is a vector of conditioning variables which include age and its square, ethnicity, region of residence, current public sector status, whether

there has been a change of employer, education, experience in full time and part time employment and job tenure.

Two further hypotheses concerning the wage impact of the transition from full to part time employment are investigated using equation (3.1). Firstly, the wage effect associated with the movement from full to part time employment is likely to be exaggerated by any time spent out of the labour market. Human capital depreciation is likely to increase the chances of entering a particularly poor quality part time job. As a result in one specification of equation (3.1) the $SWITCH_{it}$ variable is decomposed to indicate the separate effects of switching from full to part time employment with no career break, and of switching from full to part time employment over a career break. Secondly, if the movement from full to part time employment promotes a reduction in human capital and career development opportunities, then the wage effect of this transition is likely to have a scarring effect. Thus, the one year lag of the $SWITCH_{it}$ variable is included in a separate specification of equation (3.1).

The first part of the analysis in this chapter uses equation (3.1) in order to examine whether there is a negative wage effect associated with moving to part time employment (β_3<0). The second part of the analysis uses equation (3.2) to investigate whether the employment choices made by new mothers can provide some understanding of the motherhood pay penalty,

$$\ln w_{it} = (CH_{it} * CB_{it})\ \beta_1 + PT_{it}\beta_2 + SWITCH_{it}\beta_3 + DG_{it}\beta_4 + CONTROLS_{it}\beta_5 + u_{it} \quad (3.2)$$

CB_{it} is a vector of variables which indicates the characteristics of the mother's employment behaviour over the most recent childbirth. For instance, whether the mother remained in full time employment, remained in part time employment, or switched from full time to part time employment over the most recent childbirth. Interacting CB_{it} with CH_{it} therefore allows estimation of the

motherhood pay penalty by whether the mother has one or two or more children, and by their employment behaviour over the most recent childbirth. The rest of the variables included in (3.2) are as defined for equation (3.1). Henceforth, $\mathbf{x}_{it}$ will define the entire set of variables used in (3.1) and (3.2) for individual i at time t.

Equation (3.1) is firstly estimated using a pooled OLS log wage equation. However, in estimating (3.1) and (3.2) it is important to correct for selection bias, if selection into employment is positively correlated with the wage then estimates from (3.1) and (3.2) will suffer from selection bias. Thus, the Heckman (1979) two-stage procedure is utilised in which estimates from the probit model (3.3) are used to derive the inverse Mills ratio (3.4), which is then used as an additional regressor in (3.1) and (3.2);

$$y_{it} = 1\left[CONTROLS_{2it}\beta_6 + v_{it} > 0\right] \tag{3.3}$$

$$\lambda(\hat{y}_{it}) = \varphi(\hat{y}_{it}) \Big/ \Phi(\hat{y}_{it}) \tag{3.4}$$

Where y_{it} is the binary labour force participation indicator, $CONTROLS_{2it}$ includes all of the variables which are not dependent on employment in (3.1) and (3.2), as well as age of the youngest child and household income as predictors for labour force participation. β_6 are the coefficients on these variables, and v_{it} is the error term in the participation equation. w_{it} is only observed when $y_{it} = 1$, any correlation between w_{it} and y_{it} will generate selection bias. $\hat{y}_{it}$ is the predicted values of the dependent variable and $\lambda(\hat{y}_{it})$ is the inverse Mill's ratio; the normal density of the predicted values over their normal distribution. Again robust standard errors corrected for intra-individual correlation are computed.

Selection corrected OLS estimation of (3.1) and (3.2) will produce consistent estimates under the assumption of exogeneity, $E(u_{it}|\mathbf{x}_{it}) = 0$. However, there are two potential sources of endogeneity in equations (3.1) and (3.2). Firstly, exogeneity

will not hold if there are individual specific unobservable effects fixed over time which are correlated with the explanatory variables. In this case the error term becomes $u_{it} = a_{it} + \eta_i$. η_i is the individual specific variation which is fixed over time, if $E(\eta_i | \mathbf{x}_{it}) \neq 0$ then $E(u_{it}|\mathbf{x}_{it}) \neq 0$ and inconsistent regression coefficients will be derived. Lundberg and Rose (2000) have found that characteristics such as career drive and attitudes towards family life which are likely to be fixed over time are correlated with the wage and with the probability of entry into motherhood. Therefore, equation (3.1) is additionally estimated using the fixed effects linear estimator,

$$y_{it} - \bar{y}_{it} = \beta_{it}(\mathbf{x}_{it} - \bar{\mathbf{x}}_i) + (a_{it} - \bar{a}_i) + (\eta_i - \bar{\eta}_i) \qquad (3.5)$$

Subtracting the time average of each variable from the level of the variable in each time period eliminates the individual specific unobserved effect η_i, generating consistent estimates in the case where $E(\eta_i|\mathbf{x}_{it}) \neq 0$. The presence of unobserved heterogeneity is confirmed by estimating a random effects model and performing a Hausman test (table 3.8, appendix 3d). The random effects estimator is a weighted average of the between and the within (fixed effects) estimators, and remains consistent only if $E(\eta_i|\mathbf{x}_{it}) = 0$.

The second potential source of endogeneity in (3.1) and (3.2) arises if the switch into part time employment and the wage rate are jointly determined. The switch from full time to part time employment will occur if the opportunity cost of working in full time employment is larger than the wage rate. If the wage rate and movement to part time employment are jointly determined then $E(u_{it}|\mathbf{x}_{it}) \neq 0$ which implies that the estimated regression coefficients from the pooled OLS selection-corrected log wage equations (3.1) and (3.2) will be biased and inconsistent. Instrumental variable estimation can be used to correct for this bias. If it is the case

that $E(u_{it} | SWITCH_{it}) \neq 0$ then a variable z_{it} can be used to predict $SWITCH_{it}$ such that, $Corr(z_{it}, SWITCH_{it}) \neq 0$ and $E(u_{it}|z_{it}) = 0$. Marital status is used as an instrument for the switch into part time employment because of the increased value of time spent in home production, (Waldfogel, 1998; and Manning and Petrongolo, 2008). 67 percent of the sample of women used in the analysis are married or cohabiting, compared to 79 percent of those who report movements to part time employment[17]. The efficient two-step GMM estimator is used to estimate the instrumental variable specification of (3.1). The two step estimator firstly estimates the reduced form equation (the impact of marital status on the probability of switching from full time to part time employment) and secondly estimates the structural equation (the wage equation). This method uses a weight matrix to ensure that the estimator is efficient in the presence of heteroscedasticity. The significance of the marital status variable in a regression which predicts the probability of switching from full time to part time employment is observed in order to assess the strength of the instrument (table 3.7, appendix 3c)[18].

3.5 Data and sample

The analysis of movements into part time work and their impact on the wage requires analysis on women observed over a long period of time. This study uses the BHPS waves 1-14 (1991-2004) alongside the separate BHPS Consolidated Marital, Cohabitation and Fertility Histories (1991-2006) and the BHPS Combined Work-Life History Data (1990-2005). The BHPS Combined Work-Life History Data is spell-based retrospective labour market history information and monthly inter-wave

[17] Using Stata version SE 9.2, the two stage Heckman command is not available for the fixed effects and instrumental variables specifications of (3.1). Instead a separate first stage probit model is run (presented in appendix 3b) and the predicted values from this are used to generate the inverse Mills ratio. Bootstrapping is then applied to the standard errors in the fixed effects specification of (3.1) in order to generate consistent standard errors. This is done using the option 'vce(bootstrap)' in Stata and using 50 bootstrap replications.

[18] The Hansen J Statistic for instrument validity cannot be implemented as only one instrument is used in the analysis.

data for each individual. The first 14 waves on the BHPS panel are used since the monthly work-life history data is only available up to the end of wave 14.

Three steps were involved in creating the BHPS Combined Work-Life History Data file; firstly the current labour market information given at each wave was combined with the inter-wave history information to obtain continuous labour market information for each individual throughout their sample period. This information was then combined with the lifetime employment status history collected at Wave 2, and the lifetime occupational history collected at Wave 3, and compared with the corresponding information drawn from the panel, thus creating continuous employment and occupational histories that begin at the point of labour market entry and stretch to the latest wave. The third stage involved combining these two extended lifetime histories into a single record which contained both employment status information and occupational information (Halpin, 1997). The BHPS Combined Work-Life History Data file uses each employment spell an individual has as the unit of observation. This data set was expanded by the monthly length of each spell and each BHPS panel was expanded twelve times in order to generate pseudo monthly observations. These two files were merged together by month, producing a large dataset based on monthly observations. This data set was then used to correctly infer the waves in which movements from full time to part time employment or down the occupational scale had occurred. Furthermore, the monthly-based dataset allowes accurate measurement of employment transitions over the break in employment around childbirth, and accurate measurement of the wage effect at the time of the switch. The monthly-based data set gives 2242 individuals observed for a maximum of 164 months.

The BHPS Consolidated Marital, Cohabitation and Fertility Histories Data set contains lifetime histories of the respondents' partnerships and childbearing. This dataset was used to accurately infer the dates (month and year) each respondent

had a child. The BHPS panel contains further yearly information on personal and household circumstances.

The sample used in this chapter is made up of women and mothers of children under the age of 12. Mothers of children under age 12 are of greatest because it is at these ages when children require the most care and thus impact upon the mothers' labour force participation decision. The women included in the sample are between the ages of 21 and 50, thus are likely to have started childbearing and their labour market careers. Using a sample of women aged over 21 additionally excludes any part time work done by students.

In order to model the selection into employment, the sample is made up of employed and non-employed observations from this group of women. Because the second part of the analysis in this chapter investigates differences in the motherhood pay penalty by employment transitions over childbirth, the mothers included in the sample who were employed at some point in time were all employed before childbirth[19]. Thus, mothers' observations were only kept if it was possible to observe employment transitions around the childbirth period. Self-employed women have been dropped[20] since due to the variables available in the BHPS Combined Work-Life History Data it is impossible to tell whether these women work full time or part time. Only observations where there was non-missing information from the BHPS Combined Work-Life History Data and the BHPS Consolidated Marital, Cohabitation and Fertility Histories Data were included in the sample. Furthermore, each individual's first observation was not used in the analysis due to the inclusion of the variable which indicates whether the individual has switched from full time to part time employment. The sample therefore consists of 2194 individuals observed for between 1 to 164 months. This amounts to 183,910 total monthly observations and 78,936 monthly employment observations.

[19] This involves dropping 7 percent of the employment observations.
[20] Self-employed observations make up 15 percent of all employment observations.

3.6 Variables and descriptive statistics

The dependent variable in the analysis is the log of real hourly gross pay (w_{it})[21]. The summary statistics presented in table 3.1 show that, on average, motherhood status has a moderate negative effect on the hourly wage. The penalty to one child is slightly smaller than the raw wage penalty to two or more children. This suggests that it may be the case that the increased time pressures associated with a greater number of children translates into a lower pay.

An indicator for part time status is constructed by classifying anyone who reports their usual hours of work to be less than 30 hours a week[22] as a part time worker. The summary statistics in table 3.1 show that current part time status has a very large negative effect on the average hourly wage (β_2 <0) and that the negative wage impact of switching from full time to part time employment is likely to additionally be large. Switching from full to part time employment over a career break appears to generate a much larger negative wage effect that does a transition which occurs without any career break. The mean pay penalties to part time status and switching to part time employment are much greater than the mean pay penalties to motherhood; the raw data suggests that any mothers who move to part time employment appear to be particularly disadvantaged in the labour market.

Examining the mean motherhood pay penalty by employment behaviour over the childbirth period suggests that there is a large amount of variation in the motherhood pay penalty, and therefore that the employment choices of new mothers may be a major driving factor behind the existence of the motherhood pay penalty. Firstly, whether the mother stayed full time over childbirth, stayed part time

[21] Any hourly wages smaller than 50 pence and greater than 90 pounds have been excluded (0.11 percent of employed observations). Hourly wages are given at January 2006 prices.
[22] This definition is consistent with previous research (Connolly and Gregory, 2008; Manning and Petrongolo, 2008) and the OECD definition of part time employment. The number of hours of work reported excludes any over time.

over childbirth or switched full time to part time over the most recent childbirth[23] is interacted with motherhood status[24]. The descriptive statistics in table 3.1 indicate that mothers who remained in full time employment over their most recent childbirth do not suffer any penalty to the average hourly wage. However, those who remained in part time employment over childbirth earn smaller average wages than the average motherhood wage, and those who switched from full time to part time employment over childbirth on average receive an even smaller average hourly wage. Movement to part time employment over childbirth appears to be particularly damaging to post-childbirth career prospects.

Secondly, separating those who remained in part time employment over childbirth into those who only ever work part time and those who have some full time experience[25] at some point in their careers is useful as those who only ever work part time are likely to be a useful comparison group for those who begin their part time careers immediately after childbirth. Furthermore, like the women who moved to part time work over childbirth, those who worked part time immediately before and immediately after childbirth but who do work full time at some point in their careers are likely to have entered part time employment in order to better balance work and family responsibilities. However, this latter group entered part time work before childbirth and therefore may benefit from being able to stay with the same employer over the childbirth period. The summary statistics in table 3.1 show that those mothers who are only ever observed in part time employment receive a much smaller average hourly wage than do the mothers who worked part time immediately before and immediately after childbirth, but who do have a spell of full time employment at some point in their career. The mothers who worked part time immediately before and immediately after the most recent childbirth but who

[23] Only 0.38 percent of monthly employment observations recorded moving from part time to full time employment over childbirth. These observations have been dropped from the sample.
[24] The information concerning the mothers' employment choices over the most recent childbirth is fed forward until either the next childbirth, or the respondent leaves the sample.
[25] At least 3 consecutive months recorded in full time employment.

have a spell of full time employment at some point receive a greater average hourly wage than do the mothers who moved to part time employment over the most recent childbirth.

The summary statistics presented in table 3.1 additionally indicate that the motherhood pay penalty will be at least partially explained by the length of the employment gap over the childbirth period, with those who have longer breaks experiencing much larger pay penalties in the post-childbirth period. It has previously been suggested that any career break longer than one year will promote a large depreciation in human capital (Mincer and Ofek, 1982), thus for the purposes of the current analysis a long break in employment over childbirth is defined as one which lasts longer than one year. Neuburger et al (2010) have found that the negative wage effect associated with moving from full time to part time employment over childbirth will be diminished if the mother remains with the same employer, and that this is probably due to the benefits of being able to stay in the same job. Similarly, a short break in employment over childbirth is likely to reflect maternity leave usage and the ability to remain in the same job over childbirth.

Any movement down the occupational scale[26] diminishes the average hourly wage to a similar extent as does part time status ($\beta_4 < 0$). Because previous work has shown that movements down the occupational scale are common on movement into part time employment, this negative wage effect may exaggerate that felt by those moving from full time to part time employment. Furthermore, a change of employer is often necessary when moving from full time to part time employment (Blundell et al, 2005), the descriptive statistics in table 3.1 show that moving employer generates a negative wage effect, and therefore that this effect needs to be controlled for when estimating the wage effect of the transition from full time to part time employment.

[26] The occupational scale used to define occupational downgrading is that suggested by Connolly and Gregory (2008), see table 3.4 in appendix 3a for details.

Table 3.1 indicates that the wage is influenced by ethnicity, educational qualifications, occupational and sector status, these variables are therefore included in $CONTROLS_{1it}$ in estimation of equations (3.1) and (3.2), alongside age and its square, months of experience in full time and part time employment and their squared values, job tenure and its square, and region of residence.

3.7 Results

The significant negative inverse Mills ratio found in table 3.2, table 3.3, and table 3.4 indicates that there is selection into employment, and suggests that the estimates would be upwardly biased had selection not been taken account of. Table 3.6 in appendix 3b shows the results from the selection equation.

Columns 1-5 in table 3.2 indicate that having one child generates a pay penalty of around 8 percent; furthermore the presence of two or more children reduces pay by 14 percent. These results are consistent with those previously found in the literature (Waldfogel, 1995; Waldfogel, 1998; and Harkness and Waldfogel, 1999).

The results presented in table 3.2 show that current part time status generates a very large significant negative wage effect of around 15 percent. If part time employment is consistent with fewer human capital development and career progression opportunities, then a switch to part time work from full time work will involve a loss of such opportunities, and may generate an additional negative wage effect. The movement to part time employment may also generate a negative wage effect due to poor job matching into part time jobs, or if those who move to part time employment are perceived as having lower levels of work commitment. The results in columns 1-3 of table 3.2 show that switching to part time employment from full time employment generates a negative wage effect of around 8 percent which acts additionally to the 15 percent pay penalty associated with current part time status.

The 8 percent pay penalty associated with movement to part time employment is comparable to the 7 percent pay penalty found by Connolly and Gregory (2009). Moving employer will decrease the hourly wage by a further 7 percent.

The results displayed in column 3 of table 3.2 indicate that moving from full to part time employment does have a significant scarring impact on the wage, at least for one year after the switch, however the magnitude of this effect is fairly small. Furthermore, the regression coefficients presented in column 4 of table 3.2 demonstrate that the negative wage effect caused by the transition from full time to part time employment is purely driven by those transitions which occur over a break in the labour market career. Those who have no break in their labour market career and switch from full time to part time employment receive no significant pay penalty, however those who do have a break receive a very large pay penalty of 23 percent.

The results in column 5 of table 3.2 show that even with the inclusion of an occupational downgrading control the wage impact of moving from full time to part time employment remains significant. Moving to a lower skill level occupation receives an additional 8 percent pay penalty and when this variable is included the wage impact of moving from full time to part time employment falls to 7 percent. The increased probability of occupational downgrading on movement to part time employment, which has previously been demonstrated in the literature (Dex and Bukodi, 2010; and Connolly and Gregory, 2008), means that many women who move from full time to part time employment will receive pay penalties of around 15 percent.

The results displayed in table 3.4 demonstrate how the motherhood pay penalty is affected by the hours of work, occupational and length of career break choices of new mothers. In column 1 of table 3.4 the presence of one child or of two or more children is interacted with whether the mother remained in full time or part time employment, or switched from full time to part time employment over the most recent childbirth. In column 2 of table 3.4 whether the mother remained in full time

or part time employment, or switched from full time to part time employment over the most recent childbirth is interacted with motherhood status. Mothers who remained in full time or part time employment over their most recent childbirth receive a pay penalty which is of a smaller or similar magnitude to the average penalties associated with the presence of one or two or more children. In fact, mothers of one child who remained in full time or part time employment over childbirth do not receive any significant pay penalty.

However, mothers who switched from full time to part time employment over the most recent childbirth receive much larger pay penalties; column 2 of table 3.4 indicates that on average a mother who moves from full time to part time employment over the most recent childbirth period receives a wage which is 20 percentage points lower than the average female wage. Column 1 of table 3.4 shows that a mother of one child who moved from full time to part time employment over their most recent childbirth earns on average 17 percent less in the post childbirth period, furthermore a mother of two or more children who did so earns a wage which is 30 percentage points smaller than that received by the average woman.

Figure 3.2, figure 3.3, and figure 3.4 have been computed using the predicted hourly wage values from columns 2, 3 and 4 in table 3.4 respectively. The predicted wages are generated for all mothers given their behaviour over their most recent childbirth, regardless of time since most recent childbirth. Previous research has suggested that the wage effect associated with switching from full to part time employment over childbirth will persist over time (Neuburger et al, 2010). Furthermore, since some evidence of a one year lagged effect of the switch from full time to part time employment on the wage is shown in table 3.2, the predicted wages for each separate group of mothers are then plotted against years since childbirth. This will indicate whether employment choices in connection with childbirth have a scarring effect on the wage. Locally weighted regressions of the

mean yearly predicted wages for each group of mothers shown in figure 3.2, figure 3.3, and figure 3.4 on years since childbirth were carried out in order to generate smoothed variables for each group's mean predicted hourly wage at every year since childbirth, this was done using the 'lowess' command in Stata version SE 9.2. Figure 3.2 indicates that switching from full time to part time employment over the most recent childbirth will contribute to reduced earnings for these mothers, relative to the mothers who remained in full or part time employment over the most recent childbirth, for at least the first 10 years after childbirth. Furthermore, this effect occurs independently of current part time status.

The results in column 3 of table 3.4 follow the same pattern as those in column 2 of table 3.4, however the mothers who remained in part time employment over the most recent childbirth are split up into those who work full time at some point in their careers and those who are only ever observed in part time employment. Column 2 in table 3.4 shows that the average pay penalty felt by any mother who remained in part time employed over the most recent childbirth is 14 percent. The results in column 3 of table 3.4 show that those who remain in part time employment over the most recent childbirth but who do work full time at some point in their careers will earn on average a wage which is 10 percentage points less than the average female wage; however those who remain in part time employment over childbirth and only ever work part time earn on average 39 percentage points less in the post-childbirth period. Figure 3.3 illustrates the average motherhood wages of those who remained in part time employment over the most recent childbirth by whether they ever work full time or not. The mothers who remained in part time employment over the most recent childbirth but who do work in full time employment at some point in their careers earn, on average, slightly more than the average mother in the post-childbirth period. However, mothers who only ever work part time receive much lower average hourly wages than the average mother and even much lower average hourly wages than those who moved

from full time to part time work over the most recent childbirth for at least 10 years after childbirth.

Column 4 of table 3.4 demonstrates how the occupational choices of new mothers drive the motherhood pay penalty. Mothers of one child who remain in the same occupation, or move up the occupational scale over childbirth receive a 6 percent pay penalty and mothers of two or more children receive a 15 percent pay penalty. However, any mother who moved down the occupational scale over the most recent childbirth will receive a pay penalty of between 23-28 percent. Figure 3.4 shows that as with the switch to part time employment over childbirth, a movement down the occupational scale over childbirth acts to decreases mothers' wages by a large amount over the first 10 years after childbirth.

The regression coefficients displayed in column 5 of table 3.4 indicate that the motherhood pay penalty can additionally be explained by the length of the employment gap over childbirth. Mothers who have a short break in employment over childbirth (less than 1 year) and remain in full or part time employment over childbirth suffer no significant pay penalty. However, their counterparts who have longer breaks in employment over childbirth receive pay penalties of around 15-18 percent. Mothers who switch from full to part time employment over childbirth suffer pay penalties regardless of the length of time spent out of the labour market over childbirth. However, switching from full time to part time employment over childbirth and having a short break in employment over childbirth generates a larger pay penalty in the post-childbirth period than does switching from full to part time employment and having a long break in employment over childbirth. Pay penalties of around 29 percent are experienced by mothers who move from full to part time employment and who have a short break in employment over childbirth; however those who have longer breaks in employment over childbirth and switch from full to part time employment over childbirth receive pay penalties of around 18 percent.

As discussed in section 3.4 there are two potential sources of endogeneity in the current model which could lead to potential sources of bias in the regression results. Firstly, motherhood status may be endogenous in a wage equation if there are unobserved time-invariant attributes which are correlated with the presence of children and the wage. The results in table 3.8 (appendix 3d) indicate that a Breusch Pagan test on the random effects specification confirms at the 0.001 percent significance level that there are individual effects present in the model. A Hausman test suggests that at the 0.001 percent significance level these individual specific effects are correlated with the explanatory variables in the model. Therefore, the results displayed in column 1 of table 3.3 have been computed using fixed effects estimation in order to generate consistent results in the face of individual level unobserved fixed effects. However, the results in column 1 of table 3.3 provide little evidence that the motherhood pay penalties in columns 1-5 of table 3.2 suffer from endogeneity bias, the coefficients on the children variables do not decrease when fixed effects estimation is used. This result is consistent with previous findings for the motherhood wage penalty in Britain (Waldfogel, 1998; and Waldfogel, 1995). The results from the fixed effects specification suggest that around a third of the pay penalty to current part time status can be explained by unobserved characteristics. Furthermore, the results suggest that the pay penalty to moving into part time employment is increased when unobserved effects are controlled for, suggesting that those who move to part time employment have unobserved characteristics which are positively correlated with the wage. This is unexpected and may be explained by the lack of variation in switching from full time to part time employment over time.

The second potential source of endogeneity in the model arises from the possibility that the switch to part time employment and the wage are jointly determined. Instrumental variable estimation is used in column 2 of table 3.3 in order to correct for the potential endogeneity of the switch to part time employment.

Using marital status to instrument for the switch to part time employment means that the switch to part time employment reduces the wage by around 6 percentage points. Table 3.7 in appendix 3c presents the result from regressing the probability of switching into part time employment on marital status as well as all other regressors included in equation (3.1). Marital status has a positive significant (at the 10 percent significance level) impact on moving from full time to part time employment, suggesting that the instrument has some predictive strength.

3.8 Discussion

The analysis in this chapter has found a significant negative pay penalty associated with the transition from full time to part time employment, there are additionally pay penalties associated with moving down the occupational scale, and changing employer, both of which are likely to exaggerate this former effect (Connolly and Gregory, 2009). Furthermore, these effects both act to inflate the large pay penalty associated with current part time status. The second notable finding produced by this analysis indicates that the motherhood pay penalty can be entirely explained by the hours of work, occupation and length of employment gap choices of new mothers. There are great differences in the motherhood pay penalties which are generated by new mothers' hours of work, occupation, and length of employment gap choices around childbirth, with some mothers experiencing no significant pay penalty, relative to their childless counterparts.

Part time employment generates a pay penalty of 15 percent, the magnitude of this effect is consistent with previous research and suggests that part time jobs are typically segregated into poorly paid and poor quality, low skill level occupation groups (Dex and Bukodi, 2010; Manning and Petrongolo, 2008; Blackwell, 2001; McRae, 1991b). Movement from full time to part time employment will decrease wages by a further 8 percentage points, and importantly this pay penalty only slightly declines (to 7 percentage points) when occupational downgrading is

additionally included in the wage equations. Furthermore, the results show that those transitions from full to part time employment which are made over a career break generate a significant very large pay penalty (23 percent), however those transitions which occur without a career break generate no significant pay penalty. These results therefore suggest that the pay penalty associated with the movement from full to part time employment may partially reflect a poorer job match on re-entry to the labour market, and movement into part time employment. The results may additionally suggest that the negative wage effect associated with the movement from full to part time employment is a result of the fact that employers perceive the transition from full time to part time employment as a signal of reduced productivity, this is particularly likely to be the case given that this pay penalty only exists for those who are returning from a career break. Employers would be likely to pay lower wages, and be less likely to provide opportunities for training and opportunities for promotion to these employees. This suggests that the pay penalty associated with the switch from full time to part time employment, reflects inequality in treatment between full time and part time employees.

The larger pay penalty (8 percent) associated with moving down the occupational scale is likely to be a result of a movement to a 'worse' (poorer quality) job, where again there is likely to be fewer opportunities for human capital development or career promotion (Russo and Hassink, 2005). Because independent pay penalties to switching from full time to part time employment and to occupational downgrading exist, these results suggest that moving to a part time job which is situated in a lower skill level occupational group than the current occupational group will be even more damaging to a woman's career in terms of opportunities for human capital development and career progression than would just the transition from full to part time employment. This is of particular concern given that recent findings have shown that the probability of moving to an occupation with

a lower average level of pay can increase by up to 50 percent on movement from full time to part time employment (Dex and Budoki, 2010).

The findings discussed above are of particular importance for the British labour market where a large proportion of mothers decide to balance work and family life by moving from full to part time employment. Paull (2008) has indicated that at any point a full time working mother has a 25 percent probabiltiy of moving from full time to part time employment, whereas this is 15 percent for any full time working female. The results found in the first part of the analysis in this chapter indicate that for many mothers in the UK their decision to balance work and family life by moving from full time to part time employment over a break in their labour market career will result in a signal of lower productivity to employers, or in a poor job match. Any of these outcomes will act to reduce the wages and career progression opportunities of these mothers relative to childless women, or relative to to those mothers who remained in full time employment. The conclusions suggest that these inequalities in treatment may be eliminated if part time employment was given a higher status in the labour market. For example, by encouraging opportunities for part time employment in high skill level occupational groups.

The average motherhood penalties found in the first part of this analysis (8 percent to one child and 14 percent to two or more children) are of a similar magnitude to those previously found in the literature; Waldfogel (1998) and Waldfogel (1995) have found a 9 percent penalty to one child and a 16 percent penalty to two or more children for a sample of British mothers, and Harkness and Waldfogel (1999) find an 8 percent penalty to one child and a 24 percent penalty to two children for a sample of British mothers. However, the results found in this chapter contribute to the literature on the motherhood wage penalty by showing that the motherhood pay penalty can be explained by the hours of work, occupation, and length of employment gap choices of new mothers. For instance, mothers of one child who remain in full or part time employment over childbirth, or who remain in

the same occupation over childbirth recieve no significant pay penalty. Similarly, any mother who had a shorter career break (less than one year) over childbirth and remained in full or part time employment recieves no significant pay penalty. Motherhood pay penalties appear to be being driven by employment choices around childbirth.

The results presented in chapter 2 of this thesis suggest that a large proportion of mothers are likely to re-enter employment via part time work after childbirth. The second part of the analysis in this current chapter analyses the wage implications of this phenomenon. The first two columns in table 3.4 indicate that mothers who remained in full time or part time employment over their most recent childbirth receive small or inexistant pay penalites throughout their post-childbirth career. However, those who switched from full time to part time employment over the most recent childbirth suffer much greater pay penalties throughout the early maternal years. Figure 3.2 shows that the movement from full time into part time work over childbirth has a large negative impact on the wage over at least the first 10 years after childbirth, this negative wage effect remains at around 12 percent at 10 years after childbirth. This result extends previous work which has indicated that this wage effect remains at around 14 percent at 5 years after childbirth (Neuburger et al, 2010). Even after the child has reached an age when they no longer require a great amount of care, a large pay differential persists between those who remained in part time employment, and those who switched to part time employment over the most recent childbirth. This suggests that the kind of part time jobs which mothers move into on return to the labour market after childbirth (for instance, those with the most flexible benefits) will involve a particularly poor job match, or that mothers who move from full time to part time employment over childbirth will send a signal of very low levels of productivity to their new employees. These factors will act to reduce human capital development and career progression opportunities to an even greater extent than would any other movement from full to part time employment.

Figure 3.3 illustrates that unlike those who move from full time to part time work over childbirth, the mothers who remained in part time employment over their most recent childbirth but who do work in full time employment at some point in their careers are less likely to have signalled low levels of productivity over the childbirth period, or are less likely to have suffered a poor job match. Again, this suggests that it is the part time jobs most favoured by mothers with very young children (those with the most flexible benefits) which are the most damaging to the subsequent career. However, mothers who only ever work part time receive the lowest wages out of all mothers, this suggests that experience in part time employment is very damaging to the future career and wages due to reduced access to career progression and human capital development opportunities, and that these effects accumulate over time.

Mothers who move down the occupational scale over the childbirth period earn much larger wage penalties than the average motherhood penalties. Figure 3.4 shows that lower skill level jobs favoured by mothers of young children are associated with poor career progression and human capital development opportunities, resulting in a loss of earnings on movement into such jobs, as well as a scarring effect on wages as the impact of missed opportunities accumulates over time. This scarring effect appears to last until the child reaches 10 years of age. Similarly to the movement from full to part time employment after childbirth, this suggests that a movement down the occupational scale over the childbirth period results in a movement to a poorer quality job, and that this is likely to be a result of a particularly poor job match, or a signal of very low levels of productivity from the mother.

The results displayed in table 3.4 additionally show that the motherhood pay penalty can be explained by the mothers' decisions regarding the length of the employment gap, aswell as full time and part time transitions over childbirth. Mothers who had a short break (of less than one year) and remained in full time or

part time employment over the most recent childbirth recieve no significant pay penalty. Their counterparts who had breaks of longer than one year in employment over childbirth recieve pay penalties of around 15-18 percent. These results suggest that the presence of long employment gaps in a mother's career can partially explain why we observe a pay penalty associated with motherhood. Mothers who have smaller gaps in employment are likely to have been able to take advantage of maternity leave policy and remain attached to the same employer over this break. However, longer breaks in employment over childbirth are likely to result in detachment from the labour market, and a depreciation of human capital.

The results displayed in column 5 of table 3.4 suggest that switching from full to part time employment has a more detrimental impact on wages in the post-childbirth period when it is done so over a short break in employment than when this occurs over a long break in employment over childbirth. The mothers who have a short break in employment will have younger children who require very intensive time demands, however those who have longer breaks in employment will have older children who have more relaxed time demands at the point of labour market re-entry. Consequently, those mothers who have shorter breaks in employment over childbirth and move from full time to part time employment are likely to be doing so in order to relax intensive time constraints, and are therefore likely to move into the most flexible part time jobs. Again, this suggests that such jobs are likely to be associated with particulary poor job matching, or a signal of very low levels of productivity.

The switch from full to part time employment which occurs around the childbirth period most likely occurs in order for mothers to achieve a balance between their career and motherhood. Some previous research has suggested that the movement from full time to part time employment occurs because of preferences associated with spending more time with children (Booth and Van Ours, 2009), however this movement may additionally be a result of societal and

institutional constraints which act to generate inequalities in employment opportunities for mothers. The results found in this chapter indicate that the switch to part time employment (particularly that which occurs over the childbirth period) appears to be a major source of gender inequality in terms of career outcomes in the labour market in Britain. The switch to part time employment is likely to result in a poor job match, or will mean that these women are viewed by employers as having lower levels of productivity or motivation, and are therefore given fewer opportunities for human capital development or for career progression. If mothers are constrained into switching from full time to part time employment by the institutional setting then these findings indicate that part time employment is a huge source of 'unjust' inequality in the UK labour market.

The conclusions which result from this analysis have several policy implications. Firstly, increasing the status of part time jobs in the labour market may act to reduce the probability of a poor job match on moving into part time employment, this may additionally contribute towards changing any perception that women who choose to move from full to part time employment will have lower levels of productivity and motivation. This will therefore act to diminish the inequality in treatment between full and part time employees. The status of part time jobs could be increased by encouraging the creation of part time opportunities in high skill level occupation groups, this would consequently act to improve the opportunities and therefore wages of women in part time employment. Secondly, if it is the case that constraints, rather than preferences, force mothers to make the transition from full to part time employment (Grant et al, 2005), then introducing policies which relax the constraints on mothers' time allocation decision (for example, by increasing access to quality childcare) will make it easier for mothers to combine full time employment with motherhood, and reduce the need for mothers to work in part time employment.

3.9 Conclusion

The aim of the current chapter was to analyse the wage impact of maternal transitions from full time to part time employment. The negative wage effect of the average switch to part time employment is of a moderate magnitude (7 percent) and acts to exaggerate the pay penalty associated with current part time status (15 percent). However, when analysed further the results indicate that those who switch over a career break experience a pay penalty of 23 percent, whereas those who switch without a career break receive no pay penalty. The results therefore suggest that this pay penalty is likely to be a result of inequality in the treatment of full time and part time workers; employers perceive the transition from full time to part time employment as a signal of reduced productivity. Furthermore, the results have shown that any negative wage effect on movement into part time employment is further exaggerated by the wage effects associated with a movement down the occupational scale, or a change in employer. The 8 percent wage effect of moving down the occupational scale indicates that a loss of career progression and human capital development opportunities will act to reduce the wage to a large extent if there is additionally a movement down the occupational scale. Because previous work has shown that movements down the occupational scale are common when moving from full time to part time employment (Dex and Budoki, 2010; Connolly and Gregory, 2008; and Manning and Petrongolo, 2008), these results suggest that by increasing the career progression and human capital development opportunities available to part time will act to reduce gender inequality in labour market opportunities and promote a more efficient use of human capital investments in the labour market.

The average pay penalties to children are of similar magnitude to those previously found, (Waldfogel, 1995; Waldfogel, 1998; and Davies and Pierre, 2005). However, the results in this chapter have further shown that the pay penalties associated with motherhood can be explained by mothers' employment decisions

around childbirth. No significant pay penalty exists for mothers of one child who remained in full time or part time employment over their most recent childbirth, or for mothers who had a short break in employment and remained in full time or part time over their most recent childbirth. The largest pay penalties are felt by mothers who switched from full time to part time employment over their most recent childbirth and have two or more children, or by those mothers who switched from full time to part time employment over their most recent childbirth and had a short break in employment over childbirth. These mothers appear to struggle in terms of career progression and wages in the post-childbirth period, and such effects last for up to 10 years after childbirth. The results in chapter 2 of this thesis indicate that a large proportion of mothers are likely to re-enter employment via part time work after childbirth, the results in the current chapter complement these findings by illustrating that the types of part time jobs most popular with those with the most intensive time allocations decisions (those with increased flexibility benefits) are particularly harmful to the mother's post childbirth career progression. This effect is likely to result from the poor quality of these part time jobs, poor job matching on entering these jobs, or from the fact that employers perceive those mothers who move into these job to be sending a signal of very low levels of productivity and motivation.

Although the evidence surrounding the harmful implications of part time employment on women's labour market experiences is very clear, it is important to recognise that women working in part time employment may experience higher levels of well being which could act to offset the negative career implications of part time work. Previous research has shown that women in part time employment are likely to have greater levels of job satisfaction than are those working in full time employment (Booth and Van Ours, 2009). The well-being implications of part time employment are further investigated in chapter 4 of this thesis; this analysis provides some understanding of whether these effects may help offset the negative career implications of part time employment. Additionally, full time employment in

the early maternal years has been shown to limit the child's development (Berger et al, 2005; Gregg et al, 2005; Baum, 2003; and Ermisch and Francesconi, 2000), although recent research suggests that this effect may be outweighed by a greater usage of quality childcare, and greater levels of motherhood sensitivity later in the child's life (Brooks-Gun et al, 2010). However, previous research has provided some indication that motherhood full time employment is likely to have a negative impact on the child's health related behaviours (Cawley and Liu, 2007), and that there is a positive relationship between full time maternal employment and their child's BMI score (Liu et al, 2009). Thus, there are likely to be wider benefits associated with the decision to work in part time employment, relative to full time employment.

Overall, the findings in this chapter suggest that relaxing the constraints on the work life balance decision around childbirth, by moving in to part time employment, is harmful for mothers in the UK in terms of their career progression. Preferences for spending time with children, or institutional constraints which result in the movement from full to part time employment around childbirth, have large negative implications for the mothers' subsequent wages and career progression. The findings support policies such as increased access to quality childcare which would allow mothers to better combine the increased time pressures of young children with full time employment, therefore avoiding the negative career implications associated with part time employment. Additionally, increasing rights to flexible working among the higher skill level occupation groups would prevent movements to 'worse' jobs on movement to part time employment, and would reduce inequality in treatment for employees moving into part time employment. Such a policy would allow mothers to maintain their career progression whilst working part time, generating greater equality in outcomes between full and part time employees.

Table 3.1 Mean values of gross hourly pay (£)

Variable	Real hourly pay (£)
All employed	9.61
Family Status	
Mother	8.88
One child	8.82
Two or more children	8.94
Married or cohabiting	9.70
Full time / Part time Status	
Part time	7.61
Full time	10.04
Switch from full to part time work	7.31
Switch from full to part time work- no career break	7.94
Switch from full to part time work- with career break	6.10
Employment behaviour over childbirth	
Stayed in full time work over the most recent childbirth	10.15
Stayed in part time work over the most recent childbirth	8.94
Switch from full to part time work over the most recent childbirth	6.97
Stayed in part time work over the most recent childbirth but don't always work part time	7.99
Stayed in part time work over the most recent childbirth and always work part time	5.84
Short break (less than one year) over childbirth	8.95
Long break (greater than one year) over childbirth	8.10
Occupational and employer Transitions	
Occupational downgrade	7.81
Same occupation or upgrade over the most recent childbirth	9.16
Downgrade over the most recent childbirth	7.45
Change of employer	8.40
Individual and Human Capital Characteristics	
White	9.68
Degree	12.58
A level	9.37
O level	7.76
No qualifications	6.52
Occupational and Sector Status	
Teacher	14.11
Other professional	13.44
Nurse	11.24
Associate professional	10.67
Corporate manager	13.16
High skill services	10.24
High level clerical	7.91
Other manager	7.68
Skilled trader	6.89
Low level clerical	7.52
Caring services	6.21
Other personal services	5.91
Sales assistant	5.31
Other low skill	7.10
Cleaners	4.87
Public sector	11.07

Source: BHPS 1991-2006.

Table 3.2 Estimated regression coefficients from hourly log wage regressions, equation (3.1)

Variables	1	2	3	4	5
One child	-0.081***	-0.086**	-0.089**	-0.087**	-0.084**
	(0.031)	(0.035)	(0.035)	(0.035)	(0.035)
Two or more	-0.126***	-0.137***	-0.155***	-0.156***	-0.137**
children	(0.043)	(0.053)	(0.054)	(0.053)	(0.054)
Part time	-0.146***	-0.146***	-0.138***	-0.147***	-0.149***
	(0.035)	(0.035)	(0.038)	(0.035)	(0.035)
Switch FT/PT	-0.078***	-0.078***	-0.078***		-0.065**
	(0.026)	(0.026)	(0.028)		(0.026)
Lag of switch			-0.015***		
FT/PT			(0.027)		
Switch FT/PT				0.067	
no career break				(0.034)	
Switch FT/PT				-0.232***	
over career break				(0.044)	
Occupational					-0.075***
downgrade					(0.019)
Change of	-0.075***	-0.075***	-0.073***	-0.084***	-0.068***
employer	(0.017)	(0.016)	(0.016)	(0.016)	(0.017)
Human capital	✓	✓	✓	✓	✓
controls					
Household /	✓	✓	✓	✓	✓
demographic					
controls					
Job	✓	✓	✓	✓	✓
characteristics					
Inverse Mills Ratio		-0.892***	-0.894***	-0.893***	-0.893***
		(0.019)	(0.020)	(0.020)	(0.020)
Observations	78936	126644	123567	126644	126019

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

Notes:

1. Column 1 shows the results from a pooled OLS regression, Columns 2-5 show the results from pooled OLS log wage equations using the two stage Heckman selection correction technique.
2. The standard errors in columns 1-5 are robust and correct for intra-individual correlation.
3. The human capital controls are experience in full and part time work and their squared values, tenure and tenure squared and the individual's highest educational qualification. Household and demographic controls are age and its squared value, whether the individual is white and region of residence. The job characteristics category includes public sector status. Time dummies are additionally included in the regressions.

Table 3.3 Estimated regression coefficients from a fixed effects and instrumental variables log wage equation

Variables	1 Fixed Effects	2 Instrumental variables
One child	-0.078***	-0.123***
	(0.045)	(0.036)
Two or more children	-0.164***	-0.257***
	(0.105)	(0.061)
Part time	-0.109***	-0.154***
	(0.032)	(0.036)
Switch FT/PT	-0.083***	-0.078***
	(0.022)	(0.026)
Occupational downgrade	-0.054***	-0.064***
	(0.013)	(0.019)
Change of employer	-0.030***	-0.067***
	(0.010)	(0.017)
Human capital controls	✓	✓
Household / demographic controls	✓	✓
Job characteristics	✓	✓
Inverse Mills Ratio	-0.324***	-0.221***
	(0.111)	(0.016)
Individuals	1503	
Observations	78631	78631

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

Notes:

1. The results in the table display regression coefficients from selection-corrected fixed effects (column 1) and instrumental variables (column 2) regression. The inverse Mill's ratio is predicted by a separate first stage probit regression (shown in table 3.6 in appendix 3b) and then included into the fixed effects and instrumental variables regression.
2. Due to the inclusion of a first stage predicted variable, bootstrapping was applied to the standard errors in the fixed effects model. The standard errors displayed in column 2 are robust and correct for intra-individual correlation.
3. The human capital controls are experience in full and part time work and their squared values, tenure and tenure squared and the individual's highest educational qualification. Household and demographic controls are age and its squared value, whether the individual is white and region of residence. The job characteristics category includes public sector status. Time dummies are additionally included in the regressions.

Table 3.4 Estimated regression coefficients from hourly log wage regressions, equation (3.2)

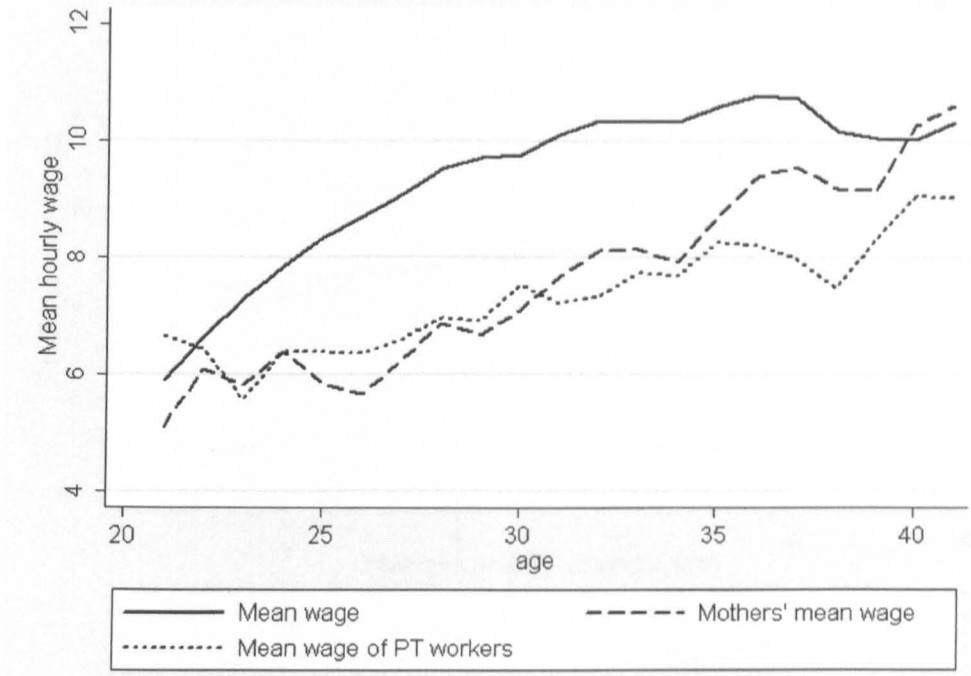
Variables	1	2	3	4	5
One child- FT over most recent CB	-0.058				
	(0.042)				
Two or more children –FT over most	-0.124**				
recent CB	(0.075)				
One child- remain PT over most	-0.050				
recent CB	(0.080)				
Two or more children- remain PT	-0.164**				
over most recent CB	(0.064)				
One child- switch to PT over most	-0.173***				
recent CB	(0.049)				
Two or more children- switch to PT	-0.300***				
over most recent CB	(0.082)				
Remained FT over most recent CB		-0.093**	-0.093**		
		(0.045)	(0.045)		
Remained PT over most recent CB		-0.128**			
		(0.056)			
Switched FT/PT over most recent		-0.200***	-0.202***		
CB		(0.049)	(0.049)		
Remained PT over most recent CB-			-0.101**		
not always in PT employment			(0.057)		
Remained PT over most recent CB-			-0.387***		
always observed in PT employment			(0.112)		
One child- same or higher occupation				-0.063*	
over					
most recent CB				(0.036)	
Two or more children- same or higher				-0.153***	
occupation over most recent CB				(0.056)	
One child- occupational downgrade				-0.227***	
over					
most recent CB				(0.070)	
Two or more children- occupational				-0.284***	
downgrade over most recent CB				(0.090)	
Short break in employment and					-0.070
remained FT over most recent CB					(0.051)
Long break in employment and					-0.146**
remained FT over most recent CB					(0.059)
Short break in employment and					-0.099
remained PT over most recent CB					(0.061)
Long break in employment and					-0.183**
remained PT over most recent CB					(0.080)
Short break in employment and					-0.293***
switched FT/PT over most recent CB					(0.077)
Long break in employment and					-0.172***
switched FT/PT over most recent CB					(0.052)
Human capital controls	✓	✓	✓	✓	✓
Household / demographic controls	✓	✓	✓	✓	✓
Job characteristics	✓	✓	✓	✓	✓
Inverse Mills Ratio	-0.895***	-0.895***	-0.895***	-0.895***	
	(0.019)	(0.019)	(0.019)	(0.020)	
Observations	126019	126019	126019	126019	

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

Notes:

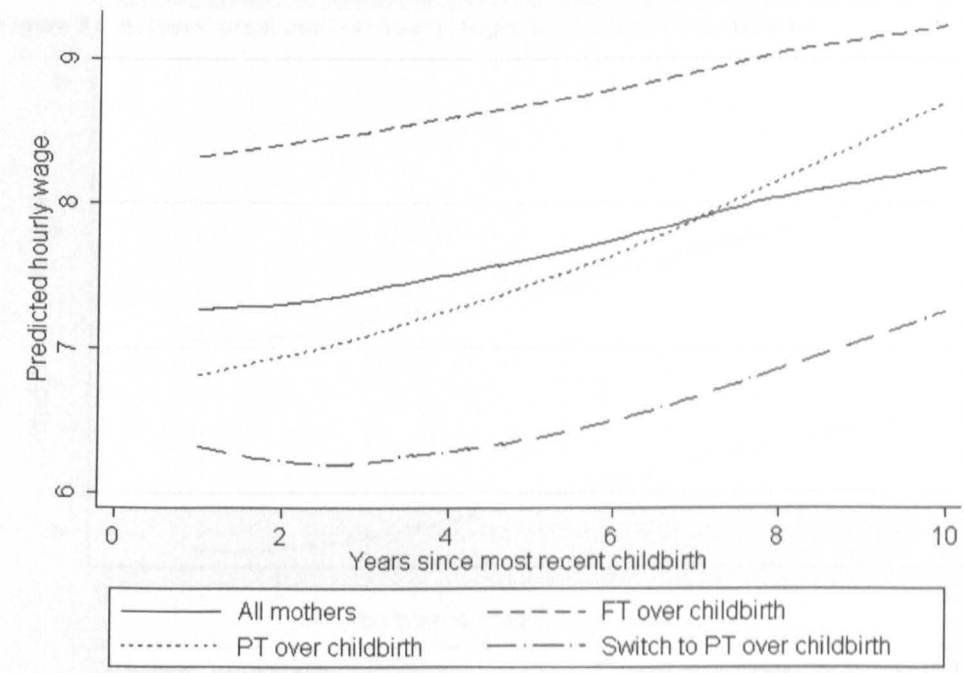
1. Columns 1-4 are pooled OLS log wage equations estimated using the Heckman two stage selection correction technique.
2. All standard errors are robust and correct for intra-individual correlation.
3. The human capital controls are experience in full and part time work and their squared values, tenure and tenure squared and the individual's highest educational qualification. Household and demographic controls are age and its squared value, whether the individual is white and region of residence. The job characteristics category includes public sector status. Time dummies are additionally included in the regressions.

Figure 3.1 Women's mean real hourly wages



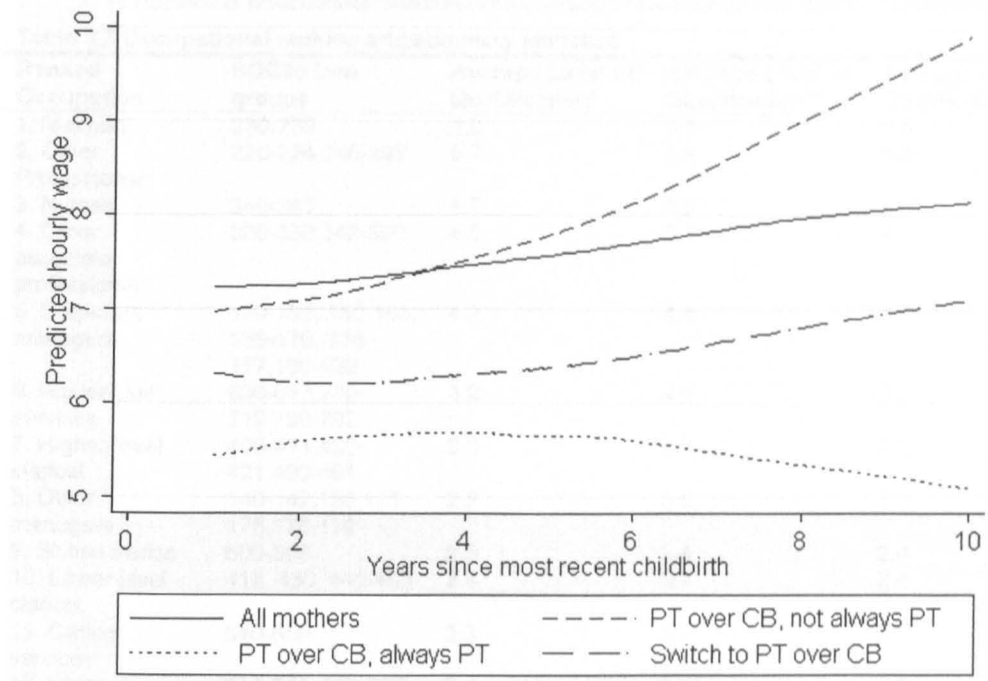
Source: BHPS 1991-2006.

Figure 3.2 Mothers' predicted real hourly wages from column 2 of table 3.4



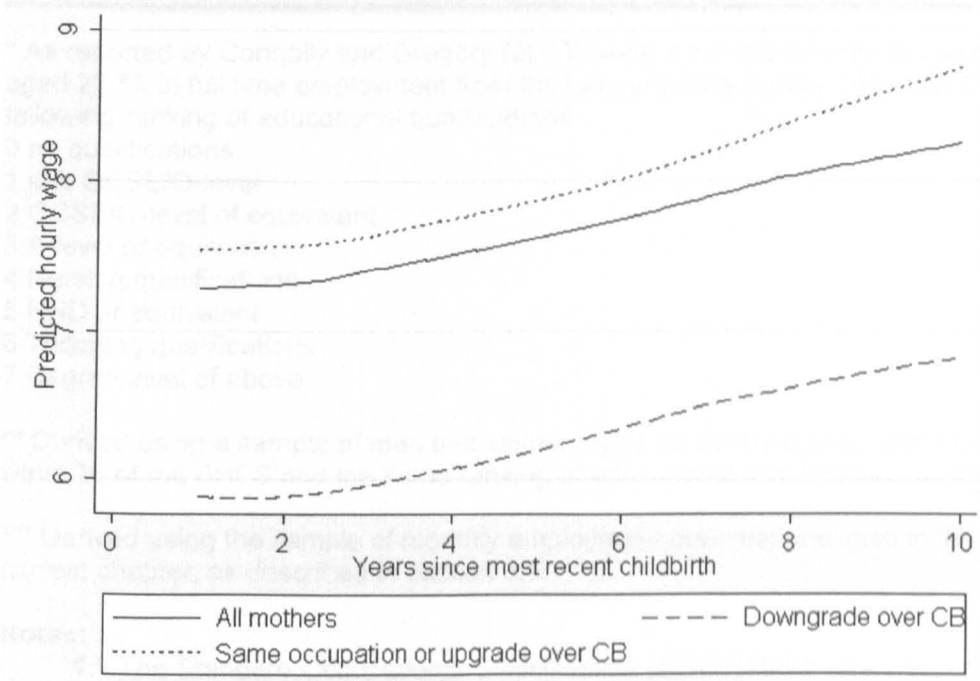
Source: BHPS 1991-2006. Locally weighted regressions of the mean yearly predicted wages for each group of mothers on years since childbirth have been computed in order to generate the smoothed variables.

Figure 3.3 Mothers' predicted real hourly wages from column 3 of table 3.4



Source: BHPS 1991-2006. Locally weighted regressions of the mean yearly predicted wages for each group of mothers on years since childbirth have been computed in order to generate the smoothed variables.

Figure 3.4 Mothers' predicted real hourly wages from column 4 of table 3.4



Source: BHPS 1991-2006. Locally weighted regressions of the mean yearly predicted wages for each group of mothers on years since childbirth have been computed in order to generate the smoothed variables.

Appendix 3a

Table 3.5 Occupational ranking and summary statistics

Ranked Occupation	SOC90 Unit groups	Average Level of Qualification*	Average Level of Qualification**	Average Level of Qualification ***
1.Teachers	230-239	6.6	6.5	6.6
2. Other Professionals	220-224,240-293	5.7	5.9	5.9
3. Nurses	340-341	4.7	5.5	4.8
4. Other associate professional	300-332,342-399	4.5	5.1	4.7
5. Corporate managers	100-139, 150-155, 169-170, 176-177,190-199	4.2	4.8	4.5
6. Higher-skill services	600-613,700-719,790-792	3.2	4.5	3.5
7. Higher-level clerical	400-411,420-421,490-491	3.0	4.2	2.9
8. Other managers	140-142,160,171-175,178-179	2.8	3.9	3.3
9. Skilled trades	500-599	2.5	3.4	2.4
10. Lower level clerical	412, 430, 440-463	2.4	3.4	2.8
11. Caring services	640-659	2.3	3.7	2.8
12. Other personal services	614-631, 660-699	2.1	3.2	1.8
13. Sales assistants	720-732	2.0	2.7	1.1
14. Other low skill occupations	800-899. 900-957, 959-999	1.6	3.0	1.2
15. Cleaners	958	1.1	2.0	1.4
Sample size		36,556	6,964	78,936

* As reported by Connolly and Gregory (2008) using a sample of men and women aged 22-59 in full time employment from the Labour Force Survey 2000 and the following ranking of educational qualifications:
0 no qualifications
1 sub GCSE/O-level
2 GCSE/O-level of equivalent
3 A-level or equivalent
4 Nursing qualifications
5 HND or equivalent
6 Teaching qualifications
7 Degree level of above

** Derived using a sample of men and women aged 22-59 in full time work from wave 16 of the BHPS and the same ranking of educational qualifications as above.

*** Derived using the sample of monthly employment observations used in the current chapter, as described in section 3.5.

Notes:

1. The Standard Occupational Classification (SOC) (1990) ranks occupations by both the basis of similarity of qualifications, training, skills and experience and by the nature of work activities. This means that at high levels aggregation it only partially provides an occupation hierarchy by skill, which is the point of interest in this analysis. Thus, Connolly and Gregory have devised a 15 point scale (table 3.5) which ranks occupations

primarily by the average level of qualifications of the workers in each occupation and secondly by similarity in working activities.

2. The scale was constructed by using data on individuals' qualifications in each 370 unit groups distinguished by SOC90 from the Labour Force Survey, 2000.
3. Table 3.5 presents the occupational ranking alongside the average level of qualification in each occupation and the comparable average qualification level of a sample of working age men and women from wave 16 of the BHPS. The results suggests that the much smaller BHPS sample includes people with more educational qualifications, however with the exception of caring services the ranking of occupations by the average level of educational qualifications remains the same. The percentage of the sample of employed women used in this chapter who fall into each ranking is displayed in the final column of table 3.5.

Appendix 3b

Table 3.6 Estimated regression coefficients from a probit model estimating probability of employment, equation (3.3)

Variables	Selection equation from Heckman procedure used in columns 2-5 of table 3.2	Pooled probit model predicting employment, used to generate inverse Mills ratio used in table 3.3.
Age	0.221***	0.239***
	(0.024)	(0.024)
Age squared	-0.003***	-0.003***
	(0.003)	(0.003)
One child	-1.070***	-1.021***
	(0.082)	(0.083)
Two or more children	-1.899***	-1.870***
	(0.097)	(0.098)
White	0.105***	0.105***
	(0.035)	(0.035)
Degree	0.758***	0.769***
	(0.115)	(0.117)
A level	0.618***	0.635***
	(0.112)	(0.113)
O level	0.621***	0.638***
	(0.108)	(0.109)
Household income	-0.004***	-0.002***
	(0.001)	(0.002)
Youngest child aged 0-2 years	-0.090	-0.068
	(0.069)	(0.070)
Youngest child aged 3-4 years	0.082	0.063
	(0.072)	(0.072)
Youngest child aged 5-11 years	0.134*	0.109
	(0.080)	(0.080)
North West	-0.039	-0.029
	(0.104)	(0.105)
North East	-0.216	-0.238
	(0.171)	(0.166)
Yorkshire and Humber	0.096	0.116
	(0.115)	(0.115)
East Midlands	-0.203*	-0.166
	(0.105)	(0.106)
West Midlands	0.002	0.031
	(0.112)	(0.115)
East	0.372***	0.415***
	(0.123)	(0.122)
South East	0.094	0.108
	(0.076)	(0.075)
South West	-0.151	-0.124
	(0.103)	(0.103)
Observations	126644	126019

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

Notes:

1. The selection equations include all variables from the log wage equations which are not dependent on employment as well as the chosen instruments for employment; household income, age of the youngest child and the number of working age individuals in the household.
2. All standard errors are robust and correct for intra-individual correlation.
3. The instruments (age of the youngest child and household income) have very significant effects on the probability of employment, and the direction of the effect of these variables on the employment probability is as economic theory suggests.
4. Time dummies are additionally included in the regressions.

Appendix 3c

Table 3.7 Estimated regression coefficients from a probit model estimating the probability of a switch from FT to PT employment (reduced form equation)

Variables	Probit
Married or cohabiting	0.093*
	(0.064)
All other regressors included in column 2 of table 3.3 (structural equation)	✓
Observations	126019

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

Notes:

1. The instrumental variables technique is used in column 2 of table 3.3 in order to allow for the potential endogeneity of movements into part time employment. The two-stage GMM method is used in order to ensure efficiency.
2. Observation of the significance of marital status in a probit regression which predicts the probability to switch from full time to part time employment will provide some information on the strength of the instrument as a predictor for the switch from full time to part time employment.
3. Table 3.7 present the regression coefficient and cluster robust standard error on the marital status variable in this reduced form regression. The result in table 3.7 shows some evidence that marital status can be used to predict movements into part time employment.
4. Time dummies are additionally included in the regression.

Appendix 3d

Table 3.8 Estimated regression coefficients from a log wage regression, equation (3.1), random effects specification

Variables	Random effects
One child	-0.072***
	(0.005)
Two or more children	-0.160***
	(0.008)
PT	-0.106***
	(0.031)
Switch FT/PT	-0.086***
	(0.021)
Inverse Mills Ratio	-0.324***
	(0.112)
Human capital characteristics	✓
Household / demographic controls	✓
Job characteristics	✓
Individuals	1503
Observations[1]	78631
P value from Breusch Pagen test	0.0000
P value from Hausman test	0.0000

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

[1] Employment observations

Notes:

1. Table 3.8 shows the results from estimating equation (3.1) using the random effects generalised least squares (GLS) transformation;

$$y_{it} - \lambda\bar{y}_{it} = \beta_0(1-\lambda) + \beta_1(\mathbf{x}_{it} - \lambda\bar{\mathbf{x}}_{it}) + (u_{it} - \lambda\bar{u}_{it}) \quad (3.6)$$

Where $\lambda = 1 - \left[\sigma_a^2 / (\sigma_a^2 + T\sigma_\eta^2)\right]^{1/2}$

λ lies between 0 and 1, thus equation (3.6) involves using quasi-demeaned data on each variable. When $u_{it} = a_{it} + \eta_i$, σ_a^2 is the variance of a_{it} and σ_η^2 is the variance of η_i.

2. The Breusch Pagen test confirms that serial correlation is present and therefore the data needs to be treated as a panel to avoid autocorrelation problems.
3. The Hausman test between the random and fixed effects models suggests that unobserved effects are correlated with the explanatory variables in the model, and therefore it is correct to us the fixed effects rather than the random effects model.
4. Due to the inclusion of a first stage predicted variable, bootstrapping was applied to the standard errors, 50 bootstrap replications were carried out using the 'bootstrap' option in Stata version SE 9.2.
5. Time dummies have been included in the regression.

4 Part time employment and happiness: A cross-country analysis.

4.1 Summary

- The relationship between part time employment and job satisfaction is analysed for mothers from the UK, Germany, Denmark, the Netherlands, France, Finland and Spain using the ECHP. The BHPS is additionally used to estimate the impact of working part time on subjective life satisfaction and mental well being for British mothers.
- The impact of part time employment on well being is likely to be a result of the value placed on flexibility and time spent with family, as well as the structure and quality of part time jobs. Cultural traditions concerning mothers's role in society, and institutional differences between the countries examined, are exploited to gain an understanding of what is driving the relationship between part time employment and well being.
- The analysis uses pooled cross sectional ordered logit models, fixed effects ordered logit models and generalised ordered logit models to estimate job and life satisfaction.
- The findings suggest that part time employment has positive implications for satisfaction with hours of work only when part time employment is accepted as a social norm. The results provide some support for the notion that poor quality part time jobs can diminish any positive well being implications of part time employment.
- The results additionally imply that institutional constraints in the UK mean that mothers are likely to have been constrained into working in part time employment. More research needs to be done to understand the implications of time spent in the household and time spent in the labour market on overall well being.

4.2 Introduction to the issue

The aim of this chapter is to investigate the relationship between part time employment and various aspects of well being; including job satisfaction, subjective life satisfaction and mental well being. The well being implications of working in part time employment are analysed relative to working in full time employment, for working age mothers from the UK, Germany, Denmark, the Netherlands, France and Spain.

Barnett and Gareis (2000) argue that the benefits associated with part time employment include having more time for yourself, for your children and your partner, feeling less exhausted and having more time to cope with the demands of work and of the family. Thus, we would expect any benefits associated with part time employment to be felt most by those with the most acute work family time demands; mothers of pre-school aged children. Moreover, previous work has shown that a direct link exists between spending time with the family relative to spending time at work and well being, Greenhaus et al (2003) have shown that for individuals who invest a lot of time in both work and family roles, those who spend more time on family than on work are likely to have a higher levels of well being. Part time employment relaxes constraints on the work life balance decision; it facilitates increased leisure time, increased time spent with the family, and flexible hours of work, whilst allowing the individual to benefit from the financial, social connection, positive self-esteem, and adherence to social norm aspects common to all types of employment (Carrol, 2007; Clark, 2003; Frey and Stutzer, 2002a). In this respect part time employment is likely to increase an individual's well being.

However, if it is the case that part time jobs are intrinsically unsatisfying, and dead end, working part time may decrease well being relative to working full time. This issue is of particular concern for part time workers in the UK. Dex and Bukodi (2010) have found that around 50 percent of mothers in the UK moving from full

time to part time work will suffer a movement to an occupation where there is a lower average level of pay. Furthermore, Blackwell (2001) has found mothers switching from full time to part time work over childbirth are more likely to be in occupations where there is a greater proportion of the female than of the male workforce; additionally such occupations are likely to be of a low skill level. The results presented in chapter 3 of this thesis indicate that, for British women, switching to part time employment over childbirth involves a large pay penalty which persists over time (particularly when there is additionally a large career break around childbirth), and that this is likely to be a result of the fact that employers view the transition into part time employment as a signal of reduced productivity, and therefore provide such workers with fewer opportunities for human capital or career development. Furthermore, evidence suggests that this phenomenon is not unique to the UK. Russo and Hassink (2005) find a lower rate of promotions in part time jobs in the Netherlands as compared to full time jobs, and Chalmers and Hill (2007) indicate that for Australian women the fewer promotion and human capital development opportunities available in part time employment generates a scarring effect on wages. The link between poor quality of jobs and lower job satisfaction has been previously investigated by Clark (2005), using the work orientations module of the International Social Survey Programme alongside the BHPS, Clark shows that job security has a significant negative impact on job satisfaction.

Above it has been suggested that the relationship between part time employment and well being is likely to be a function of the value placed on flexibility and spending time with the family and the quality of part time jobs. This analysis therefore investigates differences in cultural norms concerning women's role in society, and differences in the quality of part time jobs between the seven countries examined, in order to provide some understanding of what is driving the relationship between part time employment and well being. The quality of part time jobs greatly varies across the countries observed and is a complex outcome of the welfare state,

gender arrangements, and employment policies within a country. The value respondents place on flexible working and spending time with the family is additionally likely to differ by country due to variation in social and cultural norms.

Measuring the job and life satisfaction implications of part time employment will provide some understanding of its welfare enhancing properties (Frey and Stutzer, 2002a). This is of particular importance given the large proportion of women who currently decide to balance work and family life by working part time in the UK and in other Western European countries; currently just over 40 percent of women and 60 percent of mothers work part time in the UK (ONS, 2008). Any welfare enhancing aspects of part time employment will act to offset the inequalities of treatment associated with part time employment, which has been observed in the UK. An understanding of the relationship between part time employment and job satisfaction will further complement arguments for greater flexibility in hours in the labour market. This is of particular importance for the UK where previous research (for example, Connolly and Gregory, 2008) has argued that increasing access to flexible working in higher occupational groups will diminish the negative occupational and wage effects of moving into part time employment.

The research carried out in this chapter additionally has implications for achieving a good state of well being. Being in a good state of well being means that an individual is not only in the absence of pain and discomfort, but also that their basic needs are being met, they hold a sense of purpose, and are able to achieve goals and participate in society (Frey and Stutzer, 2002a). Throughout Europe mental illnesses are currently becoming a huge burden on society; 40 percent of all disability in Europe is due to mental illness (WHO, 2008). Furthermore in the UK, a study by DWP found that 34 percent of incapacity benefit claimants with a health condition or disability suffered from depression, and 30 percent of these individuals suffered from stress or anxiety (DWP, 2007). Research into the determinants of mental well being has important implications for raising quality of living standards,

increasing the productivity of the work force, and reducing costs of health and social care.

4.3 Background

Part time employment is likely to affect job and life satisfaction through three different channels. Firstly, part time employment allows mothers to spend more time with their children than does full time employment, by allowing mothers to fulfil their role as a homemaker, and therefore adhere to social norms, part time employment may increase satisfaction with hours worked as well as overall well being. Previous research has recognised that the negative relationship between unemployment and well being is not just a result of the loss of income, but additionally the failure to comply with the social norm of employment, (Akerlof, 1980). Failure to comply with the social norm of employment means that unemployment results in psychic and social costs, (Frey and Stutzer, 2002b; Clark and Oswald, 1994; and Carrol, 2007). Similarly, failure to comply with social norms associated with a gender role ideal may have a detrimental impact upon an individual's overall level of well being. Therefore, satisfaction with part time employment is likely to be partially determined by the social norms surrounding gender roles present in each country. Akerlof and Kranton (2000) show that following the behavioural prescriptions for one's gender affirms one's identity as a man or a woman, and can increase the utility derived from such actions. Individuals may experience a loss of identity and utility by deviating from the norm. In countries which prescribe to the male breadwinner / female homemaker gender arrangement, part time employment may therefore increase employed mothers' satisfaction with hours of work and life satisfaction, as it allows them to adhere to their gender role to a greater extent that does full time employment.

Secondly, satisfaction with part time employment is likely to be driven by whether part time employment is a socially acceptable form of employment. As

noted above, individuals who do not comply with social norms of employment experience lower levels of life satisfaction (Frey and Stutzer, 2002b; Clark and Oswald, 1994; and Carrol, 2007). If part time employment is viewed as a purely marginal form of employment, as for instance in Spain where part time employment is used as a tool for managing fluctuations in demand and uncertainty in needs (Ruivo et al, 1998). Or if there is a very strong cultural traditions of hard work and full time employment amongst both sexes (as in Finland, Pfau-Effinger, 1998), then part time employment may not be viewed as a social norm and may have negative implications for life satisfaction, overall job satisfaction and potentially satisfaction with hours of work.

Finally, satisfaction with part time employment is likely to be determined by the quality of the job. Clark (2005) found that individuals in 1997 in 7 OECD countries rated type of job the most important aspect of the job. If it is the case that part time jobs are poor quality jobs then this will decrease satisfaction with the type of job, and have a negative impact on overall job satisfaction. Burchell et al (2002) have found a strong link between feelings of job insecurity and stress, indicating that poor quality jobs are likely to have a negative impact on life satisfaction. Furthermore, if part time jobs are found in low skill level occupation groups, then this may generate feelings of low self esteem and boredom, as workers carry out routine tasks below their own skill level. The quality of part time jobs offered to women is a result of the employment policies, and the institutional setting of part time employment within a country, and is likely to impact on an individual's overall job satisfaction and satisfaction with the type of work done. Recent research undertaken in the UK confirms that part time jobs are often segregated into low skill level occupation groups (Dex and Bukodi, 2010; Connolly and Gregory, 2008a; Manning and Petrongolo, 2008), and that this is likely to be an outcome of deregulation. On the other hand, women working part time in countries with highly regulated part time opportunities (as in the Netherlands) are unlikely to be either

more or less satisfied with their type of job as compared to their full time counterparts.

Previous work examining the impact of part time employment on job and life satisfaction has produced mixed evidence. Booth and Van Ours (2009) have found that part time women in Australia are more satisfied with their hours of work than are their full time counterparts, but they exhibit no higher levels of overall job satisfaction. However, partnered full time women's life satisfaction suffers as a result of working full time. In a study of British women, Booth and Van Ours (2008) predict that women will experience greater satisfaction with hours of work and greater life satisfaction as a result of being able to work part time, due to the increased flexibility in combining work and family life. They additionally predict that due to the poor nature of part time jobs, women who work part time will experience lower levels of overall job satisfaction. However, the findings from this study suggest that part time employment increases hours satisfaction and overall job satisfaction but has no implications for subjective life satisfaction. The authors suggest that these findings may indicate that women working in part time employment are conditioned to prefer jobs which offer fewer hours of work, or that there are societal constraints which make it difficult for women to combine work and family life, and therefore women working reduced hours employment are likely to be more satisfied with their jobs. Bardasi and Francesconi (2004) have used a sample of British women to observe the life and job satisfaction implications of working in temporary or part time employment. They find that neither part time nor temporary employment has any significant impact on life satisfaction, however working part time acts to increase job satisfaction.

This chapter aims to measure variations in satisfaction with part time employment as a result of institutional difference and differences in social norms. Above I have argued that differences in social norms between countries are likely to explain differences in the satisfaction of hours worked of part time workers across

different countries, and differences in the institutional setting are likely to partly explain differences in the satisfaction in the type of work for part time workers across different countries. As a result this study will measure satisfaction with hours worked, satisfaction with type of job and overall job satisfaction, as well as life satisfaction and mental well being. Below, differences between social norms and employment policies in the countries analysed are discussed. Table 4.1 presents a summary of the cultural traditions concerning gender roles established within each country, the employment policies regarding part time employment present in each country, and summary statistics.

4.3.1 The UK

Married women's labour supply and part time participation dramatically increased after WWII, and by 2008 75 percent of women were in employment (OECD, 2010). Currently, around 40 percent of employed females work part time (OECD, 2010). The growth in part time employment over the second half of the 20th century was a result of labour shortages in the 1960's and cultural traditions which determined that the woman's primary responsibility was the home and children (Burchell at al, 1997). Women were additionally keen to combine a career with childcare via part time employment, and these attitudes appear to have persisted; only 6 percent of women working part time in the UK are doing so involuntarily (European Foundation for the Improvement of Living and Working Conditions, 2007).

However, the existence of a liberal welfare state, trends of deregulation in the labour market and a tradition of the female home maker arrangement have all contributed to the poor quality of part time jobs. Female employment was partly created with a view of allowing women to maintain family responsibilities, therefore part time employment was typically undemanding and lacked promotional opportunities (Burchell et al, 1997). Furthermore, proposals from 1982 onwards for

the UK to adopt European Union directives[27] of part time work were blocked by successive UK governments until 1997. Until 1995, women working less than 16 hours a week did not qualify for employment protection. Tijdens (2002) has found that women working less than 20 hours a week receive no basic fixed income, receive less training and have lower job tenure. Working 20 hours a week is associated with these 'marginal' characteristics to a greater degree in the UK than in other European countries.

4.3.2 The Netherlands

The Netherlands experienced an increase in female labour supply over the second half of the 20th century, 78 percent of women aged 25-49 were in employment by 2008 (OECD, 2010). Similarly to the UK, this appears to have been due to an increase in part time employment, in 2008 74 percent of the female working population were working part time, (OECD, 2010). The traditional gender arrangement in the Netherlands reflected the male breadwinner model. However, a more modern view on the gender arrangement has prevailed in the Netherlands; a dual breadwinner / family carer gender arrangement currently exists and mothers appear to rather participate in part time employment than take on a housewife role, (European Foundation for the Improvement of Living and Working Conditions, 2007). These changes occurred due to a period of rapid modernisation post WWII, coupled with less traditional attitudes towards employment practices; for example 69 percent of men in the Netherlands would prefer part time to full time employment (Pfau-Effinger, 1998).

The period of rapid modernisation and democratisation experienced in the Netherlands throughout the second half of the 20th century resulted in the foundation of a feminist movement which fought for gender equality and the possibility of mothers combining careers and motherhood. This therefore helped

[27] Britain opposed two of the three linked EU Draft Directives on Atypical Working, 1982. The EU Directive on Part Time Working was adopted in 1997 across the EU, this guarantees part-time workers the same pay and working conditions as full-time workers.

promote the protection of part time employment (Pfau-Effinger, 1998). The trade unions additionally developed a strong policy for the promotion of part time employment, and these factors have led to a relatively high standard of working conditions and social security of part time jobs. Legal regulation of part time employment was additionally pursued; in 1996 the Prohibition of Discrimination by Working Hours Act was passed and the Adjustment of Working Hours Act in 2000 gave employees the right to alter the terms of employment contracts.

4.3.3 Germany

74 percent of women aged 25-54 were in employment in Germany by 2008 (OECD, 2010). In 2008, 39 percent of these women were working part, (OECD, 2010). Even though the female employment rate in Germany is comparable to that seen in other Western European countries, the part time employment rate is lower. In Germany there are traditionally strong values relating to family life and a housewife marriage, and gendered policies in the welfare state have been traditionally influenced by the male breadwinner ideal, (Pfau-Effinger, 1998). The limited usage of part time employment is a result of social norms which dictate conservative and traditional practices towards employment, (Ellingsæter, 1992). Thus, when modernisation occurred in Germany after WWII and feminist movements encouraged women to enter the labour market, they mostly did so via full time employment.

In Germany part time jobs were traditionally much less well protected than were full time jobs (Blossfeld and Rohwer, 1997). However, there has been a shift over time in the quality of part time jobs, throughout the 1980's part time workers could increasingly be found in skilled clerical and secretarial positions (Blossfeld and Rohwer, 1997). Furthermore, in Germany, discrimination between full time and part time employers has been prevented by law since the late 1980's and the majority of part time workers have stable and permanent employment contracts (Ellingsæter, 1992). However, sickness benefits are only available to those working

over 15 hours a week, and only those who work for longer than 18 hours a week are viable for unemployment insurance, (Pfau-Effinger, 1998).

4.3.4 Denmark

Denmark has a very high female employment rate but a fairly low female part time employment rate. 83 percent of women in Denmark were employed in 2008, and 28 percent of these women were working part time (OECD, 2010). In the initial post-war period, female labour force participation was low, 23 percent of working age females were employed in 1960 (Leth-Sørensen and Rohwer, 1997). The expansion in female employment occurred relatively later in Denmark, as in the Netherlands, as compared to other Western European countries.

The welfare state in Denmark is based on social democratic principles and gender policies are built on the idea of a dual earner / state carer gender arrangement. Employment and gender policies are constructed so that a mother is able to combine a full time career and childcare in the early maternal years, (Ellingsæter, 1992); the welfare state is committed to a goal of full employment.

In Denmark employment legislation does not discriminate between full time and part time jobs, employment legislation is based on principles of universalism. Part time employment is far from marginalized in Denmark, very few women work short part time hours, (Ellingsæter, 1992). Additionally, alongside a tradition of hard work, women in Denmark are less likely to get satisfaction from the flexibility that comes with working part time. 18 percent of part time women in Denmark were involuntary, compared to a European Union average of 13 percent, (European Foundation for the Improvement of Living and Working Conditions, 2007).

4.3.5 France

There is a long tradition of working women in France. French women are typically characterised by having a heavy workload as well as heavy domestic responsibilities, and they traditionally poses high levels of education and skill (Daune-Richard, 1998). In 2008 around 77 percent of women aged 25-49 in France

participated in the labour market (OECD, 2010), around 28 percent of these women were in part time employment, (OECD, 2010). The gender arrangement in France reflects ideas that women are home makers and there is little sharing of household tasks within couples (Daune-Richard, 1998). However, French women simultaneously remain very much attached to full time employment; this can largely be explained as a result of feminist attitudes.

The welfare state allows women to fulfil this dual role as homemakers and career women, for example via high rates of public childcare provision (Daune-Richard, 1998). Because when French women first entered the labour market they followed the model of male full time workers, part time work is viewed unfavourably. Part time work came about as a result of job shortages in the 1970's and 1980's, and is not viewed as a realistic option for women who have a high degree of education and skill, and wish to progress their careers. As a result, part time employment in France usually involves the most vulnerable members of the labour force, new entrants and returners and those in low skill level jobs, 25 percent of female part time workers are involuntary (European Foundation for the Improvement of Living and Working Conditions, 2007).

4.3.6 Finland

Traditionally there has been a very high rate of female employment in Finland. 66 percent of Finnish women were already in employment in the 1950's (Pfau-Effinger, 1998) and by 2008 this had increased to 82 percent (OECD, 2010). In 2008 only 12 percent of working women were employed in a part time job; part time employment has been inconsequential in integrating women into employment in Finland, (OECD 2010).

The small degree of part time employment seen in Finland is a result of social norms and gender arrangements based on a egalitarian division of labour. Both gender roles are given equal social worth by the welfare state which promotes a dual breadwinner state carer model (Pfau-Effinger, 1998). In the 1950's and

1960's children increasingly became viewed as the responsibility of the welfare state, therefore there is a comprehensive public childcare system which facilitates the full time employment of mothers. Moreover, there is a strong work ethic in Finland and full time employment is the cultural norm, working part time or taking long parental leave is associated with a high risk of social stigmatism (Pfau-Effinger, 1998), for example 34 percent of those who do work part time do so involuntarily, (European Foundation for the Improvement of Living and Working Conditions, 2007). Thus, institutional and cultural factors appear to contribute towards a low rate of female part time employment.

4.3.7 Spain

The Spanish labour market is characterised by a very moderate amount of female employment, around 63 percent of women aged 25 to 54 years were employed in Spain in 2008 (OECD, 2010). Furthermore, there is a very small incidence of part time employment amongst the female work force; in 2008 just 9 percent of female workers were employed in part time jobs in Spain, (OECD, 2010) and 19 percent of this part time employment is involuntary, (European Foundation for the Improvement of Living and Working Conditions, 2007). The traditional gender arrangement in Spain reflects the male breadwinner / female homemaker gender arrangement, more modern ideas and feminist movements in the post-war period encouraged female labour force participation, although due to strong religious traditions for a housewife marriage the extent of women entering the labour force was smaller than that seen in Northern European countries, (Ruivo et al, 1998).

The main reason individuals accept part time jobs in Spain is due to a failure to find a full time job (Ruivo et al, 1998). In Spain part time jobs are most typically just used for traditional reasons, to cope with uncertain demand and meeting flexibility needs. This means that part time jobs remain segregated in the same levels of activity, the majority of part time jobs are in retail and the hotels and catering sectors of the economy, (Ruivo et al, 1998).

4.4 Methodology

The dependent variables used in this analysis to measure satisfaction with hours of work, satisfaction with type of work, overall job satisfaction and subjective life satisfaction are ordered discrete variables where higher numbers indicate higher levels of satisfaction.

A cross sectional analysis of the determinants of satisfaction would merely establish a correlation rather than causation. Unobserved individual effects, such as specific personality types are likely to be correlated with both the explanatory variables used in the estimations, and with the propensity to report happiness, potentially creating bias in the regression coefficients if not properly controlled for. Therefore, in order to get some idea of causation it is necessary to use panel data techniques which can control for the impact of individual specific unobserved effects which are fixed over time. Even though it may be the case that factors which affect selection into employment also affect the job satisfaction scores, generating selection bias in the results, selection correction techniques are not implemented because the analysis is motivated by the difference in the well being of part time workers relative to that of full time workers, not relative to the well being of individuals not in employment; the analysis is done conditional on employment.

The cross sectional and fixed effects models described in this section are both based on the following assumptions, where S_i is the individual's level of satisfaction and W_i denotes some underlying metaphysical concept called welfare,

i. Satisfaction is interpersonally ordinally comparable: if $S_i > S_j$ then $W_i > W_j$.

ii. There are time invariant unobserved factors (f_i) related to levels of the observed characteristics, $\text{cov}(f_i, x_{it}) \neq 0$.

Before panel data methods are discussed the cross sectional ordered logit model is presented.

$$y^* = \mathbf{x}\beta + e \tag{4.1}$$

Where y^* is the latent variable, $\mathbf{x}$ is a vector of explanatory variables, β a vector of coefficients and e is the error term. If $\eta_1 < \eta_2 < ..... < \eta_j$ are unknown cut off points then we let the observed variable y take the form,

$y = 0$ if $y^* \leq \eta_1$

$y = 1$ if $\eta_1 < y^* \leq \eta_2$

And so on so that,

$y = J$ if $y^* > \eta_j$

The pooled ordered logit model takes the form,

$$\Pr(y_{it} = j) = \Lambda(\eta_j - \beta' x_{it}) - \Lambda(\eta_{j-1} - \beta' x_{it}) \tag{4.2}$$

j represents the response category (in the current analysis there are 6 possible response categories) and $\eta_0 = -\infty$, $\eta_1 = 0$ and $\eta_5 = \infty$. Where η_j are unknown parameters to be estimated jointly with β, y_{it} indicates the satisfaction of individual i in time t, Λ indicates the logisitic cumulative distribution function, and α_j represents the intercept for category j. Equation (4.2) indicates that the probability that the observed variable y_{it} equals j is the probability that the latent variable, y^*, lies between η_{j-1} and η_j.

Previous work has attempted to control for unobserved individual effects in satisfaction analysis by dichotomising the dependent variable at a given cut off point and then applying Chamberlain's fixed effect conditional logit model (Chamberlain, 1980). For example, Hamermesh (2001) reduces a 5 point job satisfaction scale measure to a (0,1) scale by choosing a cut off point of 3, and Winkelmann and

Winkelmann (1998) reduce a 10 point general satisfaction scale by using a cut off point of 7 so that the model becomes,

$$y_{it}^{*} = x_{it}\beta + f_i + e_{it} \tag{4.3}$$

Where f_i is the individual fixed effect, and the observed variable y is given by,

$$y_{it} = I\left(y_{it}^{*} > 0\right) \tag{4.4}$$

The statistic suggested by Chamberlain (1980) is

$$P\left[y_{i1},\ldots, y_{iT} \middle| \sum_t y_{it}, \beta, f_i, \mathbf{x}_{it} \right] = \frac{e^{\sum_t (y_{it}\mathbf{x}_{it})\beta}}{\sum_{y_{it}\in s\left(\sum_t y_{it}\right)} e^{\sum_{t=1}^{T} I(y_{it}>0)\mathbf{x}_{it}\beta}} \tag{4.5}$$

This is the probability of observing $y_{i1},\ldots, y_{iT}$, conditional on their sum. $s\left(\sum_t y_{it}\right)$ indicates the set of all possible combinations of $y_{i1},\ldots, y_{iT}$ that sum up to $\sum_t y_{it}$. Only individuals who move across the cut off point are used. This method eliminates the individual fixed effect, f_i.

The drawback of this method is that only those individuals who move across the cut off point in the sample period are used in the analysis, resulting in large efficiency losses. Furthermore, the results are likely to be sensitive to the arbitrarily chosen cut off point.

In contrast, this chapter uses the fixed effects ordered logit model as suggested by Ferrer-i-Carbonell and Frijters (2004). This is a more efficient estimator and has previously been used in this literature by Booth and van Ours (2009). Again, the dependent variable is collapsed to a binary variable, however it is done so by an individual specific recoding of the data. Here individual fixed effects and individual specific thresholds are introduced.

$$\Pr(y_{it} = j) = \Lambda\left(\eta_{ij} - f_j - \beta' x_{it}\right) - \Lambda\left(\eta_{ij-1} - f_i - \beta' x_{it}\right) \tag{4.6}$$

$$y_{it}^{*} = x_{it}\beta + f_i + e_{it} \tag{4.7}$$

$$y_{it} = k \Leftrightarrow \eta_k^i \le y_{it}^{*} < \eta_i^{k+1} \tag{4.8}$$

η_k^i are individual specific thresholds such that $k = 0,...,K$. A specific barrier k_i is chosen for every individual; this is set as the individual mean for the purposes of this analysis (Booth and Van Ours, 2009). The dependent variable is then given a different value when observed satisfaction is above or below the individual mean value. All observations for which $y_{it} > k$ are transformed into $y_{it}^* = 1$ and all observations for which $y_{iy} \leq k$ is transformed into $y_{it}^* = 0$.

The conditional logit statistic is given by,

$$P[I(y_{it} \rangle k_i)] = \frac{e^{\sum_{t=1}^{T} I(y_{it} \rangle k_i) x_{it}\beta}}{\sum_{y \in s(k_i,c)} e^{\sum_{t=1}^{T} I(y_{it} \rangle k_i) x_{it}\beta}} \tag{4.9}$$

Here, $0 < c < T$ and $s(k_i, c_i)$ denotes the set of all possible combinations of $y_{i1},...,y_{iT}$ for which $\sum_t I(y_{it} \rangle k_i) = c_i$, c_i denotes the number of times satisfaction is above the individual specific barrier k_i. This is the same estimator as in the fixed effect conditional logit case, again the data is collapsed to a binary variable, however this time it is applied to an individual specific recoding of the data via the free parameter k_i. This means that it is now possible to include the satisfaction score of all individuals whose score changes; not just those whose score moves over a given cut-off point, whilst eliminating the individual specific unobserved effect, f_i. Table 4.2 illustrates that for the overall job satisfaction dependent variable a very high proportion (between 77 and 85 percent) of the employment observations from all the countries analysed are from individuals whose overall job satisfaction score changes over the observation period, and therefore can be used to estimate the fixed effect ordered logit models to predict overall job satisfaction.

There is concern that responses to subjective job or life satisfaction questions may systematically differ across populations, this may occur due to cultural differences (Daykin and Moffatt, 2002), or past experiences which lead to

differing perceptions of 'very satisfied at work' or 'very unsatisfied at work'. This problem has previously been referred to as 'state-dependent' reporting behaviour (Kerkhofs and Lindeboom, 1995), or 'scale of reference bias' (Groot, 2001), and occurs when different groups systematically use different threshold levels when assessing subjective satisfaction or well being despite having the same true level of well being (Lindeboom and van Doorslaer, 2004). Failure to properly account for heterogeneous thresholds means that the results may reflect differences in reporting behaviour rather than differences in well being.

Accordingly, the robustness of the cross sectional ordered logit models which examine overall job satisfaction is tested by implementing a model of differential reporting in ordered logit models; the generalised ordered logit model Williams (2006) allows individual specific parameters to vary with different values of the covariates. The totally unconstrained generalised ordered logit model takes the following form,

$$\Pr(y_{it} > j) = g(x\beta_j) = \frac{\exp(\alpha_j + x_{it}\beta_j)}{1 + [\exp(\alpha_j + x_{it}\beta_j)]} \tag{4.10}$$

Likelihood ratio tests are carried out between the generalised orderd logit and the ordered logit models estimating overall job satisfaction for each country, where the null hypothesis is that the two specifications are equivalent. A rejection of the null hypothesis will suggest that it is necessary to allow for differential reporting in the ordered logit models.

4.5 Data

This analysis aims to establish the well being attributes of part time employment for a sample of employed mothers. The focus is on three different aspects of job satisfaction (overall job satisfaction, satisfaction with type of work and satisfaction with hours of work). The effect of part time employment on measures of subjective life satisfaction and mental well being are additionally analysed for British

mothers. The focus is solely on women with children because it has been well established that part time jobs are damaging to the career progression of women in the UK, and that very large proportions of mothers in the UK and in other Western European countries engage in part time employment, particularly around the childbirth period (Paull, 2008).

The empirical analysis will use waves 2-8[28] (1995-2001) of the ECHP survey for, France, the Netherlands, Denmark, Spain, and Finland. The first waves 2-3 (1995-1996) of the ECHP are used for Germany, in 1997 the German element of the ECHP was replaced with the German national household longitudinal surveys; the German Socio-Economic Panel (SOEP). Previous information for these respondents is also given for 1994-1997, however the data from the SOEP does not include the dependent variables used in this analysis. The first 17 waves (1991-2007) of the BHPS are additionally used to analyse job satisfaction and life satisfaction for British women. This separate dataset is used for British women because the BHPS includes information on life satisfaction (which the ECHP does not), and because there are a high proportion of missing values for two of the dependent variables (satisfaction with hours of work and satisfaction with type of work) in the ECHP for women from the UK. Both surveys are longitudinal surveys of representative households in the respective countries.

Because we are interested in measuring job satisfaction with part time employment relative to that with full time employment, the analysis is restricted to a sub-sample of employed mothers of children under 12 years who are aged between 25-50 years; prime-aged women who are confronted with choices concerning family life and paid work. Because of the reliance on fixed effects estimation the sample is further restricted to those present in at least two consecutive waves.

[28] In the current analysis it is not possible to use the first wave of data from the ECHP because the variable which indicates the number of children aged 0-12 years in the household (the variable used to identify 'motherhood' status in this analysis) is missing for each individual in this wave.

Because the data for mothers from the UK comes from a separate dataset it is not possible to pool the data from each country used in this analysis when estimating the cross-country differences in the impact of working part time on well being. It is possible to pool the data on mothers from Germany, Denmark, the Netherlands, Finland, France and Spain, however conducting likelihood ratio tests between restricted models which pool the data from these six countries and unrestricted models (where one regression is estimated for each country) indicates that the unrestricted models provide a better specification for the given data (appendix 4c).

4.6 Variables

Three dependent variables are used in the analysis of the ECHP. The first analyses the respondents' overall job satisfaction, and is derived from the following question,

'How satisfied are you with your present situation in the following areas?.... Your work or main activity'

Two more dependent variables are obtained from the following question

'How satisfied are you with your present job or business in terms of...type of work'

and,

'How satisfied are you with your present job or business in terms of...hours of work'

All three questions are answered on a 1-6 scale, where higher numbers denote higher levels of satisfaction.

The same 3 dependent variables are used in the BHPS analysis. The following question from the BHPS is used to generate the variable which measures overall job satisfaction,

'All things considered, how satisfied or dissatisfied are you with your present job overall using the same 1-7 scale?'

The variables concerning satisfaction with type of work and satisfaction with hours of work are generated from the following question,

'I'm going to read out a list of various aspects of jobs, and after each one I'd like you to tell me from this card which number best describes how satisfied or dissatisfied you are with that particular aspect of your own present job.'

Two of the aspects include 'the actual work itself' and 'the hours you work'. The respondents are asked to rate their satisfaction with these aspects of their work on a 1-7 scale where a higher number indicates a higher level of satisfaction.

The questions concerning overall job satisfaction, satisfaction with hours of work and satisfaction with type of employment remain very similar between the BHPS and the ECHP questionnaires.

Because we are not only interested in the impact of part time employment on satisfaction with job attributes, but also on life satisfaction and mental well being, additional dependent variables are analysed using the BHPS to measure how part time employment affects the well being of a sample of British mothers. Subjective life satisfaction is measured with the following question,

'How dissatisfied or satisfied are you with.....your life overall'

The answers range from 1 to 7, where 7 is completely satisfied. However, this question is only included in waves 6-10, and 12-17. The GHQ measure[29] of mental well being is included in every wave and is also used as a measure of happiness (Clark, 2003; Clark and Oswald, 1994; Bardasi and Francesconi, 2004). The GHQ score is derived from the GHQ-12, the 12 item mental health questionnaire. This is typically used for detecting psychiatric disorders, it is based on a 0-36 scale where

[29] This measure converts answers from 12 questions related to subjective mental well being to a single scale which ranges from 0 (the least distressed) to 36 (the most distressed). This is done by recoding the scales of the individual variables to 0-3 instead of 1-4, then summing each individual's responses to the 12 questions.

higher numbers indicate worse levels of mental well being. The negative values of the scale are used in the analysis, so that a positive coefficient will indicate a positive effect on well being.

Subjective job and life satisfaction variables are utilised in order to proxy the welfare enhancing capabilities of the job and individual welfare respectively. Frey et al (2009) indicate that a measure of subjective well being will serve as a proxy for welfare as long as "the standards underlying people's judgments are those the individual would like to pursue in his or her ideal of the good life" (Frey et al, 2009, p.5). Similarly, subjective measures of job satisfaction will provide a good understanding of the welfare enhancing capabilities of the job are long as the standards underling people's judgements are those the individual associates with their understanding of a good job.

A dummy variable indicating that a woman works in part time employment relative to full time employment will be the explanatory variable of interest in all of the regression analysis. This is constructed using the hours of work variable, a cut of point of 30 hours is chosen so that anyone working less than 30 hours[30] is working part time. The OECD suggest defining part time employment using a cut off of between 30-35 hours a week. In the ECHP part time employment is defined as working less than 30 hours a week, and for the UK this is the most common classification of part time employment (Connolly and Gregory, 2008; Manning and Petrongolo, 2008).

Following the job satisfaction literature, a number of further controls are included in the regressions (Booth and Van Ours, 2009; Bardasi and Francesconi, 2004; Clark and Oswald, 1994; Frey and Stutzer, 2002b). A set of personal controls includes the respondent's age and highest educational qualification. In the ECHP educational qualifications are described by the International Standard Classification of Education (ISCED). Dummy variables which indicate whether the respondent has

[30] The number of hours of work reported excludes any over time.

achieved a tertiary level of qualification (ISCED levels 5-7; synonymous with NQF[31] level 4 or above in the UK), whether the respondent has achieved a qualification at second stage of secondary education (ISCED level 3; comparable to NQF levels 2 and 3 in the UK) are compared to a base category of achieving a lower qualification. In the BHPS analysis the educational variables reflect whether the woman has a degree level qualification (NQF level 4 or above), an A level standard qualification (NQF level 3) or an O level standard qualification (NQF levels 1 and 2) relative to no qualifications. An indicator for any respondents living in social housing (proxied by accommodation being provided rent-free in the ECHP) is included in both the ECHP and BHPS samples. A dummy variable that indicates whether the respondents consider themselves to be in good health is included in the job satisfaction regressions.

A set of job characteristic variables is included in the job and life satisfaction equations. This includes whether the respondent is on a temporary or fixed contract (in the ECHP the temporary variable additionally includes casual workers), whether the individual works in the public or private sector, the size of the firm the individual works for (the impact of being in a firm with 1-99 employees or 100-499 employees is compared relative to being in a firm with 500 or more employees), as well as the one-digit industrial classification.

Through the impact of close relationships and stability, the family structure is an important determinant of well being, (Frey and Stutzer, 2002b). Therefore, marital status is included as a regressor in the job and life satisfaction equations (being married or cohabiting, is compared to the base category of those who are not married). Whether the respondent has had a childbirth in the previous wave (the previous year), the number of children under the age of 12 years and the number of

[31] NQF is the National Qualification Framework for the UK. The comparisons between the ISCED and NQF are cited from Bosworth and Kik (2009).

children aged between 12-15 years in the household[32], are additionally included into the regressions. The real level of household income, excluding the respondent's labour income, and adjusted for purchasing power in included in Euros in the ECHP analysis, and in Sterling in the BHPS analysis.

A further set of variables are included which attempt to control for the impact of time constraints on mothers of young children. In the ECHP analysis two variables are included which show whether the respondent spends more than 20 hours a week caring for children, or whether the respondent spends more than 20 hours a week caring for any other individual. In the BHPS analysis one variable is included which indicates whether the respondent spends more than 20 hours a week caring for either a child or anyone else.

4.7 Descriptive statistics

Table 4.3 presents the mean values of the job satisfaction variables by country and part time status from the ECHP dataset. Table 4.4 presents the mean values of these same variables, as well as the mean values of a subjective life satisfaction variable, and the GHQ score from the BHPS dataset. The analysis undertaken in this chapter for the UK just uses the variables from the BHPS dataset, because of too many missing values in the ECHP. However, in this section the UK data from the ECHP is additionally discussed because of the inconsistency in the scaling of the job satisfaction variables between the two datasets. The job satisfaction variables in the ECHP are asked on a 1-6 scale, however in the BHPS they are asked on a 1-7 scale. The descriptive statistics presented in table 4.3 and table 4.4 show that there is consistency between the data from the UK in the ECHP and the data from the BHPS.

[32] The ECHP does not provide any greater detail concerning the ages of children in the household.

The descriptive statistics in panel a of table 4.3 indicate that in Denmark, the Netherlands, and the UK, overall job satisfaction is, on average, slightly greater for mothers who are in part time employment, than for those who are in full time employment. The extent of these differences is however fairly small. Given the male breadwinner / female carer cultural traditions which prevail in the Netherlands and the UK, it is likely that women may prefer to combine motherhood and their career by working part time rather than working full time, since they can spend a larger amount of time with their family. In Denmark the positive effect of part time employment on job satisfaction is likely to be a result of being able to enjoy a greater amount of leisure time whilst maintaining a similar quality job as if the individual was in full time employment, in fact in panel b we see that Denmark is one of only two countries where those working part time report greater satisfaction with the type of work than do those working full time.

In Germany, Finland, France and Spain, those working part time report lower average levels of overall job satisfaction than do those in full time employment. This is likely to be a result of the fact that part time employment is much less frequent in these countries, and therefore less accepted as a non-marginal form of employment. When part time employment is used in these countries it is often done so to meet excess demand, or undertaken by the most vulnerable members of the labour market who cannot find full time employment, part time jobs are typically of poor quality in these countries.

In Denmark and Finland, mothers working in part time employment report higher average satisfaction with the type of work than do those working in full time employment. This result is unexpected for Finland where part time employment is most often carried out by those with the lowest labour market attachment, and is typically a marginalised form of employment. However, in Denmark employment policies based on principles of universalism (policies do not discriminate by labour market position) have acted to ensure the good quality of part time jobs.

Assuming that individuals get utility from leisure time, we would expect to see part time workers reporting greater levels of satisfaction with hours of work. The descriptive statistics in panel c of table 4.3 indicate that on average satisfaction with hours of work is greater for women working part time than full time in all countries except Finland and France. In both of these countries, part time employment is not viewed as a socially acceptable form of employment and strong cultural traditions of full time employment exist in both countries. In Finland part time employment is associated with social stigmatism (Pfau-Effinger, 1998).

The higher levels of satisfaction with hours of work found for women in Germany, the Netherlands, Spain and the UK may be explained by the traditional cultural ideas surrounding the gender arrangement in these countries; because the social norm suggests that, or because women have been brought up to want to spend time with their own children, women in these countries are likely to prefer to work shorter hours in order to spend more time with their children. However, the fact that we also observe mothers working part time in Denmark experiencing higher levels of satisfaction with hours of work than their full time counterparts suggests that having more hours of leisure time may increase satisfaction with hours of work as long as part time employment is a socially acceptable form of employment.

The descriptive statistics presented in table 4.4 indicate that mothers in the UK working in part time employment report slightly higher levels of subjective life satisfaction than do those in full time employment. However, mothers from the UK in part time employment appear to have slightly lower levels of mental well being on average, than do their full time counterparts (part time mothers report a very slightly higher GHQ score on average than do full time mothers). The impact of part time employment on overall well being appears to be unclear.

The descriptive statistics presented in table 4.3 and table 4.4 suggest that the positive implications of part time employment on overall job satisfaction will act to outweigh, to some extent, any negative effects on well being arising from the poor

quality of part time jobs experienced by mothers in the UK. However, the descriptive statistics do not provide convincing evidence that there will additionally be positive implications on overall well being and life satisfaction.

4.8 Results

4.8.1 *Overall job satisfaction*

Table 4.5 (panel a) presents estimated coefficients on the part time explanatory variable from the pooled cross sectional ordered logit models estimating overall job satisfaction, for mothers in Germany, Denmark, the Netherlands, Finland, the UK, France, and Spain. Table 4.6 (panel a) presents estimated coefficients on the part time explanatory variable from the fixed effects ordered logit models measuring overall job satisfaction for mothers from the same countries.

The results from the overall job satisfaction estimations, presented in table 4.5 (panel a) indicate that working part time has an insignificant effect on overall job satisfaction in the cross section for mothers from Germany, Finland, France and Spain. Working part time has a significant positive effect on overall job satisfaction in Denmark, the Netherlands, and the UK. The magnitude of this effect is largest for the UK, with a coefficient of 0.24. The marginal effects (table 4.12, appendix 4a) indicate that working part time in Denmark increases the probability of being in the 'fully satisfied' category (category 6) by 5 percent, and reduces the probability of being in any other category. In the Netherlands and the UK, working in part time employment increases the probability of being in the highest 2 categories (categories 5 and 6 for the Netherlands, and categories 6 and 7 for the UK) by around 2 percent in the Netherlands for each category, and by 2 and 3 percent in the UK for categories 6 and 7 respectively.

The generalised ordered logit results (table 4.11) suggest that differential reporting in ordered logit models needs to be taken account of for each of the countries analysed when estimating overall job satisfaction; the null hypothesis of

the likelihood ratio test between the ordered logit and generalised ordered logit models estimating overall job satisfaction is rejected for each country. The results in table 4.11 reinforce the positive effect that part time employment has on overall job satisfaction for mothers in Denmark, the Netherlands and the UK. The results indicate that for mothers in Denmark, part time employment purely acts to move mothers towards the very top of the distribution of overall job satisfaction; it increases the probability that mothers will be in the very highest category of overall job satisfaction. However, for mothers in the Netherlands and the UK, part time employment acts to push mothers away from the most negative attitudes concerning overall job satisfaction.

The fixed effects results on overall job satisfaction (panel a of table 4.6) show that once unobserved characteristics are controlled for, working part time only has a significant positive impact on overall job satisfaction for women in the UK; the positive effect becomes insignificant for mothers in Denmark and the Netherlands. Furthermore, the magnitude of the coefficient on the part time variable for the UK falls to 0.20. The impact of part time employment on job satisfaction for women in Germany, Finland, France and Spain remains insignificant.

In panel b of (table 4.7) the part time employment variable has been interacted with the skill level of the occupation[33] that the respondent is in. Column 1 in table 4.7 displays the regression coefficients on these interaction terms from the pooled ordered logit and the fixed effects ordered logit model measuring overall job satisfaction for a sample of British mothers only. The results from the fixed effects analysis suggest that is the mothers in the medium and high skill level occupational groups whose job satisfaction is increased the most by working part time relative to working full time. The positive significant effect does not hold for women in the low skill level occupations in the fixed effects analysis.

[33] The skill ranking of occupations is explained in appendix 3a.

Table 4.16 in appendix 4b presents the regression coefficients from all explanatory variables included in the cross sectional and fixed effects overall job satisfaction regressions for the UK. Once individual level fixed effects have been controlled for demographic and household characteristics have little impact on overall job satisfaction. However, the results show that working in a temporary job has a large negative impact on overall job satisfaction, and working in the public sector has a large positive effect.

4.8.2 Satisfaction with type of work

The results presented in panel b of table 4.5 show the estimated coefficients on the part time explanatory variable from pooled cross section ordered logit models measuring satisfaction with the type of work for women in Germany, Denmark, the Netherlands, Finland, the UK, France, and Spain. The results in panel b of table 4.6 show the estimated coefficients on the part time explanatory variable from the fixed effects ordered logit models estimating satisfaction with type of work for samples of women from the same countries.

The cross sectional results estimating satisfaction with type of work indicate that mothers in Germany, Denmark, Finland, France, Spain the UK experience no significant relationship between working part time and satisfaction with the type of work in the cross section. However, the cross sectional results indicate that working part time is likely to lower satisfaction with the type of work done in the Netherlands and the magnitude of this effect is around -0.10. The marginal effects indicate that working part time in the Netherlands decreases the probability of being in the top 2 categories of the satisfaction with type of work done variable and increases the probability of being in any other category, the magnitude of these effects is very small.

Panel b of table 4.6 indicates that when satisfaction with the type of work is analysed in a fixed effects framework mothers in the Netherlands are slightly less satisfied with the type of work done (coefficient of -0.18). Furthermore, a significant

positive relationship between working part time and satisfaction with type of work if found for French mothers after accounting for unobserved heterogeneity. The magnitude of this effect is 0.19 and this is significant at the 10 percent significance level.

4.8.3 Satisfaction with hours of work

The results displayed in panel c of table 4.5 illustrate the estimated coefficients from the part time explanatory variable in the pooled cross section ordered logit models measuring satisfaction with hours of work for mothers in Germany, Denmark, the Netherlands, Finland, the UK, France, and Spain. Panel c of table 4.6 displays the estimated coefficients on the part time explanatory variable from the fixed effects ordered logit models measuring satisfaction with hours of work for samples of mothers from the same countries.

The cross sectional results (panel c, table 4.5) indicate a very strong positive relationship between part time employment and satisfaction with hours of work in all countries except Finland and France. The marginal effects (table 4.14, appendix 4a) indicate that working part time in Finland and France has no significant impact on being in any category of the satisfaction with hours of work variable.

The magnitudes of the estimated coefficients displayed in panel c of table 4.5 are much larger than those found in panels a or b of table 4.5. The largest positive relationship between part time employment and satisfaction with hours of work is found in Denmark (1.30), and then in the UK (0.86). The smallest significant positive relationship between part time employment and satisfaction with hours of work is found in Spain (0.46), however the magnitude of this coefficient is still large in comparison to those displayed in panels a and b of table 4.5.

The marginal effects (table 4.14) show that working part time in Denmark increases the probability of being in the highest category of the satisfaction with hours of work variable (category 6) relative to any other category, the magnitude of this effect is 31 percent. In Germany, the Netherlands, Spain and the UK, working

part time increases the probability of being in the highest 2 categories of the satisfaction with hours of work variables (categories 5 and 6 for Germany, the Netherlands and Spain, and categories 6 and 7 for the UK), and decreases the probability of being in any other category. In the Netherlands and the UK working part time increases the probability of being in the highest category of the satisfaction with hours of work variable, relative to any other category, by 14-15 percent.

The results shown in panel c of table 4.6 illustrate that after taking unobserved heterogeneity into account, mothers in Denmark, the Netherlands, and the UK still exhibit strong significant positive relationships between working part time and satisfaction with hours of work. These effects are of a slightly smaller magnitude that those displayed in panel c of table 4.5. However, for mothers in Germany after accounting for individual fixed effects the significant positive relationship between part time employment and hours of work no longer holds. Again there is an insignificant effect of part time employment on satisfaction with hours of work for French mothers, however panel c of table 4.6 indicates that after accounting for unobserved heterogeneity there is a large negative significant relationship between part time employment and satisfaction with hours of work for mothers in Finland.

4.8.4 Life satisfaction and mental well being

The impact of working part time on life satisfaction and well being has been analysed just for the sample of British mothers. Column 2 of table 4.7 illustrates the estimated coefficients on the part time variables in a pooled ordered logit and in a fixed effects ordered logit model, which both analyse self-reported life satisfaction. Column 3 of table 4.7 displays the estimated coefficients on the part time explanatory variables in a cross section linear regression and in a linear fixed effects regression which both analyse the GHQ score (mental well being).

The results in panel a of table 4.7 indicate that in the cross section working part time has a positive significant impact on self-reported life satisfaction with a

coefficient of 0.13. The marginal effects from the overall life satisfaction cross sectional ordered probit model (table 4.15) shows that working part time in the UK increases the probability of being in the highest 2 categories (categories 6 and 7) of the overall life satisfaction variable, relative to any other category by around 1-2 percentage points, and has a negative impact on being in any other category of this variable. In the fixed effects framework being employed in part time relative to full time work has no significant impact on self-reported life satisfaction. The results presented in panel a of table 4.7 for mental well being indicate that working in part time employment relative to full time employment has no significant impact on the GHQ score for a sample of mothers from the UK.

In panel b of table 4.7 part time status is interacted with the skill level of occupation. In the cross sectional analysis the positive significant relationship between part time employment and overall life satisfaction remains for only those working in the highest skill level occupational groups. However, in the fixed effects framework working part time relative to full time does not have a significant impact on self-reported life satisfaction or on mental well being for this sample of mothers from the UK.

4.9 Switching from full to part time employment

In the UK mothers are more likely to work part time than are their childless counterparts; around 60 percent of employed mothers of a dependent child and 40 percent of all employed women are in part time employment (ONS, 2008). Mothers' part time employment commonly occurs as an interruption to a full time career and the transition to part time employment most commonly occurs around the timing of the first childbirth. Paull (2008) has shown that 43 percent of mothers in the UK move from full to part time employment over the first childbirth. Furthermore, these mothers display increased tendencies to work in part time employment for up to 10 years after the first childbirth (Paull, 2008). Recent findings have indicated that for

mothers in the UK, the transition into part time employment is likely to lead to movements to occupational groups associated with lower levels of average education or average pay (Dex and Bukodi, 2010; Manning and Petrongolo, 2008; and Connolly and Gregory, 2008). Furthermore, the analysis presented in chapter 3 of this thesis indicates that the movement from full time to part time employment generates a large pay penalty. In this section we investigate whether transitions from full to part time employment are a result of preferences, and the impact that these switches have on the mothers' overall job satisfaction and satisfaction with hours of work.

Conditional on the participation decision, the labour supply decision (in hours of leisure/consumption space) depends on the position of the budget constraint (which depends on the wage offer and the level of non-labour income), and the slope of the indifference curve (which depends on tastes for time spent at work relative to time spent in leisure). A movement to fewer hours of work would occur if there was an increase in non-labour income (provided leisure was seen as a normal good at the current hours of work), if tastes changed such that the marginal utility of leisure time increased relative to the marginal utility of time spent at work, if the wage increased (and the income effect dominates the substation effect), or if the wage decreased (and the substitution effect dominates the income effect).

A movement to fewer hours of work because of a change in tastes, because of an increase in non-labour income (provided that leisure is a normal good at the current hours of work), or because of an increase in the wage (when the income effect dominates the substitution effect) is likely to reflect an unconstrained movement in hours of work; these changes in hours of work reflect movements in individual's tastes or positive increases in endowments alongside attitudes which place value on increased leisure time. However, a movement to fewer hours of work because of a decrease in the wage (when the substitution effect dominates the income effect) is likely to reflect a constrained movement to fewer hours of work; for

the highest number of hours worked the marginal value of this time now lies below the marginal value of spending these hours as leisure time, therefore a rational utility-maximising individual must decrease the hours worked regardless of their tastes for work.

In the context of mothers' labour supply decision it can be argued that factors such as having a child (and therefore placing more value on time spent outside of work, relative to time spent at work), an increase in husband's income, or an increase in the mother's own wage constitute factors which may lead to an unconstrained movement to fewer hours of work. Hakim (2000) has previously argued that the decision to work part time is a result of preferences to spend time with children. On the other hand, a decrease in the mother's wage rate, or an increase in childcare costs, are likely to lead to constrained movements to fewer hours of work. Grant et al (2005) have previously suggested five reasons why a woman may choose to work in part time employment, whilst one of these related to preferences, four of these reasons related to constraints.

In this section, the overall job satisfaction and satisfaction with hours of work implications of moving from full to part time employment are analysed. A positive effect of this movement on satisfaction may suggest an unconstrained movement. The cross sectional ordered logit and fixed effects ordered logit models described in section 4.4 are again used in this analysis, the variables described in section 4.6 are additionally used, however three new explanatory variables are included in place of the part time dummy variable. These three variables indicate whether the individual has moved from full to part time employment, from part to full time employment, or remained in part time employment since the previous employment observation[34], relative to remaining in full time employment since the previous employment observation. Because these variables require prior information at each observation

[34] The previous employment observation is not constrained to be the observation in the previous wave. This is due to small sample sizes when this constrain is made.

point this means that each individual's first observation cannot be used in the regressions, a sub-sample of the observations is used. Table 4.8 presents the new sample sizes for each country as well as the proportion of employment observations where the respondents report having switched from full to part time employment, having switched from part to full time employment, having remained in part time employment and having remained in full time employment.

The results in table 4.9 present the estimated regression coefficients from the pooled cross section ordered logit models (panel a) and fixed effects ordered logit models (panel b) measuring overall job satisfaction. The results in table 4.9 suggest that mothers in the Netherlands and the UK experience higher levels of overall job satisfaction if they have moved from full to part time employment relative to having stayed in full time employment since the previous employment observation; suggesting an unconstrained movement. After controlling for unobserved heterogeneity mothers in the UK experience greater levels of overall job satisfaction by switching from full to part time employment, relative to having stayed in full time employment. However, no significant effect remains for mothers in the Netherlands once individual level fixed effects have been controlled for.

The results in table 4.10 show the estimated regression coefficients from the pooled cross section ordered logit models (panel a) and fixed effect ordered logit models (panel b) estimating satisfaction with hours of work. The results in table 4.6 indicated that after controlling for unobserved heterogeneity, mothers in Denmark, the Netherlands, and the UK experienced higher levels of satisfaction with hours worked as a result of working part time relative to full time. Similarly, in table 4.10 we observe that after controlling for unobserved heterogeneity, switching from full to part time employment, relative to having remained in full time employment, increases satisfaction with hours of work for mothers in the same three countries as well as in Spain. Furthermore, for all countries this effect is greater than that associated with having remained in part time employment.

4.10 Discussion

The traditional gender role arrangement is that of the male breadwinner / female carer model in Germany, the Netherlands, the UK and Spain. If the gender identity hypothesis holds then women in these countries working part time should experience greater satisfaction with hours of work, relative to those working in full time employment, as a result of being able to dedicate more time to children and the household. Part time employment increases satisfaction with hours of work in all four countries in the cross sectional analysis as well as in Denmark (where the gender arrangement is a dual earner / state carer model). After controlling for unobserved heterogeneity, this effect only remains significant in the countries where part time employment is accept as a social norm; Denmark, the Netherlands and the UK. The lack of a significant result between satisfaction with hours of work and part time employment for mothers in Germany and Spain in the fixed effects analysis may reflect the fact that longer hours of work, and more traditional employment practices, are viewed as the social norm in these countries.

The fact that we find a positive relationship between satisfaction with hours of work and part time employment for the three countries which all accept part time employment as a social norm, but have very different institutional arrangements and family policies, suggests that as long as part time employment is a social norm then the impact of increased leisure time will increase satisfaction with hours of work. Further support is found for this argument since mothers who work part time in Finland experience significantly lower levels of satisfaction with hours of work, once unobserved heterogeneity has been accounted for, than do their full time counterparts. In Finland a culture of hard work is encouraged and part time employment is associated with social stigmatism. Thus, these results suggest that increasing access to part time employment in the UK is likely to increase mothers' well being.

The results from the switching analysis indicate that after unobserved heterogeneity has been accounted for, mothers in Denmark, the Netherlands, the UK and additionally Spain experience greater levels of satisfaction with hours of work as a result of having switched from full to part time employment, relative to having remained in full time employment, suggesting that for these mothers the movement is driven by preferences. Since we not only find this result for the countries where part time is accepted as a social norm (Denmark, the Netherlands, and the UK), but given that we additionally find this result for mothers in Spain, may suggest some support for the gender identity hypothesis.

However, this conclusion seems unconvincing given the relatively high rate of involuntary female part time employment and the marginalisation of part time jobs in Spain (Ruivo et al, 1998). Alternatively, the positive relationship between having moved from full to part time employment and satisfaction with hours of work could indicate that mothers in Spain gain satisfaction by moving into part time employment because constraints within society result in difficulties in combining full time work and family life. Indeed, it appears to be the case that mothers in Spain face the majority of the childcare burden due to extremely high childcare costs and limited family benefits, therefore acting to intensify constraints on their work life balance decisions. For example, in 2004 the average fee for a two year old attending childcare was 30 percent of the average wage in Spain, compared to an OECD average of 16 percent. Furthermore 1.24 percent of Spain's GDP was spent on family benefits in 2005, compared to an OECD average of 2.5 percent (OECD, 2008). Thus, the constraints on the work life balance decision may alter the preferences of mothers in Spain towards (otherwise unfavourable) part time jobs. Were such constrains not imposed on the mothers' work life balance decision then they may prefer to maintain in full time employment.

The results from the cross sectional analysis on the impact of part time employment on overall job satisfaction may indicate that it is just mothers who are

subject to traditional ideas which suggest a male breadwinner/female homemaker gender arrangement, and who live in an environment where part time employment is a social norm, who will experience greater overall job satisfaction (not just greater satisfaction with hours) as a result of working in part time employment; a positive relationship between overall job satisfaction and part time employment only exists for mothers in the UK and in the Netherlands. In the fixed effects analysis this positive relationship only remains significant for mothers in the UK. Furthermore, women in the Netherlands and the UK who switch from full to part time employment experience greater levels of overall job satisfaction, reflecting a movement to a preferential job. These results may reflect the positive impact of mothers being able to spend more time with their children and therefore adhere to norms of their gender identity, whilst also adhering to social norms of employment practices.

These results appear surprising given recent findings which have suggested that part time jobs in the UK are likely to be occupationally segregated 'dead-end' jobs (Dex and Bukodi, 2010; Connolly and Gregory, 2008; Manning and Petrongolo, 2008; and Connolly and Gregory, 2009), as well as the findings from chapter 3 in this thesis, which highlight the poor opportunities available to part time workers. Thus, again a possible explanation for this apparent contradiction is the existence of constraints within society which serve to intensify the work life balance decision for full time working mothers. Grant et al (2005) have previously highlighted that the decision to work part time is more likely to be a result of constraints rather than preferences. This argument can explain why we observe a positive relationship between overall job satisfaction and part time employment (or switching into part time employment) in the fixed effects analysis for mothers in the UK but not for mothers in the Netherlands. There has recently been an acceptance of a family carer role in the Netherlands; men are willing to engage in part time employment, 69 percent of men in the Netherlands reported they would prefer a part time to a full time job (Pfau-Effinger, 1998). Whereas, in the UK the burden of the child is still

viewed as being mainly the responsibility of the mother; while mothers are allowed up to a year of maternity leave, fathers are allowed just 2 weeks of paternity leave. Furthermore, around just 9 percent of employed men work part time, compared to over 40 percent of employed women (ONS, 2008). Additionally, whilst some free childcare is provided for children aged 3-4 years in the UK, none is provided for children younger than 3 years. These factors are likely to have a large effect on intensifying time constraints and decreasing the satisfaction of mothers who attempt to balance motherhood with full time hours of work in the UK. As with mothers in Spain, these constraints may alter preferences towards poor quality part time jobs.

The conclusion that the positive relationship between overall job satisfaction and part time employment observed for mothers in the UK may be a result of societal and institutional constraints, which make it very difficult for mothers to combine full time hours of work with family life, is strengthened by three further factors. Firstly, the fact that no significant relationship between part time employment and life satisfaction is identified for these mothers suggests that mothers in the UK do not have strong intrinsic preferences for part time employment, relative to full time employment. Secondly, the generalised ordered logit results indicate that working in part time employment pushes mothers in the UK away from the most dissatisfied attitudes concerning overall job satisfaction. This suggests that full time employment is synonymous with relatively high levels of dissatisfaction, potentially due to the difficulties mothers in the UK face in combining full time hours of work with family life. Thirdly, the positive relationship between part time employment and overall job satisfaction only exists for those towards the top of the occupational structure, where there is likely to be greater pressures on time demands.

Because part time employment allows mothers to make decision regarding how to combine work and family life in a less intensive manner than does full time employment, we would expect that it would additionally increase the life satisfaction

of mothers in the UK by relieving the stress associated with being faced with making acute work life balance decisions. However, contrary to previous work carried out on Australian women (Booth and Van Ours, 2009) the evidence provided in this chapter does not suggest that a significant relationship exists between working part time and increased life satisfaction for mothers in the UK. The positive relationship found between part time employment and subjective well being only holds in the cross section, and no significant relationship between working part time and mental well being is found. Even though the results suggest that mothers in the UK will be more satisfied with part time jobs in terms of the hours of work situation, and in terms of the overall job, it is additionally found that part time employment will have no positive effect on overall life satisfaction well being. Thus, there appears to be no positive implications of part time employment on overall life satisfaction, which would act to offset the negative wage and career implications.

A clear relationship between quality of employment and job satisfaction is not identified in the current results. A negative relationship between satisfaction with type of work done and part time employment is identified for women in the Netherlands, where previous research has indicated a lower rate of promotions amongst part time employees (Russo and Hassink, 2005). Furthermore, the results suggest that in the UK working part time in medium or high skill level occupational groups increases overall job satisfaction, this is consistent with previous findings for women in the UK, (Bardasi and Francesconi, 2004). Once unobserved heterogeneity has been accounted for, women in the UK working part time in lower skill level occupational groups do not experience greater job satisfaction than their full time counterparts, this is particularly worrying given the occupational segregation of part time jobs in the UK into lower skill level occupational groups (Dex and Bukodi, 2010; Connolly and Gregory, 2008; and Manning and Petrongolo, 2008). Thus, the results suggest that increasing access to good quality part time jobs will help to emphasise the well being implications of part time work.

The results found in this chapter have important implications. Firstly, the results indicate that in any country where part time employment is a social norm, working part time relative to full time will increase mothers' satisfaction with their hours of work. Therefore, working part time relative to full time is likely to have positive implications for the well being of mothers in the UK, in the respect that it relaxes the intensity of the balance between work and family life and allows mothers to spend more time with their children. Given that around 20 percent of women in the UK currently suffer from a depression or anxiety related disorder (The NHS Information Centre for Health and Social Care, 2009), and that the intensification of decisions regarding balancing work and family life is often cited as main cause of such stress disorders (Smith et al, 2000), these findings have important implications for the well being of mothers. This finding suggests that policies which relax the intensity of the work life balance decision for mothers and allow mothers to spend more time with their children, for example increasing access to flexible working, will have positive implications for motherhood well being.

Even though the results found in this analysis show that part time employment will increase motherhood well being in the UK, in the respect that it relaxes the intensity of the work life balance decision and facilitates more time to be spent with children, no significant relationship between part time employment and overall life satisfaction is observed for mothers in the UK. This suggests that time spent in the household may not have a greater impact on overall life satisfaction and well being than time spent in the labour market. This is consistent with findings which have shown that women's greater hours of unpaid work contribute to women experiencing higher levels of stress (MacDonald, 2005; and Gjerdingen et al, 2001). Further research needs to be done to establish the relative well being implications of unpaid and market work. The absence of a significant relationship between part time employment and overall life satisfaction for mothers in the UK may additionally be a result of the poor quality of part time jobs in the UK (Dex and Bukodi, 2010;

Connolly and Gregory, 2008; and Manning and Petrongolo, 2008). Even though part time employment may act to increase satisfaction with hours of work by relaxing the intensity of the work life balance decision, working in a poor quality 'dead-end' job will have a negative impact on overall well being. Increasing access to part time jobs in higher occupational groups may diminish this negative impact and generate a positive relationship between part time employment and overall well being.

Despite findings in chapter 3 which suggest that moving in to part time employment will have a large negative impact on the wage as well as career progression, the findings in this chapter suggest that mothers in the UK experience greater levels of job satisfaction by working part time. Similar surprising results are found for mothers in Spain, where part time jobs are particularly marginalised. Such findings may suggest that institutional constraints act to alter these mothers' preferences towards part time employment. Therefore, suggesting a trade off between preferable 'good' jobs and making stressful work life balance decisions, and 'worse' part time jobs and being faced with less intensive, and less constrained, work life balance decisions. These findings have important implications for motherhood well being, efficiency, and gender equality.

The results found in this chapter suggest that poor quality jobs may have a detrimental impact on well being, relative to working in a better quality job. Thus, constraints which make mothers less satisfied when working full time, and therefore alter preferences towards poor quality part time employment, will have some negative implications for well being. Therefore, reducing inequalities in treatment between part time and full time workers would enhance the positive job satisfaction impact of working part time. Furthermore, this may additionally act to stimulate a positive relationship between part time employment and overall life satisfaction. Increasing access to part time employment and flexible working arrangements throughout the occupational scale will promote the well being of mothers in the UK.

If mothers in the UK are constrained into working in poor quality part time jobs this has further implications for gender equality in labour market outcomes, and for efficiency in the labour market. Olsen et al (2010) have shown that the poor calibre of part time jobs in the UK is one of the leading explanations for the 19 percent gender pay gap. The limited human capital development and career progression opportunities available to part time workers is the main explanation behind the poor outcomes of these workers (who are predominantly female) in the labour market relative to their full time counterparts. Additionally, occupational downgrading is a common result of the movement into part time employment in the UK (Connolly and Gregory, 2008), suggesting that there is a large under-utilisation of skill in the labour market. The types of part time jobs which mothers in the UK are often constrained into accepting will increase levels of gender inequality in labour market outcomes, and generate poorer quality job matches in the labour market than if such jobs had a higher status in the labour market. If these mothers were able to make unconstrained time allocation decisions it is likely that the movement into poor quality part time employment may not occur. In order to more efficiently utilise mothers' skills in the labour market, and to promote greater gender equality in labour market outcomes, it is necessary to promote policies which relax constraints on the time allocation decision. Increasing access to quality childcare would relax the constraints on a mother who wants to balance full time work with family life, and therefore make full time employment a more realistic work life balance solution. Increasing access to flexible working in higher level occupational groups would allow mothers to make more flexible work life balance decisions whilst maintaining a good quality job.

4.11 Conclusion

The current chapter has examined the relationship between part time employment and job satisfaction in a range of European countries (the UK,

Germany, Denmark, the Netherlands, France and Spain) and has exploited differences between the countries in cultural backgrounds and institutional arrangements to explain these relationships. Akerlof and Kranton (2000) have shown that following the behavioural prescriptions for one's gender affirms one's identity as a man or a woman, and can increase the utility derived from such actions. The results found in the current chapter provide little support for this finding; instead we see that adhering to social norms in terms of employment practices is more important for mothers' well being, in the countries where part time employment is accepted as a social norm (Denmark, the Netherlands and the UK) working in part time relative to full time employment and moving into part time employment increases satisfaction with hours of work.

The results provide some support for the argument that poorer quality part time jobs can reduce any positive well being implications of part time employment. For example, the poor quality of part time jobs in the Netherlands appears to act to diminish the well being enhancing properties of part time employment for women in these countries. Furthermore, after controlling for unobserved heterogeneity part time employment only has positive implications for overall job satisfaction and life satisfaction for those in higher skill level occupational groups in the UK. This finding has important implications for the well being of part time women in the UK, where it has been found that part time jobs are commonly segregated into low skill level occupational groups (Dex and Bukodi, 2010; Manning and Petrongolo, 2008; Connolly and Gregory, 2008). The results suggest that increasing the quality of part time jobs will further improve its welfare enhancing properties and may explain the absence of a significant relationship between part time employment and life satisfaction.

The results found in the chapter suggest that mothers in the UK and in Spain face large constraints in combining full time employment with family life, and such constraints may therefore alter preferences towards part time employment. It seems

that these mothers trade off 'good' jobs in return for a less intensive work life balance decision. These results are likely to be largely driven by limited access to quality childcare in both countries. Additionally, unlike in the Netherlands (where there are similar traditional gender arrangement ideas and a similar acceptance of part time employment as in the UK), family policies are typically constructed in the UK under the assumption that mothers have the sole responsibility for their children. These factors will act to intensify the work life balance decisions faced by full time working mothers' in these countries, and therefore increase stress and diminish well being (Booth and van Ours, 2009). Policies which act to relax constraints on the work life balance decisions experienced by full time working mothers (for example, increasing access to flexible working practices and increasing access to quality childcare) are essential in reducing the increasing proportion of women reporting stress and anxiety related disorders (The NHS Information Centre for Health and Social Care, 2009), diminishing gender inequalities in the labour market (Olsen et al, 2010), and in promoting a more efficient usage of skill in the labour market.

If mothers in the UK work part time in order to relax constraints on their work life balance decision, then we would expect part time employment to increase life satisfaction (Booth and van Ours, 2009). Only limited support is found for this relationship in the current chapter. As a result, more research needs to be done to establish how additional hours of unpaid household work affects the well being of women relative to additional hours of paid work.

Table 4.1 Summary of section 4.3

	Traditional cultural ideas on the gender arrangement	Structure of part time jobs	Summary statistics		
			% of employed females[1]	% of employed females working part time[2]	% of employed mothers[3]
Germany	Male breadwinner model. Strong ideals on the preservation of family life.	Typically poorly regulated, however discrimination between full and part time workers legally prevented since the late 1980s.	74%	39%	69%
Denmark	Dual-earner / state-carer arrangement.	Legislation does not discriminate by hours of work. Part time jobs of good quality.	83%	28%	81%
The Netherlands	Male breadwinner / female home-maker gender arrangement.	Strong welfare policies in the 1980s based on promoting gender quality coupled with high regulation means part time work is well protected.	78%	74%	78%
Finland	Egalitarian division of labour. Dual bread winner / dual carer gender arrangement.	Women are encouraged to participate in full time employment, children are seen as the responsibility of the welfare state. Part time employment is associated with social stigmatism.	82%	12%	81%
France	Female worker / female carer.	Part time employment was created as a result of job shortages in the 1970's and 1980's. There is a strong tradition of full time work.	77%	28%	73%
Spain	Male breadwinner / female carer	Part time employment is not commonplace in Southern Europe, it is often entered after a failure to find a full time job, or in order to cope with uncertain demand.	63%	9%	61%
UK	Male breadwinner / female home-maker gender arrangement.	Part time employment was created with a view of allowing women to maintain family responsibilities as their main role. Coupled with trends of deregulation in the UK means part time jobs are poor quality.	74%	40%	68%

1. Proportion of females aged 25-54 years in employment in 2008, from OECD(2010)
2. Proportion of females aged 25-54 years in part time employment in 2008, from OECD(2010). Part time employment is based on a common definition of less than 30 hours a week.
3. Proportion of mothers of children under the age of 16 years who are aged between 25-49 years in employment in 2007, from OECD (2008) 'Family Database'.

Table 4.2 Summary statistics indicating the proportion of observations which can be used in the fixed effects ordered logit models

Country	Employed	Proportion of employment observations where the individual's overall job satisfaction changes over time
Germany	2572	77%
Denmark	6316	83%
The Netherlands	10657	82%
Finland	8026	80%
France	12074	82%
Spain	9971	85%
UK	13582	85%

Table 4.3 Mean values of variables by country from the ECHP dataset.

	Germany	Denmark	The Netherlands	Finland	France	Spain	UK
			Mean values				
			a. Overall job satisfaction				
Part time	4.32	4.97	4.71	4.51	4.35	3.82	4.67
	(1.10)	(1.01)	(0.87)	(1.19)	(1.06)	(1.41)	(1.13)
Full time	4.42	4.89	4.68	4.60	4.44	4.28	4.42
	(1.10)	(1.00)	(0.91)	(0.97)	(1.01)	(1.25)	(1.23)
			b. Satisfaction with type of work				
Part time	4.54	4.88	4.80	4.54	4.58	4.04	4.46
	(1.07)	(1.10)	(1.03)	(1.07)	(1.07)	(1.47)	(1.32)
Full time	4.58	4.84	4.85	4.52	4.67	4.36	4.48
	(1.10)	(1.08)	(1.00)	(1.02)	(1.00)	(1.29)	(1.29)
			c. Satisfaction with hours of work				
Part time	4.66	5.37	4.92	4.28	3.04	4.00	4.76
	(1.23)	(1.08)	(1.08)	(1.60)	(1.84)	(1.43)	(1.26)
Full time	4.22	4.72	4.50	4.43	3.18	3.94	4.26
	(1.24)	(1.24)	(1.15)	(1.24)	(1.74)	(1.38)	(1.38)
			d. Observations				
Part time	771	909	5052	639	2409	1441	5720
Full time	1801	5407	5605	7387	9665	8530	7862

Standard deviations in parentheses.

Notes:

1. The data used for Germany comes from waves 2-3 of the ECHP, the data used for Denmark, the Netherlands, Finland, France and Spain comes from waves 2-8 of the ECHO, and the data used for the UK comes from waves 1-17 of the BHPS.
2. All 3 variables analysed are on a 1-6 scale.

Table 4.4 Mean values of variables from the BHPS dataset. The variables analysed in the first 4 columns are on a 1-7 scale and the GHQ score is based on a 36 point scale.

	Mean values					Observations
	Overall job satisfaction	Satisfaction with type of work	Satisfaction with hours of work	Life satisfaction	GHQ score	
Part time	5.68	5.57	5.77	5.25	11.43	7925
	(1.16)	(1.29)	(1.28)	(1.15)	(5.17)	
Full time	5.43	5.60	5.14	5.17	11.39	5743
	(1.23)	(1.25)	(1.42)	(1.12)	(5.28)	

Standard deviations in parentheses.

Notes:

1. The variables analysed in the first 4 columns are on a 1-7 scale and the GHQ score is based on a 36 point scale.

Table 4.5 Estimated regression coefficients on the explanatory variable of interest from three pooled cross section ordered logit models

	1 Germany	2 Denmark	3 The Netherlands	4 Finland	5 France	6 Spain	7 UK
			a. Overall job satisfaction				
Part time	0.021	0.216**	0.194***	0.075	0.033	-0.095	0.235***
	(0.102)	(0.099)	(0.062)	(0.106)	(0.061)	(0.070)	(0.052)
Obs	2536	6254	10617	7776	12035	9828	13186
			b. Satisfaction with type of work				
Part time	-0.099	0.080	-0.099*	0.103	0.073	0.020	-0.013
	(0.103)	(0.100)	(0.060)	(0.108)	(0.064)	(0.074)	(0.052)
Obs	2532	6303	10615	7773	12038	9840	13186
			c. Satisfaction with hours of work				
Part time	0.710***	1.297***	0.786***	-0.012	0.074	0.455*	0.857***
	(0.109)	(0.108)	(0.063)	(0.134)	(0.056)	(0.072)	(0.050)
Obs	2538	6303	10614	7776	12031	9836	13188

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses.

Notes:

1. Each regression includes the following explanatory variables; age, age squared, highest education level, self-assessed good health, living rent free, in a temporary job, in the public sector, size of work place, the one digit industry identifier, married or cohabiting, had a birth in the previous year, number of children aged 0-12 years in the household, number of children aged 12-15 years in the household, real household income, spend more than 20 hours a week caring for a child or another individual.
2. The results displayed in column 1 have been estimated using waves 2-3 of the ECHP, the results displayed in columns 2-6 have been estimated using waves 2-8 of the ECHP, and the results displayed in column 7 have been estimated using waves 1-17 of the BHPS.
3. All standard errors are robust and correct for intra-individual correlation.

Table 4.6 Estimated regression coefficient on the explanatory variable of interest from three fixed effects ordered logit models

	1 Germany	2 Denmark	3 The Netherlands	4 Finland	5 France	6 Spain	7 UK
			a. Overall job satisfaction				
Part time	-0.313	-0.100	-0.001	-0.214	-0.039	0.005	0.195***
	(0.304)	(0.143)	(0.086)	(0.137)	(0.096)	(0.098)	(0.074)
Individuals	577	1052	1812	1458	2056	1903	1941
Obs	1154	5141	8503	6147	9616	8211	11023
			b. Satisfaction with type of work				
Part time	0.030	0.024	-0.176***	-0.175	0.186*	-0.002	-0.057
	(0.316)	(0.141)	(0.087)	(0.136)	(0.098)	(0.099)	(0.073)
Individuals	574	1058	1774	1474	1979	1907	1988
Obs	1148	5182	8366	6205	9369	8279	11217
			c. Satisfaction with hours of work				
Part time	-0.100	1.067***	0.643***	-0.296**	0.166	0.254	0.840***
	(0.305)	(0.152)	(0.082)	(0.130)	(0.128)	(0.098)	(0.073)
Individuals	644	1079	1905	1539	2206	1928	2072
Obs	1288	5283	8840	6457	10547	8381	11611

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

1. Each regression includes the following explanatory variables; age, age squared, highest education level, self-assessed good health, living rent free, in a temporary job, in the public sector, size of work place, the one digit industry identifier, married or cohabiting, had a birth in the previous year, number of children aged 0-12 years in the household, number of children aged 12-15 years in the household, real household income, spend more than 20 hours a week caring for a child or another individual.
2. The results displayed in column 1 have been estimated using waves 2-3 of the ECHP, the results displayed in columns 2-6 have been estimated using waves 2-8 of the ECHP, and the results displayed in column 7 have been estimated using waves 1-17 of the BHPS.

Table 4.7 Estimated regression coefficients on the explanatory variable of interest from pooled cross section ordered logit and fixed effects ordered logit models (columns 1 and 2), and from a pooled cross section OLS and a fixed effects model (column 3)

	1		2		3	
Variable	Overall job satisfaction		Overall life satisfaction		GHQ (Well being)	
	Pooled	FE	Pooled	FE	Pooled	FE
		a. Effect of working part time				
Part time			0.129**	-0.122	0.010	-0.161
			(0.063)	(0.095)	(0.150)	(0.147)
Individuals				1486		3035
Obs			8370	6730	12987	12987
b.	Interacting part time status with skill level of the occupation					
High skill	0.175***	0.159**	0.193*	0.033	0.269	0.178
PT	(0.080)	(0.117)	(0.101)	(0.146)	(0.237)	(0.228)
Med skill	0.287***	0.177***	0.149	-0.292	0.089	0.0488
PT	(0.087)	(0.114)	(0.103)	(0.148)	(0.238)	(0.227)
Low skill	0.350*	0.224	0.067	-0.163	-0.225	0.198
PT	(0.071)	(0.091)	(0.084)	(0.118)	(0.197)	(0.184)
Individuals		1941		1486		3035
Obs	13186	11023	8370	6730	12987	12987

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

Notes:

1. Each regression includes the following explanatory variables; age, age squared, highest education level, self-assessed good health, living rent free, in a temporary job, in the public sector, size of work place, the one digit industry identifier, married or cohabiting, had a birth in the previous year, number of children aged 0-12 years in the household, number of children aged 12-15 years in the household, real household income, spend more than 20 hours a week caring for a child or another individual.
2. The results displayed have been estimated using waves 1-17 of the BHPS.
3. Standard errors are robust and correct for intra-individual correlation in the pooled cross sectional models.

Table 4.8 Sample sizes and descriptive statistics from the sub-samples used to estimate the satisfaction impact of switching from full time to part time employment

Country	Observations	Proportion of employment observations			
		Switch FT to PT	Switch PT to FT	Stay FT	Stay PT
Germany	1087	4%	4%	67%	25%
Denmark	4684	3%	3%	83%	11%
The Netherlands	7733	7%	6%	47%	41%
Finland	5700	3%	4%	89%	4%
France	8868	4%	5%	77%	15%
Spain	6912	4%	5%	83%	8%
UK	9191	3%	6%	38%	58%

Notes:

1. The statistics in the table show the proportion of each country's employment observations where a respondent reports having just switched from full to part time employment, having just switched from part to full time employment, having remained in full time employment or having remained in part time employment as compared to the previous employment observation.
2. Because we are interested in what each respondent has done as compared to the previous employment observation each individual's first observation has to be dropped from the sample, a sub-sample of the previous sample is used.
3. The data used for Germany comes from waves 3 of the ECHP, the data used for Denmark, the Netherlands, Finland, France and Spain comes from waves 3-8 of the ECHP, and the data used for the UK comes from waves 2-17 of the BHPS.

Table 4.9 Estimated regression coefficients on the explanatory variable of interest from pooled cross section ordered logit models and fixed effects ordered logit models estimating overall job satisfaction

	Overall job satisfaction						
	1 Germany	2 Denmark	3 The Netherlands	4 Finland	5 France	6 Spain	7 UK
			a. Pooled cross section regressions				
Switch FT to PT	0.056	-0.339**	0.398***	0.030	0.017	-0.091	0.313**
	(0.326)	(0.173)	(0.102)	(0.164)	(0.108)	(0.124)	(0.133)
Switch PT to FT	0.74	0.294*	0.178*	0.105	0.192*	-0.036	0.302**
	(0.279)	(0.167)	(0.104)	(0.124)	(0.099)	(0.102)	(0.069)
Stay PT	-0.027	0.249*	0.209***	0.384	0.059	-0.046	0.599***
	(0.153)	(0.132)	(0.080)	(0.179)	(0.082)	(0.116)	(0.096)
Obs	1084	4631	7714	5538	8839	6844	8954
			b. Fixed effects regressions				
Switch FT to PT		-0.179	0.332**	0.134	0.022	0.051	0.442***
		(0.240)	(0.145)	(0.212)	(0.163)	(0.169)	(0.169_
Switch PT to FT		0129	0.125	-0.048	0.115	0.224	0.334
		(0.240)	(0.146)	(0.206)	(0.156)	(0.152)	(0.136)
Stay PT		-0.074	0.012	-0.314	-0.050	0.082	0.308
		(0.248)	(0.142)	(0.334)	(0.171)	(0.201)	(0.122)
Individuals		796	1320	1042	1503	1290	1325
Obs		3589	5695	3965	6465	5412	6943

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

Notes:

1. Each regression includes the following explanatory variables; age, age squared, highest education level, self-assessed good health, living rent free, in a temporary job, in the public sector, size of work place, the one digit industry identifier, married or cohabiting, had a birth in the previous year, number of children aged 0-12 years in the household, number of children aged 12-15 years in the household, real household income, spend more than 20 hours a week caring for a child or another individual.
2. The results displayed have been estimated using the sub-samples of the original samples which are displayed in table 4.8.
3. The results displayed in column 1 have been estimated using waves 3 of the ECHP, the results displayed in columns 2-6 have been estimated using waves 3-8 of the ECHP, and the results displayed in column 7 have been estimated using waves 2-17 of the BHPS.
4. The fixed effects ordered logit model estimating satisfaction with hours of work could not be estimated for the sample of German mothers because there is no variation in the dependent variable for any individual since only one wave of data is being used.
5. Standard errors are robust and correct for intra-individual correlation in the pooled cross sectional models.

Table 4.10 Estimated regression coefficients on the explanatory variable of interest from pooled *cross section ordered logit models and fixed effects ordered logit models estimating* satisfaction with hours of work

	Satisfaction with hours of work						
	1 Germany	2 Denmark	3 The Netherlands	4 Finland	5 France	6 Spain	7 UK
			a. Pooled cross section regressions				
Switch FT To PT	0.311	1.256***	0.894***	0.078	0.399	0.524***	0.955***
	(0.292)	(0.188)	(0.110)	(0.184)	(0.109)	(0.121)	(0.126)
Switch PT To FT	0.293	0.363**	0.295***	-0.030	0.382	0.152*	0.556*
	(0.337)	(0.169)	(0.107)	(0.129)	(0.103)	(0.092)	(0.090)
Stay PT	0.747***	1.393***	0.959***	0.459	0.267	0.630***	0.945***
	(0.157)	(0.145)	(0.079)	(0.246)	(0.075)	(0.121)	(0.066)
Obs	1082	4677	7711	5539	8841	6848	8955
			b. Fixed effects regressions				
Switch FT to PT		1.112***	0.933	0.047	0.370	0.419*	1.143***
		(0.261)	(0.141)	(0.204)	(0.215)	(0.169)	(0.171)
Switch PT To FT		0.042	0.190	-0.225	0.266	0.110	0.629*
		(0.234)	(0.139)	(0.200)	(0.188)	(0.151)	(0.130)
Stay PT		1.100***	0.711	-0.285	0.371	0.234	1.157***
		(0.268)	(0.136)	(0.315)	(0.228)	(0.200)	(0.120)
Individuals		817	1404	1093	1776	1330	1426
Obs		3683	6025	4123	7510	5577	7424

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

Notes:

1. Each regression includes the following explanatory variables; age, age squared, highest education level, self-assessed good health, living rent free, in a temporary job, in the public sector, size of work place, the one digit industry identifier, married or cohabiting, had a birth in the previous year, number of children aged 0-12 years in the household, number of children aged 12-15 years in the household, real household income, spend more than 20 hours a week caring for a child or another individual.
2. The results displayed have been estimated using the sub-samples of the original samples which are displayed in table 4.8.
3. The results displayed in column 1 have been estimated using waves 3 of the ECHP, the results displayed in columns 2-6 have been estimated using waves 3-8 of the ECHP, and the results displayed in column 7 have been estimated using waves 2-17 of the BHPS.
4. The fixed effects ordered logit model estimating satisfaction with hours of work could not be estimated for the sample of German mothers because there is no variation in the dependent variable for any individual since only one wave of data is being used.
5. Standard errors are robust and correct for intra-individual correlation in the pooled cross sectional models.

Table 4.11 Estimated regression coefficients on the explanatory variable of interest from generalised ordered logit models estimating overall job satisfaction

	Overall job satisfaction					
	y=1	y=2	y=3	y=4	y=5	y=6
			a. Germany			
Part time	1.413**	0.120	0.171	-0.114	-0.003	
	(0.604)	(0.240)	(0.127)	(0.100)	(0.148)	
Observations	2536					
LR test (p value)	0.000					
			b. Denmark			
Part time	-0.203	0.462*	0.139	0.141	0.248***	
	(0.511)	(0.259)	(0.138)	(0.086)	(0.08-)	
Observations	6254					
LR test (p value)	0.000					
			c. The Netherlands			
Part time	0.876**	0.531***	0.241***	0.221***	0.058	
	(0.389)	(0.163)	(0.086)	(0.050)	(0.065)	
Observations	10617					
LR test (p value)	0.000					
			d. Finland			
Part time	-0.367	-0.415**	-0.090	0.068	0.167	
	(0.426)	(0.199)	(0.125)	(0.089)	(0.112)	
Observations	7776					
LR test (p value)	0.000					
			e. France			
Part time	-0.303*	-0.106	-0.048	0.044	0.093	
	(0.173)	(0.113)	(0.070)	(0.049)	(0.082)	
Observations	12035					
LR test (p value)	0.000					
			f. Spain			
Part time	-0.092	-0.255***	-0.126*	-0.075	-0.015	
	(0.150)	(0.089)	(0.067)	(0.062)	(0.089)	
Observations	9828					
LR test (p value)	0.000					
			g. UK			
Part time	0.441**	0.402***	0.282***	0.319***	0.246 ***	0.175**
	(0.210)	(0.114)	(0.072)	(0.057)	(0.042)	(0.054)
Observations	13186					
LR test (p value)	0.000					

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

Notes:

1. Each regression includes the following explanatory variables; age, age squared, highest education level, self-assessed good health, living rent free, in a temporary job, in the public sector, size of work place, the one digit industry identifier, married or cohabiting, had a birth in the previous year, number of children aged 0-12 years in the household, number of children aged 12-15 years in the household, real household income, spend more than 20 hours a week caring for a child or another individual.
2. The results displayed in panel a have been estimated using waves 3 of the ECHP, the results displayed in panels b, c, d, e and f have been estimated using waves 3-8 of the ECHP, and the results displayed in panel g have been estimated using waves 2-17 of the BHPS.
3. The likelihood ratio test tests the null hypothesis of equivalence between the ordered logit model and generalised ordered logit model for each country.
4. Robust standard errors cannot be specified when computing the likelihood ratio statistic using the 'gologit2' Stata programme (Williams, 2006).

Appendix 4a

Marginal effects from the cross sectional ordered logit models

Table 4.12 Estimated marginal effects from 7 pooled cross sectional ordered logit models estimating overall job satisfaction

	Overall job satisfaction Marginal effects						
	dP1/dx	*dP2/dx*	*dP3/dx*	*dP4/dx*	*dP5/dx*	*dP6/dx*	*dP7/dx*
				a. Germany			
Part time	-0.000	-0.001	-0.002	-0.002	0.003	0.002	
Obs	2536						
				b. Denmark			
Part time	-0.001***	-0.004***	-0.010***	-0.025***	-0.005*	0.045***	
Obs	6254						
				c. The Netherlands			
Part time	-0.001***	-0.003***	-0.011***	-0.030***	0.019***	0.025***	
Obs	10617						
				d. Finland			
Part time	-0.001	-0.002	-0.005	-0.010	0.008	0.010	
Obs	7773						
				e. France			
Part time	-0.001	-0.001	-0.002	-0.005	0.006	0.002	
Obs	12035						
				f. Spain			
Part time	0.003*	0.006*	0.010*	0.006*	-0.013*	-0.011*	
Obs	9840						
				g. UK			
Part time	-0.002***	-0.004***	-0.010***	-0.010***	-0.025***	0.018***	0.033***
Obs	13186						

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

Notes:

1. Each regression includes the following explanatory variables; age, age squared, highest education level, self-assessed good health, living rent free, in a temporary job, in the public sector, size of work place, the one digit industry identifier, married or cohabiting, had a birth in the previous year, number of children aged 0-12 years in the household, number of children aged 12-15 years in the household, real household income, spend more than 20 hours a week caring for a child or another individual.
2. Panel a is estimated using the waves 2-3 of the ECHP, panels b-f are estimated using all waves 2-8 of the ECHP, and panel g is estimated using the first 17 waves of the BHPS.
3. All standard errors are robust and correct for intra-individual correlation.

Table 4.13 Estimated marginal effects from 7 pooled cross sectional ordered logit models analysing satisfaction with type of work

	Satisfaction with type of work Marginal effects						
	dP1/dx	*dP2/dx*	*dP3/dx*	*dP4/dx*	*dP5/dx*	*dP6/dx*	*dP7/dx*
				a. Germany			
Part time	0.001	0.003	0.009	0.011	-0.010	-0.014	
Obs	2532						
				b. Denmark			
Part time	-0.001	-0.002	-0.005	-0.009	-0.000	0.017	
Obs	6303						
				c. The Netherlands			
Part time	0.001**	0.002**	0.005**	0.012**	-0.002**	-0.019**	
Obs	10615						
				d. Finland			
Part time	-0.001	-0.001	-0.003	-0.009	-0.013	0.012	
Obs	7773						
				e. France			
Part time	-0.001	-0.002	-0.004	-0.009	0.007*	0.009	
Obs	12038						
				f. Spain			
Part time	-0.001	-0.001	-0.002	-0.001	0.002	0.003	
Obs	9840						
				g. UK			
Part time	0.000	0.000	0.001	0.001	0.001	-0.001	-0.002
Obs	113186						

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

Notes:

1. Each regression includes the following explanatory variables; age, age squared, highest education level, self-assessed good health, living rent free, in a temporary job, in the public sector, size of work place, the one digit industry identifier, married or cohabiting, had a birth in the previous year, number of children aged 0-12 years in the household, number of children aged 12-15 years in the household, real household income, spend more than 20 hours a week caring for a child or another individual.
2. Panel a is estimated using the first waves 2-3 of the ECHP, panels b-f are estimated using all waves 2-8 of the ECHP, and panel g is estimated using the first 17 waves of the BHPS.
3. All standard errors are robust and correct for intra-individual correlation.

Table 4.14 Estimated marginal effects from 7 pooled cross sectional ordered logit models analysing satisfaction with hours of work

	Satisfaction with hours of work Marginal effects						
	dP1/dx	*dP2/dx*	*dP3/dx*	*dP4/dx*	*dP5/dx*	*dP6/dx*	*dP7/dx*
				a. Germany			
Part time	-0.014***	-0.035***	-0.068***	-0.056***	0.065***	0.108***	
Obs	2538						
				b. Denmark			
Part time	-0.016***	-0.028***	-0.068***	-0.118***	-0.083***	0.313***	
Obs	6303						
				c. The Netherlands			
Part time	-0.008***	-0.025***	-0.059***	-0.087***	0.028***	0.151***	
Obs	10614						
				d. Finland			
Part time	0.000	0.001	0.001	0.001	-0.001	-0.002	
Obs	7776						
				e. France			
Part time	-0.016*	-0.001	-0.001	0.003*	0.013	0.002	
Obs	12031						
				f. Spain			
Part time	-0.019***	-0.035***	-0.042***	-0.016***	0.060***	0.051***	
Obs	9836						
				g. UK			
Part time	-0.011***	-0.017***	-0.060***	-0.041***	-0.073***	0.059***	0.143***
Obs	13188						

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

Notes:

1. Each regression includes the following explanatory variables; age, age squared, highest education level, self-assessed good health, living rent free, in a temporary job, in the public sector, size of work place, the one digit industry identifier, married or cohabiting, had a birth in the previous year, number of children aged 0-12 years in the household, number of children aged 12-15 years in the household, real household income, spend more than 20 hours a week caring for a child or another individual.
2. Panel a is estimated using the first waves 2-3 of the ECHP, panels b-f are estimated using all waves 2-8 of the ECHP, and panel g is estimated using the first 17 waves of the BHPS.
3. All standard errors are robust and correct for intra-individual correlation.

Table 4.15 Estimated marginal effects from a pooled cross sectional ordered logit models analysing overall life satisfaction

	Overall life satisfaction Marginal effects						
	dP1/dx	*dP2/dx*	*dP3/dx*	*dP4/dx*	*dP5/dx*	*dP6/dx*	*dP7/dx*
Part time	-0.001*	-0.002**	-0.006**	-0.014**	-0.010**	0.022**	0.010**
Obs	8370						

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

Notes:

1. Each regression includes the following explanatory variables; age, age squared, highest education level, self-assessed good health, living rent free, in a temporary job, in the public sector, size of work place, the one digit industry identifier, married or cohabiting, had a birth in the previous year, number of children aged 0-12 years in the household, number of children aged 12-15 years in the household, real household income, spend more than 20 hours a week caring for a child or another individual.
2. The results in table 4.15 are estimated using the first 17 waves of the BHPS.
3. All standard errors are robust and correct for intra-individual correlation.

Appendix 4b

Table 4.16 Estimated regression coefficients from a pooled cross sectional ordered logit model and a fixed effects ordered logit model, estimating overall job satisfaction using the BHPS.

Variables	Overall job satisfaction	
	Pooled	FE
Part time	0.235***	0.195***
	(0.052)	(0.074)
Age	-0.065	-0.125*
	(0.044)	(0.064)
Age squared	0.001	0.001
	(0.001)	(0.001)
Degree	-0.572***	-0.046
	(0.106)	(0.295)
A level	-0.423***	-0.147
	(0.118)	(0.317)
O level	-0.310***	0.087
	(0.108)	(0.309)
Good health	0.239***	0.0562
	(0.042)	(0.050)
Local authority	0.079	-0.072
housing	(0.091)	(0.142)
Temporary job	-0.217***	-0.256**
	(0.080)	(0.102)
Public sector	0.084	0.344***
	(0.057)	(0.086)
Non-profit	0.215**	0.603***
organisation	(0.106)	(0.170)
Between 1-99	0.279***	0.117
employees in firm	(0.059)	(0.085)
Between 100-499	-0.054	-0.172*
employees in firm	(0.066)	(0.093)
SOC group 2	-0.074	0.289*
	(0.096)	(0.173)
SOC group 3	-0.036	0.144
	(0.094)	(0.138)
SOC group 4	-0.111	-0.096
	(0.079)	(0.116)
SOC group 5	-0.005	0.232
	(0.173)	(0.254)
SOC group 6	0.112	-0.152
	(0.089)	(0.139)
SOC group 7	-0.138	-0.227
	(0.109)	(0.143)
SOC group 8	-0.612***	-0.383*
	(0.150)	(0.227)
SOC group 9	-0.071	-0.336**
	(0.116)	(0.160)
Married or	0.156**	0.034
cohabiting	(0.069)	(0.107)
Childbirth in previous	-0.075	-0.119
year	(0.064)	(0.090)
Number of children	0.083**	0.073
under 12 in household	(0.035)	(0.052)
Number of children	0.041	-0.022
12-15 in household	(0.041)	(0.061)
Household income	-0.003	0.003
	(0.128)	(0.186)
Spend more than 20	0.468***	0.245
hours a week caring	(0.163)	(0.194)
Individuals		1941
Observations	13186	11023

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

Notes:

1. Waves 1-17 of the BHPS are used to estimated the two regressions.
2. Standard errors in the pooled cross section regression are robust and correct for intra-individual correlation in the pooled cross sectional model.

Appendix 4c

Pooling countries in the ECHP

Table 4.17 Estimated coefficients from cross sectional ordered logit models measuring overall job satisfaction, using waves 2-8 of the ECHP.

Variable	Overall job satisfaction
a. Testing whether slopes differ between countries	
Part time	0.063***
	(0.022)
Denmark	0.905***
	(0.045)
The Netherlands	0.445***
	(0.042)
Finland	0.281***
	(0.048)
France	0.198***
	(0.045)
Spain	-0.100*
	(0.060)
Observations	49046
P value of likelihood ratio test	0.000
b. Testing whether intercepts differ between countries	
PT*Germany	0.019*
	(0.091)
PT*Denmark	0.239***
	(0.072)
PT*The Netherlands	0.175***
	(0.043)
PT*Finland	0.075
	(0.081)
PT*France	0.025
	(0.043)
PT*Spain	-0.113*
	(0.058)
Observations	49046
P value of likelihood ratio test	0.000

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses.

Notes:

1. In order to estimate the cross-country differences of the effect of part time employment on job satisfaction it is possible to pool the data from the countries used from the ECHP dataset (Germany, Denmark, the Netherlands, Finland, France and Spain) and estimate one regression, including identifiers for each country. However, if it is the case that the intercepts and slopes of this regression differ for each country then it is better to estimate one separate regression for each country. Here we test whether it is best to pool the countries, or to estimate a set of unrestricted regressions (one regression is estimated for each country).
2. Panel a presents the test of whether the slopes differ between the countries. The estimated regression coefficients presented in panel a are from a cross sectional ordered logit model estimating overall job satisfaction which includes a dummy variable for each country as well as the following explanatory variables; part time, age, age squared, highest education level, self-assessed good health, living rent free, in a temporary job, in the public sector, size of work place, the one digit industry identifier, married or

cohabiting, had a birth in the previous year, number of children aged 0-12 years in the household, number of children aged 12-15 years in the household, real household income, spend more than 20 hours a week caring for a child or another individual. A likelihood ratio test is carried out between this regression (the restricted regression) and the set of unrestricted regressions. The p value from this test suggests that we need to allow for different slopes between these six countries included in the estimation.

3. Panel b presents coefficients estimated from a cross sectional ordered logit model estimating overall job satisfaction where the country identifiers have each been interacted with part time status. This regression also includes the interaction of each country identifier with all other explanatory variables referred to in note 2. However, the country dummies are not included on their own. Therefore, the equation presented in panel b allows the slopes to differ between the countries but forces the intercept to be the same. Carrying out a likelihood ratio test between the regression displayed in panel b of table 4.17 and the set of unrestricted regressions (will therefore indicate whether the slopes differ between the countries. The p value for the likelihood ratio test suggests that we should allow intercepts to differ between the countries. The set of unrestricted regressions are therefore the preferred estimates.

5 Conclusion

5.1 Summary of empirical findings

5.1.1 Chapter 2

The results found in the first empirical study in this thesis indicate that remaining continuously attached to employment around the childbirth period is crucial in determining the probability of mothers' employment in subsequent years. The results imply that by encouraging mothers to resume employment within a year of childbirth, maternity leave policy increases the employment probability in the subsequent year by at least 20 percentage points, and therefore encourages employment in all subsequent years, over that of a mother who did not resume employment at the end of the maternity leave period. Furthermore, remaining continuously attached to the labour market over the childbirth period has a large positive impact on the probability of employment for at least 10 years after childbirth.

The magnitude of the impact of remaining continuously attached to employment over childbirth on the probability of employment in subsequent years is slightly larger than that found in previous studies of this issue, (Joshi et al, 1996; and Dex et al, 1998). The sample of mothers analysed in this chapter who remained continuously attached to the labour market over childbirth are a larger proportion of the female labour force, and are therefore likely to be a more heterogeneous group of mothers, than those analysed in previous studies of this issue. Thus, the results indicate that increasing access to maternity leave policy to a wider share of the female labour force will result in a greater proportion of mothers remaining in employment throughout the early years of their child's life.

Furthermore, this study has analysed the employment impact of remaining continuously attached to the labour market over childbirth for those mothers who have the characteristics of those who typically would not have remained attached to the labour market over childbirth. The results suggest that extending maternity leave policy to those who typically had long breaks in employment around childbirth (those

with lower levels of education), will additionally have positive implications on the number of mothers who remain attached to employment throughout the early years of the child's life. However, amongst those with lower levels of education and who are having continuous employment over childbirth there is an increased tendency to re-enter the labour market via part time employment, relative to their counterparts with degree level education.

5.1.2 Chapter 3

Part time employment is a very popular work life balance strategy for mothers in the UK, the results presented in chapter 2 of this thesis confirm the popularity of part time employment amongst mothers re-entering employment after childbirth. The results in the second empirical study within this thesis demonstrate the wage effects of this movement. The findings in this study suggest that moving from full to part time employment will generate a 7 percentage point decline in the average female wage. Analysing the pay penalty associated with the movement from full to part time employment by whether the switch was made over an employment gap indicates that those who switch over no employment gap receive no significant pay penalty, however those who do switch over an employment gap receive a pay penalty of 23 percent. Additionally, the fact that this penalty does not appear to be explained by occupational downgrading effects suggests that it is potentially being driven by employer's views and attitudes towards women who move from full time to part time employment, or a poor job match and loss of job-specific human capital. The pay penalty is further increased by 8 percentage points if the individual additionally experiences occupational downgrading, and previous research has suggested that around 50 percent of women who move from full time to part time employment will experience a movement to an occupation where there is a lower level of average pay (Dex and Bukodi, 2010). An additional 8 percentage pay penalty is generated if there is also a change of employer.

The findings in the second empirical study of this thesis additionally indicate that the pay penalty associated with motherhood can be explained by employment behaviour over the childbirth period. Mothers of one child who remained in full time or part time employment over the most recent childbirth receive no significant pay penalty. Similarly, mothers who remained in full time or part time employment and had a short break in employment over the most recent childbirth additionally receive no significant pay penalty. Those mothers who switched from full to part time employment over their most recent childbirth receive a wage penalty of around 20 percent relative to their childless counterparts. This pay penalty can reach 30 percent for mothers of two or more children, or for those who additionally had a short break in employment over their most recent childbirth. Furthermore, these wage penalties remain large and last for at least 10 years after childbirth. Mothers who only ever work in part time employment suffer even greater motherhood pay penalties; those who remained in part time employment over the most recent childbirth and only ever work part time receive a wage which is nearly 40 percent lower than that of a mother who remained in full time employment over the most recent childbirth period.

5.1.3 Chapter 4

The findings in chapter 3 of this thesis highlight the negative wage and career implications of part time employment. Thus, the analysis in the third empirical within this thesis (chapter 4) provides some understanding of whether the well being implications of part time employment can act to offset the negative wage and career effects. The results suggest that it seems to be the case that part time employment increases satisfaction with hours of work only in situations where it is a socially acceptable form of employment. The results from this chapter additionally provide some evidence that the poorer quality of part time jobs can have negative implications on well being. No positive relationship between part time employment and overall life satisfaction or mental well being is found for mothers in the UK,

despite the traditional ideas of a male breadwinner/female homemaker gender arrangement which are prevalent in the UK, and the institutional constraints which are likely to intensify the work life balance decision.

The results show that mothers in Spain (where part time employment is largely a marginal form of employment, and there is a high degree of involuntary part time employment) experience higher levels of satisfaction with hours of work when they move into part time employment, and that mothers in the UK (where part time jobs are of low quality) experience higher levels of job satisfaction by working in or moving into part time employment. At first these results appear surprising, however in both these countries there are large constraints (mainly associated with childcare costs) which act to make the combination of full time employment with family life particularly difficult. Consequently, these results may suggest that such constraints make it so difficult for mothers to combine full time work and family life, that preferences are altered towards part time employment. This conclusion is strengthened by the fact that mothers in the UK experience no greater levels of overall life satisfaction by working in part time employment, part time employment does not intrinsically make mothers happier, but increases their satisfaction with their work life balance situation.

5.1.4 Overall summary

In summary, being covered by maternity leave policy and having continuity in employment over childbirth has a large positive effect on the probability of mothers' employment for at least 10 years after childbirth. Furthermore, it seems that extending maternity leave rights to those with weaker levels of labour market attachment will additionally have positive implications on the proportion of employed mothers of young children. We have also seen that those with lower levels of education having continuity in employment over childbirth are most likely to be employed in part time employment throughout the early years of the child's life. However, the movement from full to part time employment is associated with a large

wage penalty, which will be exaggerated by any occupational downgrading effects. Additionally, mothers who move from full to part time employment over the childbirth period will receive much lower wages than those mothers who remained in full time employment over childbirth, for at least 10 years after childbirth. For mothers in the UK, the results suggest that the greater job satisfaction of part time workers may, to some extent, offset the negative wage and occupational implications of part time employment. However, if mothers in the UK were able to make unconstrained time allocation decisions, then the positive effect of part time employment on job satisfaction may no longer exist. Furthermore, the positive relationship between part time employment and job satisfaction does not exist for women working in low skill level part time jobs.

5.2 Implications of findings

5.2.1 Efficiency implications

As outlined in the introduction chapter any policy which relaxes the constraints on a mother's work life balance decision will act to increase the probability that a mother will participate in the labour market, and therefore have positive implications for the overall employment rate and labour market efficiency (European Foundation for the Improvement of Living and Working Conditions, 2006). This thesis has analysed the ability of maternity leave policy in the UK to help mothers remain attached to the labour force. The findings in this thesis suggest that maternity leave policy is very effective at maintaining mothers' labour market attachment throughout the early years of their child's life, and therefore will have positive implications for the employment rate and labour market efficiency; having continuity in employment over childbirth will greatly increase the probability that a mother is employment for at least 10 years after the childbirth.

Furthermore, the results show that allowing a wider range of mothers to have access to maternity leave policy should increase the number of mothers in

employment throughout the early years of the child's life. Given that a much higher proportion of mothers are currently experiencing continuity in employment over childbirth than was the case 20 years ago, this has further positive implications for employment. Since 45 percent of mothers in the UK who worked whilst pregnant returned to employment in 1988, compared to 80 percent in 2002 (La Valle et al, 2008), the results found in this thesis suggest that if this trend continues then we will additionally see continued increases in the proportion of mothers of young children in employment. These results additionally imply that the increase in the maternity leave period which occurred in the UK in 2003 will have positive implications for the employment rate, and therefore labour market efficiency. The extension to maternity leave policy in 2003 allowed mothers 6 months of paid and 6 months of unpaid leave, previously to 2003 mothers were allowed 9 months of maternity leave, 18 weeks of which were paid. This increase in the leave period is likely to have brought the actual leave length closer to the desired length of leave for a greater proportion of mothers, and therefore encouraged a greater proportion of mothers to have continuity in employment over childbirth. Consequently, this is likely to have increased the proportion of mothers in employment for at least the first 10 years after childbirth.

However, the results found in this thesis suggest that if any employment increase associated with maternity leave policy occurs via part time employment then maternity leave policy may be less effective in increasing employment rates, additionally the increased skill supplied to the labour market may not be efficiently used. The results found in this thesis indicate that any movement from full to part time employment which occurs over a career break is associated with a 23 percentage point pay penalty, which increases by 8 percentage points if occupational downgrading additionally occurs. The 23 percent pay penalty is not associated with occupational downgrading effects, and is therefore likely to be due to the fact that women who move from full to part time employment send a signal of

reduced productivity and motivation to employers. Therefore, these women are less likely to receive opportunities for human capital development or career promotion and be at a relatively disadvantaged position in the labour market. Additionally, occupational downgrading is fairly common on entry into part time employment, therefore these results suggest that movements into part time employment will often reflect a movement to a 'worse' job where again there are likely to be fewer opportunities for human capital development and subsequent career promotion. The negative signalling and occupational downgrading properties of the switch from full to part time suggest that there is likely to be an under-utilisation of skill in the female part time labour market, acting to diminish efficiency in the labour market. Furthermore, since previous work has suggested that working in poor quality part time jobs will diminish mothers' future labour market attachment (Gash, 2008), then the positive employment gains associated with maternity leave policy which have been identified in this thesis are unlikely to be sustained, as a large amount of these employment gains will occur via part time employment. The nature of part time employment weakens the labour market efficiency gains associated with maternity leave policy.

5.2.2 Gender equality implications

A mother's decision of how to allocate time between the labour market and family life will have large implications for gender equality in labour market opportunities and outcomes. Recent work on the gender pay gap has indicated that time off paid work for family care reasons has a negative cumulatitive effect on wages over time; on average a part time working women has had 4 years out of the labour market for family reasons, this contributes to a 4 percent pay penalty which persists over the lifecycle (Olsen et al, 2010). Thus, the results found in this thesis suggest that by allowing mothers to maintain stronger labour market attachment in the pre-school years of their child's life, maternity leave policy will therefore have positive implications for gender equality in labour market outcomes.

60 percent of mothers choose to combine work and family life by working in part time employment (ONS, 2008). However, the results presented in this thesis have indicated that any movement from full to part time employment over the childbirth period is likely to have a large negative impact on the mother's wage relative to the wage of a childless woman, and can help to explain the motherhood pay penalty; the magnitude of this effect will be around 20 percentage points and will last for at least 10 years after childbirth. This pay penalty will be as great as 30 percent for mothers with two or more children who switched from full to part time employment over the most recent childbirth, or for those who had a short break in employment and switched from full to part time employment over the most recent childbirth. This suggests that the type of part time jobs which are favoured by mothers with the most intensive time demands (those with very flexible benefits) are particularly damaging to opportunities for future career progresion and wages. These negative wage effects are not being drive by occupational downgrading effects and act over and above any pay penalties associated with current part time status. Therefore, these results are likely to indicate inequality in the treatment of full time and part time employees; employers use the movement into such jobs as a signal of very low levels of productivity reduced work commitment, resulting in a particularly poor job match on movement into part time employment. As a result, mothers who move into such jobs are likely to be disadvantaged in terms of opportunties for human capital development and career progression. Given the high proportion of mothers who make the transition from full time to part time employment, this inequality in treatment between full time and part time workers will act to fuel gender inequalities in labour market outcomes. Increasing the status of part time jobs within the labour market would help to change attitudes towards those who choose to work in part time employment, and therefore would act to reduce the inequality in the treatment of full time and part time workers in the labour market, as well as gender inequality in labour market outcomes.

The inequality in treatment and in career opportunities, which mothers experience by moving into part time jobs over childbirth, is likely to be exaggerated if there is also a movement to an occupation with a lower average level of pay, which up to 50 percent of women experience when moving from full time to part time employment (Dex and Bukodi, 2010). This suggests that the movement into part time employment around the childbirth period is a huge source of gender inequality in labour market opportunities. These results indicate that increasing access to part time employment in higher skill level occupational groups will act to diminish these gender inequalities in labour market opportunities and promote greater gender equality in labour market outcomes. The UK government extended the right to request flexible working in 2009, which includes the right to request part time working. Any parent who has been continuously with their employer for at least 26 weeks has the right to request flexible working. However, this request may be rejected if there are good business reasons for doing so. Thus, mothers in the UK do not have the right to work part time in any occupation, and are likely to be discouraged from doing so in higher level occupations where work is likely to be more intensive and costs of training new workers are higher.

5.2.3 Implications of institutional and societal constraints

Previous research has indicated the poor occupational status of part time jobs in the UK (Connolly and Gregory, 2008; and Manning and Petrongolo, 2008). Furthermore, it has been shown that part time employment in Spain is a very marginal form of employment and is usually only carried out by those who fail to find a full time job (Ruivo et al, 1998). Therefore, although we may expect part time employment to increase overall life satisfaction due to its effect on relaxing the work life balance decision, in the UK and Spain we may expect to see a negative relationship between part time employment and overall job satisfaction. Against this background, results which show that mothers in the UK in part time employment experience higher levels of overall job and hours of work satisfaction, and that

mothers who switch from full time to part time employment in Spain experience higher levels of job and hours of work satisfaction initially appear surprising. However, given the constraints which act on mothers in both of these countries when trying to combine full time work and family life, it may be the case that such constraints make the combination of full time work and motherhood so inaccessible that mothers' preferences are altered towards part time employment. For instance, in the UK the average childcare fee for a 2 year old is 24 percent of the average wage, the corresponding figure for Spain in 30 percent, whereas the OECD average is 16 percent. Furthermore, around just half of all respondents to a major work life balance survey reported that they had access to flexible working practices (Hooker et al, 2007). This conclusion is strengthened by the lack of a relationship found between part time employment and overall life satisfaction for mothers in the UK; part time employment is not intrinsically making these mothers happier, but is managing to increase their job and hours of work satisfaction. Additionally, previous research has established five reasons that a woman will decide to work in part time employment, whilst one of these relates to preferences, the remaining four relate to constraints; suggesting that the decision is more likely to be a result of constraints than of preferences (Grant et al, 2005).

The findings in this thesis therefore suggest that the gender inequalities in labour market outcomes, and the labour market inefficiencies, which result from mothers' part time employment, may be a result of the fact that mothers are constrained into working in part time employment because of the limited availability of policies which facilitate the combination of full time work with family life. If the constraints on mothers' work life balance decisions were relaxed then these mothers may actually prefer to work in full time employment. Increasing access to quality childcare, and increasing access to flexible working practices, will make it easier for mothers to combine full time work with family life, and therefore will promote gender equality in labour market outcomes, and a more efficient use of skill

in the labour market. The UK government's recent extension in the right to request flexible working is therefore a movement in the right direction to relaxing constraints on the mother's work life balance decision. As well as allowing mothers the right to request part time working, the right to request flexible working additionally means that mothers have the right to request to be able to work from home, work flexi-time, or to fit their hours of work into a compressed hours structure. These employment structures will help to relax constraints on the time allocation decision for mothers and make it easier for mothers who would prefer full time employment, to work full time hours.

5.2.4 Motherhood and child well being implications

If part time employment generates positive implications for well being then this may, at least partly, offset the negative gender equality and efficiency implications associated with part time employment in the UK labour market. The intensity of the pressures acting upon a mother's time allocation decision, and the ability of mothers to allocation time in their preferred manner will have important implications for their overall well being.

Around 60 percent of mothers in the UK decide to balance work and family life by working in part time employment (ONS, 2008). The results found in the third empirical study of this thesis suggest that mothers working in part time employment, in countries where part time employment is accepted as a social norm, are more likely to be satisfied with their hours of work than are those working in full time employment. Furthermore, there is some evidence that for mothers (in higher level occupational groups) in the UK working in part time employment increases overall job satisfaction, relative to working in full time employment. However, this may be a result of the impact of constraints on changing preferences as discussed in section 5.2.3

The results in this analysis additionally suggest that working in poor quality part time jobs may have a negative impact on well being. A negative relationship

between satisfaction with type of work done and part time employment is identified for women in the Netherlands where previous research has indicated a lower rate of promotions amongst part time employees (Russo and Hassink, 2005). Furthermore, the results suggest that in the UK the positive relationship between overall job satisfaction and part time employment is only observed for those working in medium or high skill level occupation groups. Given the poor quality of part time jobs in the UK, this suggests that part time employment may not go very far towards increasing job satisfaction for many workers in the UK. This suggests that there are likely to be few positive well being implications associated with part time employment in order to offset the negative gender equality and efficiency implications.

Given that working in part time employment makes the work life balance decisions easier for mothers, we may expect working in part time employment to increase life satisfaction and well being. However, no significant relationship between part time employment and life satisfaction or well being is identified. This result suggests that engaging in additional hours of household work may have negative implications for life satisfaction and well being. These findings suggest that the well being implications of a mothers' work life balance decision are likely to be a result of the impact of housework relative to that of market work on well being.

The amount of time which a mother allocates to spend with their children will have implications for the child's well being. The results found within this thesis have shown that mothers, with lower levels of education, who have continuous employment over childbirth are likely to maintain their labour market attachment throughout the early years of their child's life by working in part time employment. Part time employment may have positive implications for the health of their children, since mothers are able to spend more time with their children and therefore have more control over their children's activities, part time mothers may also have more energy in order to encourage physical activity. However, the results from this thesis additionally suggest that the movement into part time employment is a large source

of lost earnings for mothers. Due to the impact of lower earnings on the ability to provide healthy food, and other resources to help stimulate the child's development, health, and security, working part time may therefore have a negative impact on the child's well being relative to working in full time employment.

Furthermore, the results found in this thesis indicate that mothers who remain attached to the labour market over childbirth but who have a degree level qualification are likely to remain attached to the labour market via full time employment throughout the early years of the child's life, and are likely to suffer are very small, or an insignificant, motherhood pay penalty. The children of these mothers may experience higher levels of well being due to the fact that relative to part time or non-working mothers, these mothers will have more resources with which to provide healthy food, security and to stimulate the child's development. However, even though recent work has indicated that the negative impact of maternal employment in the first year on the child's development is likely to be moderated by usage of good quality childcare, and increased maternal sensitivity when the child is older (Brooks-Gun et al, 2010), it is likely to be the case that early maternal full time employment increases the probability that the child is overweight (Liu et al, 2009), and has a negative impact on the child's health-related behaviours. More research needs to be done in order to establish the ways in which the mother's time allocation decision can affect child well being.

5.2.5 Summary of implications

In summary, the results found in this thesis suggest that the generosity of maternity leave policy is important in the first few years after childbirth, in maintaining female employment levels, and therefore in encouraging an efficient usage of labour. However, if mothers re-enter employment via part time work the positive impact on employment of maternity leave policy may be diminished due to the the poorer levels of labour market attachment of part time workers. Furthermore, in this case there is likely to be an inefficient usage of the increased skill supplied to

the labour market, due to the poorer opportunities available to part time workers in the UK, decreasing efficiency in the labour market. However, by encouraging women to remain attached to the labour force throughout the pre-school years of their child's life, maternity leave policy will act to diminish gender inequalities in labour market opportunities. Although, the results presented in this thesis have shown that any movement from full time to part time employment around the childbirth period will act to enhance any gender inequalities in labour market opportunities and outcomes. This occurs due to the poor nature of pay and wage and career progression which has been observed in part time jobs.

The results suggest that the movement into part time employment is likely to be a result of societal and institutional constraints which act to intensify the mothers' ability to combine full time work and family life, and therefore result in a preference for part time employment, even though part time employment is likely to be of poorer quality than is full time employment. This suggests that policies which help mothers facilitate the combination of full time work and motherhood will be effective in reducing gender inequalities in labour market outcomes, as well as inefficiencies in the labour market. Combining a career and family life by working in part time, relative to full time employment, does not appear to have any positive life satisfaction or mental well being implications for mothers in the UK. This is surprising given that these mothers are likely to face less intensive decisions regarding the balance between work and family life, and therefore suggests that time spent working in the household can be stressful and damaging to overall life satisfaction. Finally, the results found in this thesis additionally suggest that the children of mothers who remain in part time employment in the early years of their lives may suffer lower levels of well being than do children of mothers who work in full time employment, due to the lower hourly wages received by part time workers.

5.3 Limitations of Thesis

The aim of the first empirical study within this thesis is to estimate the impact of returning to the same employer after childbirth on the probability of employment in full or part time employment in the post-childbirth period. The limitation of this chapter is due to the fact that in order to rigorously measure this effect it was necessary to use two different datasets and estimation strategies. The first estimation strategy indicates the effect of returning to the same employer after childbirth and is able to analyse the full or part time decision. However, the results from this estimation strategy are likely to suffer from endogeneity bias due to state dependence issues. Instrumental variable techniques could have been introduced in order to try and control for the endogeneity in the impact of continuity in employment over childbirth on the probability of subsequent employment. However, in the absence of a strong instrument I decided that it would be more insightful to predict the dynamic path of employment for mothers around childbirth, by consistently taking account of state dependence issues in the employment decision. Therefore, the second estimation strategy used in the first chapter of this thesis uses a longer panel dataset and is able to correct for the endogeneity which results from state dependence by using the dynamic linear probability model and the random effects dynamic probit model. However, the predicted values from this regression can only indicate the overall employment impact of being in employment within 12 months before the childbirth and 12 months after the childbirth on the probability of employment in subsequent years; we do not know whether these mothers returned to employment at the end of their maternity leave period and whether they returned to the same employer. Furthermore, the outcome under observation is just the employment decision, not the full time or part time decision.

The methodology used to analyse the pay penalty associated with the switch from full to part time employment in the second empirical study (chapter 3) of this thesis involved using the dummy variable method. However, methods which allow

the wage penalty associated with the transition from full to part time employment, to vary by the women's characteristics could have given additional insights into what is actually driving this wage penalty. For example, the Oaxaca decomposition (Oaxaca, 1973) suggests estimating a wage regression for the group of women who did switch from full time to part time employment, and for the group who have not switched from full time to part time employment. The size of the wage inequality between the two groups is expressed as a portion which is due to differences in the magnitude of the observed characteristics (the explained portion), and the portion which is due to differences in the effects of these characteristics (the unexplained portion). It is therefore possible to estimate the counterfactual wage; the wage of all women who have not switched from full to part time employment given they have the characteristics of those who have switched from full to part time employment. Alternatively, the reweighting method suggested by DiNardo et al (1996) may be better suited to estimating the entire distribution of wages or moments other than the mean. Whereas the Oaxaca decomposition makes the assumption that the log wage is linear in the covariates, the reweighting method does not make this assumption. This method involves estimating a logit or probit equation to predict a propensity score for having switched from full to part time employment. The propensity score is then used to reweight the observations of all women who have not switched from full time to part time employment, to ensure the distribution of characteristics is the same as for those women who have switched from full time to part time employment. The counterfactual mean wage can again be computed. Both the Oaxaca decomposition methodology and the reweighting methodology would have allowed us to observe how the pay penalty associated with the switch from full time to part time employment varies given the various characteristics included in the model, additionally these methods indicate whether the pay penalty is being driven by differences in these characteristics, or whether it is being driven by differences in the effects of these characteristics. The methodology used in chapter 3 of this thesis

does not show how far the characteristics included in the model contribute towards explaining the pay penalty associated with the switch from full time to part time employment; furthermore this methodology assumes the effect of the characteristics is the same for both groups of women. However, both of these methods were not feasible tools in the analysis carried out in chapter 3 of this thesis, because of the small number of observations who switch from full to part time employment.

The methodology in the second chapter of this thesis used instrumental variable techniques in order to control for the potential endogeneity in the switch from full to part time employment. However, the instrument used (marital status) is a weak predictor of the outcome (switching from full to part time employment), and therefore the wage estimate of the switch from full to part time employment is not robust. Previous work has additionally used marital status as an instrument for the propensity to work in part time employment (Waldfogel, 1998; and Manning and Petronogolo, 2008); however these authors have also recognised that this estimate may not provide a better estimate than under the exogeneity assumption because of the weakness of the instrument. The reliability of the results found in the second empirical study (chapter 3) of this thesis could therefore be strengthened if an instrument with more predictive power of the switch from full to part time employment was available. The potential for finding such an instrument available is limited due to the small number of observations who switch from full to part time employment.

The third chapter in this thesis suffers from limitations because the impact of part time employment on life satisfaction is only observed for women in the UK, not in any of the other countries analysed. The results for the UK indicated that working in part time employment had no significant impact on life satisfaction or mental well being. Having information on the relationship between part time employment and life satisfaction for mothers from other countries would have provided additional insight into why we find no significant relationship for women in the UK. For example, if

positive relationships between part time employment and life satisfaction were observed for mothers in the Netherlands or Denmark, this may indicate that increasing the career opportunities and quality of part time jobs in the UK may increase the well being properties of such jobs.

5.4 Implications for further research

Achieving gender equality in labour market outcomes involves facilitating mothers labour supply decisions and labour market outcomes to be as unaffected by childbirth as possible. The main way in which the UK government has so far attempted to relax constraints on the mothers' labour supply decisions is by providing long periods of maternity leave. The results from the first empirical study (chapter 2) in this thesis suggest that allowing a greater proportion of mothers to have continuity in employment over childbirth will result in a greater proportion of mothers in employment in the early years of their child's life. In 2003 the maternity leave period was further extended so that mothers were allowed 12 months, rather than 9 months of leave. The results found in this thesis suggest that further work needs to be done to indicate whether the extension in the length of the leave period in 2003 allowed a greater proportion of mothers to remain continuously employed over the childbirth period. If, by bringing the actual length of leave closer to the mother's desired length of leave for a greater proportion of mothers, the extension did increase the proportion of mothers remaining continuously attached to employment over childbirth, the work in this thesis suggests that we would therefore see a greater proportion of mothers in employment throughout the early years of their child's life.

The conclusions from the second empirical paper within this thesis indicate that women who move from full to part time employment suffer a pay penalty which remains significant even after controlling for occupational downgrading effects, and is therefore probably being driven by the fact that employers view the movement

from full to part time employment as a signal of lower productivity or motivation. Since the institutional setting in the UK is likely to mean that many mothers are constrained into working in part time employment, many women who do switch from full time to part time employment may not actually intend to reduce the level of productivity or motivation which they apply to their work; suggesting that this penalty is a source of unexplained, or unjust, gender inequality in labour market outcomes. Further research therefore needs to investigate how employers typically structure part time jobs, for example, whether they usually involve a job share, and the amount of opportunities for training and career progression which are given to part time workers relative to full time workers. This will provide some understanding of the difficulties which employers face in employing part time workers in high status occupations, and how policies may therefore help to promote the position of part time employment in the workplace.

The results in this thesis found that for employed women in the UK there was no significant relationship between working in part time employment and overall life satisfaction. This finding seems surprising given the institutional forces which act to increase the difficulty of balancing work and family life for full time working women in the UK, the acceptance of part time employment as a social norm in the UK, and the cultural tradition of the female homemaker gender role. The analysis in the second and third empirical studies in this thesis was carried out with a focus on employed mothers. Therefore, further research needs to be done, unconditional on employment status, in order to assess the relative well being implications of time spent carrying out household chores, relative to time spent in the labour market. This work will help provide some greater understanding of the results presented in chapter 4 of this thesis.

The results from the third empirical study (chapter 4) in this thesis indicate that there is no positive relationship between part time employment and overall life satisfaction or mental well being for mothers in the UK. Furthermore, because it has

already been established that part time jobs in the UK are typically of poor quality, the positive relationship observed between part time employment and job satisfaction is therefore likely to be driven by the fact that the institutional setting in the UK makes it very difficult for mothers to combine full time jobs with family life. Thus, the results suggest that at least some mothers in the UK would prefer to remain in full time employment if these institutional constraints did not act to intensify constraints on their time allocation decision. Thus, whereas previous research in this field has recommended the need to increase the status of part time jobs in the UK (Connolly and Gregory, 2008; and Manning and Petrongolo, 2008) in order to increase gender inequality in the labour market, the results found in this thesis additionally provide support for policies which allow mothers to remain in full time employment.

Facilitating the full time employment of mothers in the UK will help to eliminate gender inequalities in labour market outcomes, and reduce the labour market inefficiencies associated with poor quality part time employment. Therefore, future research needs to concentrate on the determinants of mothers' full time labour supply. Previous research has provided estimates of the responsiveness of female labour force participation and supply to childcare costs; the childcare cost elasticity for labour force participation lays between -0.6 to -0.2 (Ribar, 1992; Blau and Robins, 1988; and Connelly, 1992). However, fewer studies have analysed the impact of childcare costs on female labour supply, although the impact appears to be smaller; Ribar (1995) finds an elasticity of around -0.07. Therefore, further research needs to be done to establish how responsive mothers' hours of work are to childcare costs, as well as policies such as an increase in access to flexible work arrangements.

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