Combining Family and Work in Europe: 1960–2000

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Abstract

The rise in female labour supply in developed economies has stimulated research on the combination of family and work. The aim of this thesis is to provide some empirical evidence on the factors driving family formation and mothers' employment across Europe over the period 1960–2000.

After the Introduction, Chapter 2 describes a theory to explain the elements (e.g. public provided childcare, taxation system, subsidies to childcare, flexi-time at work, and unemployment rates) that affect the sign of the correlation between fertility and employment.

The two subsequent chapters are both divided into two core sections: a Spanish case and a comprehensive European comparison (Belgium, West-Germany, Italy, Spain and Sweden). Chapter 3 analyses how the labour market affects individual fertility decisions (i.e. marriage/cohabitation, first, second and third birth) using a Cox hazard approach. Results suggest that if we would like to reverse the declining path in fertility in Spain, we need to accomplish three main things: overturn the negative impact of female employment on childbearing through policies that facilitate reconciliation of work and family, reduce the instability of working patterns, and implement policies that raise male employment. Interestingly, the cross-country comparison reveals that Sweden is the only country where being employed encourages earlier childbearing.

Chapter 4 investigates transitions from employment to non-employment around childbearing and its evolution across time. The European comparison suggests that the probabilities of staying-on employed are different across countries and these have changed substantially over the period 1973–93. This evolution is mainly explained by the taxation system (joint *vs.* separate), the removal of barriers to part-time work and the increase in education.

Chapter 5 focuses on female employment in the UK between 1974–2002. A first section aims to quantify how much of the rise in female participation is due to changes in the structure of the female population and how much is caused by changes in behaviour. A second section investigates the rise in the employment of married mothers. We isolate those birth cohorts whose mothers experienced significant increases in employment and relate those to changes in policies (maternity rights, taxation and childcare). Maternity rights have induced a change in behaviour toward returning to work in the first year post-birth, mostly among better-educated and higher-paid mothers.

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Chapter 1

Introduction

1.1 Topic and Relevance

Over the period 1960–2000, cross-country correlations between female labour supply and fertility in developed economies have moved from negative to positive. This phenomenon has been achieved because some countries (with high female participation rates) have passed new laws that facilitate combining family and work, whereas others (with rising female participation rates) have not. Besides, countries differ in their economic patterns (i.e. unemployment rates and fixed-term contracts) and social behaviour.

Nowadays, women in industrialised countries are more attached to the labour force and it is important to know how they fit their births into their careers. In the relationship between family and work there are several connections to investigate. This thesis focuses mainly on two. First, decisions on the timing of childbearing and, second, decisions on employment amongst mothers.

Current public debates in the EU suggest that it is necessary to simultaneously accomplish the following: more women in paid work and more children. Some countries have been more successful than others in attaining this looked-for outcome. This thesis exploits country comparison to find out which economic structures and policies are required to allow high female employment rates and reasonable fertility rates to co-exist. In particular, our work analyses six European countries (Belgium, West-Germany, Italy, Spain, Sweden and the UK).

This thesis contributes to the social science topic of combining family and work in the following main aspects. First, it provides a deep analysis of Spain, where both low fertility and female participation offered scope for further investigation at the start of this work.

Second, it studies policy relevant issues for the timing of childbearing and post-birth employment in a comparative and harmonised perspective. Third, it analyses which mothers with newborns in the UK work, when they started to do so and how the latter is linked to new maternity rights.

1.2 Data

For most of the empirical analysis in Chapters 3 and 4, we have constructed fertility and work history files with the 'Family and Fertility Survey' (FFS). This has been done for Belgium, West-Germany, Italy, Spain and Sweden. Using the same data facilitates a comprehensive comparison across these countries. For the Spanish case in Chapter 4, we have also used the 'Encuesta de Población Activa' (EPA) and the 'European Community Household Panel' (ECHP). Finally, the British study in Chapter 5 has been undertaken with the 'Labour Force Survey' (LFS) and the 'General Household Survey' (GHS).

1.3 Outline

Before the empirical analysis is made, Chapter 2, following the model proposed by Apps and Rees (2001), describes a theory to highlight the factors that are relevant for the sign of the correlation between fertility and employment. Some of these elements are public provided childcare, the taxation system (*joint vs. separate*), subsidies to childcare, flexitime at work, and unemployment rates.

Chapter 3 analyses the timing of cohabitation, maternity and spacing of births in Belgium, West-Germany, Italy, Spain and Sweden. Postponing the demographic process will eventually generate low fertility rates. This chapter seeks to find those individual characteristics that make it more likely that women will delay childbearing. The decision on the timing of births is influenced by the opportunity cost of spending some time out of the labour force, which is strongly affected by family-friendly policies and prospects in the labour market. The latter differs substantially across countries. So far, most comparison studies focus on different data for each country. Our work differs from them in that we use the same data to harmonise the cross-country comparison.

Results point out that precarious labour markets (i.e. unemployment rates and fixed-term contracts) put off childbearing. Furthermore, being at work delays fertility in all countries, except for Sweden. This is an indication that Sweden has implemented policies that make possible the combination of family and work.

In Chapter 4 the following questions are answered: what are the staying-on rates in employment after a first birth? How do they differ across countries? Has the probability of staying-on at work evolved over the period 1970–90? What economic factors and policies explain this evolution? What determines whether a woman continues at work after a birth?

This chapter finds that high education is a requirement for a continuous career woman in all countries, except for Sweden. Women with high levels of education (and, consequently, higher earnings) are the only ones to be able to pay for private childcare. That is, unless public free childcare is provided (or, in some cases, childcare by relatives), staying-on at work will only be worthwhile for women with potential high earnings. Our study shows that Swedish mothers find it optimal to remain employed, no matter what their level of education, thanks to their public childcare system.

Chapter 4 also highlights the change from a *joint* to an *individual* taxation system as favouring on the increase in the probability of staying-on over time, as well as the rise in education levels and the removal of the constraints on part-time jobs.

Finally, Chapter 5 analyses the rising trend in female participation in the UK over the period 1974–2002. First, the chapter studies whether the increase in female participation has been caused by changes in those characteristics in the population that make it more likely that women participate or if, instead, it has been due to a changes in their behaviour. Results point out that the periods with higher growth in female participation are those years where behavioural changes have played a principal role. The introduction of new policies that have an effect on female participation will be accounted within the changes in behaviour. Our work suggests that policies were more effective in increasing female participation in the 80s than in the 90s.

Second, Chapter 5 focuses on married women with children, since this is the female group with the greatest increase in employment. Our work isolates the birth cohorts whose mothers had significant rises in employment, compared to a control group (married women without children). It aims to link these shifts to family-friendly schemes. Policies up to now have been successful in rising the employment of mothers with newborns, but only for those women with higher education.

Chapter 6 concludes with a summary of the main findings.

Chapter 2

Theoretical Considerations on Combining Family and Work: a Simple Model

2.1 Introduction

The aim of this chapter is to analyse the factors that affect the relationship between female labour supply and fertility. It is interesting to point out that in developed economies, the correlation between female labour supply and fertility has become positive in the last decade. Those countries with the lowest fertility rates (i.e. Spain, Italy and Germany) are also those with the lowest female participation rates. This phenomenon is driven by differences in policies and economic patterns that allow individuals in some countries to better combine the task of child rearing and employment compared to others.

The paper by Ahn and Mira (2002) reports that the correlation between the total fertility rate and the female participation rate was negative and significant in the 70s, whereas became positive and significant in the 90s. The authors discuss some plausible reasons for the change in this relationship. For example, they argue that for sufficiently high levels of the female wage, further wage increases may lead to income effects prevailing over substitution effects and, consequently, may instigate a rise in fertility. They also emphasise that the latter is more likely to occur the greater the availability of market childcare. The link between purchased childcare and the changing effect on fertility of increases in women's wages was introduced by Ermisch (1989).

Following the model proposed by Apps and Rees (2001), we comment on some of the factors that we believe relevant for the sign of this fertility-employment correlation. Ex-

amples are public provided childcare, the taxation system (*joint vs. separate*), subsidies to childcare, flexi-time at work, and unemployment rates.

The main contribution of the model by Apps and Rees (2001)[1] is to show that countries with individual rather than joint taxation are likely to have both higher female labour supply and higher fertility. Furthermore, it demonstrates that support for families is far more effective through improved availability of alternatives to domestic childcare, compared to direct child payments.

In this chapter, we describe the paper by Apps and Rees (2001) in Section 2.2 and propose further considerations in Section 2.3. We extend their research and analyse the impact of female unemployment, the availability of public childcare time and flexi-time hours at work on the correlation between number of children and female labour supply. In the last section, we emphasise the policies that facilitate a positive correlation between fertility and female participation.

2.2 A Simple Model

As in Galor and Weil (1996), the paper by Apps and Rees (2001) is a 3-period model. In the first period, individuals are children and they are cared for by their parents. In the second period, individuals work, take care of their children and save. In their last period, individuals retire and consume their savings.

The utility of the household is given by

$$U_t = \gamma \ln n_t + (1-\gamma) \ln c_{t+1} \tag{2.1}$$

At time t, each household chooses the number of children n_t and consumption in the retirement period c_{t+1}, subject to several constraints. First, there is the female time constraint,[2] which take the form

$$z_{ft} + l_{ft} = 1 \tag{2.2}$$

where z_{ft} is the female time spent on childcare and l_{ft} is the female labour supply.

Second, households face the following budget constraint

[1] Their work is an extension of the model by Galor and Weil (1996).

[2] We assume that female's leisure is exogenous and that partners devote no time to childcare.

$$s_t + (1 - \sigma_t)x_t = (1 - \tau_{ft})w_{ft}l_{ft} + (1 - \tau_{mt})w_{mt}l_{mt} + g_t n_t + EI_t \tag{2.3}$$

The amount of savings (s_t) and spending on childcare goods (x_t) must be equal to the income generated from work by both members, the direct child payments by the government ($g_t n_t$) and the external income (EI_t). Note that the households receive a government subsidy σ_t per each unit of childcare goods they spend in the market and a payment of g_t per child. The state also taxes labour and this produces a net wage of $NW_{ft} = (1 - \tau_{ft})(w_{ft})$ and $NW_{mt} = (1 - \tau_{mt})(w_{mt})$ for females and males respectively.

Third, there is the production function of childcare as follows

$$n_t = f(z_{ft}, \bar{z}_{pt}, x_t) \tag{2.4}$$

with $\bar{z}_{pt}$ being the free public childcare time exogenously given by the government. We assume that this function is linear homogenous, continuously differentiable and strictly quasi-concave. We also consider that the three types of childcare inputs are perfectly substitutes with each other in the sense that mothers find them equally satisfactory.

Finally, there is the intertemporal budget constraint with form

$$c_{t+1} = (1 + r_{t+1})s_t \tag{2.5}$$

We assume that there is a gap between female and male wages ($h > 0$) that makes that males specialise completely in labour supply ($l_{mt} = 1$). Thus, the gross male wage can be written as $w_{mt} = w_{ft} + h$. Because of progressive taxation and male wages being higher, we suppose that $\tau_{ft} < \tau_{mt}$. The total net income from work in the household is then given by $NW_t^T = (1 - \tau_{ft})w_{ft}(1 - z_{ft}) + (1 - \tau_{mt})(w_{ft} + h)$.

The maximisation problem is solved in two stages. First, we choose the optimal distribution of childcare inputs in order to take care of one child in the cheapest manner. That is, we minimise the per-child unit childcare cost subject to producing sufficient childcare for this one child.[3]

$$\min \tilde{v}_t = (1 - \tau_{ft})w_{ft}\tilde{z}_{ft} + (1 - \sigma_t)\tilde{x}_t \tag{2.6}$$

$$s.t.\ 1 = f(\tilde{z}_{ft}, \bar{\tilde{z}}_{pt}, \tilde{x}_t) \tag{2.7}$$

[3]The homogeneity assumption allows us to divide all variables by the number of children n_t in order to obtain a unit function.

where $\tilde{z}_{ft} = \frac{z_{ft}}{n_t}$, $\bar{\tilde{z}}_{pt} = \frac{\bar{z}_{pt}}{n_t}$ and $\tilde{x}_t = \frac{x_t}{n_t}$.

The per-unit child cost is the female's opportunity cost of spending her time on caring for one child ($(1-\tau_{ft})w_{ft}\tilde{z}_{ft}$) plus the net care per child bought at the market ($(1-\sigma_t)\tilde{x}_t$). Solving the previous equation yields the optimal input requirements for a unit cost of childcare ($\tilde{v}_t$), which are $\tilde{z}_{ft}$ and $\tilde{x}_t$.[4]

The optimal total cost of childcare is $v_t^* = \tilde{v}_t(NW_{ft}, \sigma_t, \bar{\tilde{z}}_{pt})n_t^*$ and childcare demand functions are $z_{ft}^* = \tilde{z}_{ft}(NW_{ft}, \sigma_t, \bar{\tilde{z}}_{pt})n_t^*$ and $x_t^* = \tilde{x}_t(NW_{ft}, \sigma_t, \bar{\tilde{z}}_{pt})n_t^*$.

Once we have the optimal childcare demand functions, we proceed with the second stage of the problem that consists of maximising the household utility function subject to the budget constraint.

$$\max U_t = \gamma \ln n_t + (1-\gamma)\ln c_{t+1} \tag{2.8}$$

$$s.t.\ [\tilde{v}_t(NW_{ft}, \sigma_t, \bar{\tilde{z}}_{pt}) - g_t]n_t + \frac{c_{t+1}}{1+r_{t+1}} = NW_{ft} + NW_{mt} + EI_t \tag{2.9}$$

In Appendix 2.5.1 we derive the solution. We assume that $\tilde{v}_t(NW_{ft}, \sigma_t, \bar{\tilde{z}}_{pt}) > g_t$ and $c_{t+1} = (1+r_{t+1})s_t$. The optimal values of fertility, consumption and savings are:

$$n_t^* = \frac{\gamma[NW_{ft} + NW_{mt} + EI_t]}{\tilde{v}_t(NW_{ft}, \sigma_t, \bar{\tilde{z}}_{pt}) - g_t} \tag{2.10}$$

$$c_{t+1}^* = (1+r_{t+1})(1-\gamma)(NW_{ft} + NW_{mt} + EI_t) \tag{2.11}$$

$$s_t^* = (1-\gamma)(NW_{ft} + NW_{mt} + EI_t) \tag{2.12}$$

2.3 Further Considerations

The paper by Apps and Rees (2001) focuses on the effects of a *joint vs. separate* taxation system and finds that the latter scheme facilitates a positive correlation between fertility and female labour supply. In this section, we use an extension of their model to describe the impact of other factors on the relationship between number of children and employment.

[4] $\tilde{z}_{ft} = \frac{\partial \tilde{v}_t(NW_{ft}, \sigma_t, \bar{\tilde{z}}_{pt})}{\partial NW_{ft}}$ and $\tilde{x}_t = -\frac{\partial \tilde{v}_t(NW_{ft}, \sigma_t, \bar{\tilde{z}}_{pt})}{\partial \sigma_t}$.

2.3.1 A Change in the Female Gross Wage

Differentiating (2.10) with respect to the female gross wage w_{ft} gives[5]

$$\frac{\partial n_t^*}{\partial w_{ft}} = \frac{\gamma[(1-\tau_{ft})+(1-\tau_{mt})] - z_{ft}^*(1-\tau_{ft})}{\tilde{v}_t(NW_{ft}, \sigma_t, \bar{\tilde{z}}_{pt}) - g_t} \tag{2.13}$$

$$\frac{\partial n_t^*}{\partial w_{ft}} > 0 \Leftrightarrow \gamma > z_{ft}^* \frac{(1-\tau_{ft})}{(1-\tau_{ft})+(1-\tau_{mt})} = z_{ft}^* \left[2 + \frac{(\tau_{ft}-\tau_{mt})}{1-\tau_{ft}}\right]^{-1} \tag{2.14}$$

Recall that $z_{ft}^* \in [0,1]$ and γ is the weight of n_t in the utility function. If condition in equation (2.14) holds, then fertility increases with female gross wages, which means that the pure income effect of higher female wages prevails over the greater opportunity cost (through more childcare time) linked to it. To satisfy the condition in equation (2.14), γ can be smaller for given n_t^*, the smaller is $\tilde{z}_{ft}$. This suggests that the preference for children γ will have to be smaller, ceteris paribus, to have the same fertility and satisfy the condition in those countries with the highest public childcare time $\bar{\tilde{z}}_{pt}$ (since $\tilde{z}_{ft}$ and $\bar{\tilde{z}}_{pt}$ are substitutes). Furthermore, fulfilling equation (2.14) requires a lower preference for children γ, the closer are the marginal rates for females and males, since $\tau_{ft} < \tau_{mt}$. This indirectly implies that increases in female wages are more likely to cause rises in fertility, the smaller the taxation difference between sexes. But the latter is only true while female wages do not exceed male wages and, consequently, female marginal tax rates are below male marginal tax rates.

In this subsection, we also note the potential impact of female unemployment rates on fertility. Suppose that condition (2.14) is satisfied across countries so that higher female wages are translated into higher fertility. We therefore expect to have greater fertility on those countries with higher female wages. Expected or average incomes per period in the labour force over time can be thought of as $w_{ft}(1-u_{ft})$, so a rise in female unemployment has the same impact as a fall in female wages.

2.3.2 A Change in the Female Marginal Tax Rate

Differentiating (2.10) with respect to the female marginal tax rate τ_{ft} gives

$$\frac{\partial n_t^*}{\partial \tau_{ft}} = \frac{w_{ft}(z_{ft}^* - \gamma)}{\tilde{v}_t(NW_{ft}, \sigma_t, \bar{\tilde{z}}_{pt}) - g_t} \tag{2.15}$$

$$\frac{\partial n_t^*}{\partial \tau_{ft}} < 0 \Leftrightarrow \gamma > z_{ft}^* \tag{2.16}$$

[5]Further details in Appendix 2.5.2.

As with the effect of female wages on fertility, we find that for the same preference parameter γ, you are more likely to satisfy condition (2.16) with greater public time childcare $\bar{\bar{z}}_{pt}$. When we add another input into child-rearing (the free governmental time), the cost of the women's time is only a proportion of the total cost of childcare. This means that it is more likely that increases in net wages (either through rises in gross wages or through drops in marginal taxes) will have an income effect that outweighs the opportunity cost accounted in the price of childcare and will lead to a rise in fertility.

Under a joint taxation system, women typically face a higher marginal tax rate for their work earnings compared to a separate taxation system. This is because they are eligible to the tax rate that corresponds to the sum of the wages of both members of the couple, which is generally higher. Imagine that a country shifts from a joint to an individual scheme. This immediately implies a decrease in womens' marginal tax rate (τ_{ft}). If condition (2.16) is fulfilled, then we expect that the move from joint to separate taxation system increases fertility.

In their paper, Apps and Rees (2001) rewrite the previous equation to provide further intuition. They find that increases in female net wages (thus, drops in their marginal rates) are more likely to lead to a rise in fertility, the smaller the gap between male's and female's wages (h) is. They also show that changes in the male's marginal tax rate (in this framework in which husbands do not participate in childcare time) have only income effects.

2.3.3 A Change in the Public Childcare Time

Previously, we pointed out that greater $\bar{\bar{z}}_{pt}$ means that we are more likely to see increases in female wages resulting in higher fertility (both conditions (2.14) and (2.16) are satisfied with higher probability). Equation (2.17) looks at the direct impact of $\bar{\bar{z}}_{pt}$ on the number of children.

$$\frac{\partial n_t^*}{\partial \bar{\bar{z}}_{pt}} = \frac{-\frac{\partial \tilde{v}_t}{\partial \bar{\bar{z}}_{pt}} \gamma W_t^F}{(\tilde{v}_t(NW_{ft}, \sigma_t, \bar{\bar{z}}_{pt}) - g_t)(\tilde{v}_t(NW_{ft}, \sigma_t, \bar{\bar{z}}_{pt}) - g_t)} \tag{2.17}$$

$$\frac{\partial n_t^*}{\partial \bar{\bar{z}}_{pt}} > 0 \Leftrightarrow -\frac{\partial \tilde{v}_t}{\partial \bar{\bar{z}}_{pt}} \gamma W_t^F > 0 \tag{2.18}$$

If W_t^F, which is the full income in the household ($W_t^F = (1 - \tau_{ft})w_{ft} + (1 - \tau_{mt})(w_{ft} + h) + EI_t$) is positive, and $\frac{\partial \tilde{v}_t}{\partial \bar{\bar{z}}_{pt}}$ is negative, then increases in $\bar{\bar{z}}_{pt}$ unambiguously leads to a rise in fertility, as expected.

2.3.4 The Effect of Flexi-hours at Work

In these models, it is usually assumed that individuals can choose any time devoted to work ($l_{ft} = 1 - z_{ft}$), which also means that they face flexibility on the amount of hours devoted to childcare. However, in some countries women face a constraint that forces them to work a minimum number of hours if they decide to be employed ($l_{ft} \geq \underline{l_{ft}}$ or $z_{ft} \leq 1 - \underline{l_{ft}}$). Those women who find it optimal to work below the minimum number of hours allowed, may not be employed in an economy where this is not permitted. Therefore, those countries with tighter constraints on the choice of the number of hours will have less female employment.

Aside from hours flexibility, the time of day when you actually work is important, especially for combining family and work. For example, getting to work later to bring children to school or leaving early because of child illness. Families can definitely organise themselves better if both members are not subject to strict timetables. This 'freedom' is a bonus for working since it adds quality to the job. We call it β. Since in our framework, we do not have labour directly specified in our utility function, we incorporate this extra utility of work into the model in a different manner. This $\beta > 1$ multiplies gross wages as if the extra utility were a subsidy for work. That is, the utility provided by the flexibility is directly translated into a monetary premium. We next rewrite problem (2.6) with a new parameter that accompanies the gross wages, which is perceived by the individual as something that raises the opportunity cost of devoting time to childcare. As it is set out in equation (2.19), the bigger β is, the higher the quality at work and the greater the bonus.

$$\min \tilde{v}_t = (1 - \tau_{ft}) w_{ft} \tilde{z}_{ft} \beta + (1 - \sigma_t) \tilde{x}_t \tag{2.19}$$

$$s.t.\ 1 = f(\tilde{z}_{ft}, \bar{\tilde{z}}_{pt}, \tilde{x}_t) \tag{2.20}$$

The optimal inputs for one unit of childcare and cost of childcare now depend also on this extra parameter β. The optimal total cost of childcare is $v_t^* = \tilde{v}_t(NW_{ft}, \sigma_t, \bar{\tilde{z}}_{pt}, \beta) n_t^*$ and childcare demand functions are $z_{ft}^* = \tilde{z}_{ft}(NW_{ft}, \sigma_t, \bar{\tilde{z}}_{pt}, \beta) n_t^*$ and $x_t^* = \tilde{x}_t(NW_{ft}, \sigma_t, \bar{\tilde{z}}_{pt}, \beta) n_t^*$.

β does not affect the requirements needed to make increases in wages have a positive impact on fertility (condition (2.22) is equal to (2.14)).

$$\frac{\partial n_t^*}{\partial w_{ft}} = \frac{\beta[\gamma[(1 - \tau_{ft}) + (1 - \tau_{mt})] - z_{ft}^*(1 - \tau_{ft})]}{\tilde{v}_t(NW_{ft}, \sigma_t, \bar{\tilde{z}}_{pt}, \beta) - g_t} \tag{2.21}$$

$$\frac{\partial n_t^*}{\partial w_{ft}} > 0 \Leftrightarrow \gamma > z_{ft}^* \frac{(1-\tau_{ft})}{(1-\tau_{ft})+(1-\tau_{mt})} = z_{ft}^* [2 + \frac{(\tau_{ft}-\tau_{mt})}{1-\tau_{ft}}]^{-1} \tag{2.22}$$

The next equation specifies the condition for increases in β to lead to more fertility.

$$\frac{\partial n_t^*}{\partial \beta} = \frac{\gamma(NW_{ft}+NW_{mt}) - NW_{ft}z_{ft}^*}{\tilde{v}_t(NW_{ft}, \sigma_t, \bar{\bar{z}}_{pt}, \beta) - g_t} \tag{2.23}$$

$$\frac{\partial n_t^*}{\partial \beta} > 0 \Leftrightarrow \gamma > z_{ft}^* \frac{NW_{ft}}{NW_{ft}+NW_{mt}} \tag{2.24}$$

Condition (2.24) sets out that an increase in the quality β is more likely to increase fertility for given preference γ, the smaller is $\frac{NW_{ft}}{NW_{ft}+NW_{mt}}$. This occurs when NW_{ft} is tinier and when the gap between the two partners' income is greater. This means that flexibility β will rise fertility with higher probability, the bigger the gap between male and female's net wages. Thus, increasing flexibility will tend to raise fertility, especially in those countries with big wage gaps.[6]

2.4 Policy Implications

There is a general consensus that female labour supply respond positively to increases in net wages. Moreover, female wages are increasing over time in developed economies. This means that the less strongly negative is the fertility elasticity with respect to the wage, the weaker will be the inverse correlation between female employment and fertility. That is, those countries that implement policies that make it more likely that rises in female wages increase fertility (or at least, reduce it less) will experience a positive (or weaker negative) association between female labour supply and number of children. In this chapter we highlight some of the policies that make the latter more likely to occur. For example, this could be achieved by higher subsidies for bought-in childcare (σ_t), separate taxation and provision of free childcare time ($\bar{z}_{pt}$).

The availability of public childcare has an immediate direct effect on rising fertility, ceteris paribus. More free childcare time also makes it more likely that the condition for positive fertility elasticity with respect to female wages holds (either because of increases in gross wages or by reductions in the marginal tax rates).

Furthermore, a positive correlation between female wages and fertility is more likely to

[6] If we repeat this exercise with β given only to females we find that condition (2.24) is $\gamma > z_{ft}^*$. This requires greater preference for children γ to fulfill the condition that an increase in β leads to higher fertility. Thus, flexibility should be given to both males and females since it is then more likely to have a positive impact on fertility.

occur, the smaller the gap between female and male wages.

Finally, the increase in work flexibility (β) as modelled here does not affect the requirements for a positive relationship between female wages and number of children. However, more flexibility is more likely to be translated to rises in fertility, ceteris paribus, the smaller are female net wages and the greater is the pay gender gap. Thus, flexibility potentially facilitates increasing fertility in those countries with bigger wage differentials.

2.5 Appendix

2.5.1 Solution to the Maximisation Problem

We substitute $c_{t+1} = (1 + r_{t+1})s_t$ on the utility function and budget constraint and rearrange terms.

$$\max U_t = \gamma \ln n_t + (1-\gamma)\ln(1+r_{t+1}) + (1-\gamma)\ln s_t \tag{2.25}$$

$$s.t.\ s_t = NW_{ft} + NW_{mt} + EI_t - [\tilde{v}_t(NW_{ft}, \sigma_t, \bar{\bar{z}}_{pt}) - g_t]n_t \tag{2.26}$$

$$\frac{\partial L}{\partial n_t} = \gamma\frac{1}{n_t} + (1-\gamma)\frac{1}{s_t}\frac{\partial s_t}{\partial n_t} = 0 \tag{2.27}$$

Since

$$\frac{\partial s_t}{\partial n_t} = -(\tilde{v}_t(NW_{ft}, \sigma_t, \bar{\bar{z}}_{pt}) - g_t) \tag{2.28}$$

we isolate

$$n_t = \frac{\gamma}{1-\gamma}\frac{1}{\tilde{v}_t(NW_{ft}, \sigma_t, \bar{\bar{z}}_{pt}) - g_t}\, s_t \tag{2.29}$$

By plugging in the value of s_t and arranging terms for n_t, we find the optimal

$$n_t^* = \frac{\gamma[NW_{ft} + NW_{mt} + EI_t]}{\tilde{v}_t(NW_{ft}, \sigma_t, \bar{\bar{z}}_{pt}) - g_t} \tag{2.30}$$

Then, it is straightforward to find the optimal values of consumption c_{t+1}^* and savings s_t^*.

2.5.2 Comparative Statistics

We call full income in the household the sum of the after tax income it would earn if all time was used for market labour supply and the external income. This is defined as

$$W_t^F = (1-\tau_{ft})w_{ft} + (1-\tau_{mt})(w_{ft} + h) + EI_t,$$

which means that $n_t^* = \frac{\gamma W_t^F}{\tilde{v}_t(NW_{ft}, \sigma_t, \bar{\bar{z}}_{pt}) - g_t}$.

A Change in the Female Gross Wage

$$\frac{\partial n_t^*}{\partial w_{ft}} = \frac{\gamma[(1-\tau_{ft})+(1-\tau_{mt})](\tilde{v}_t(NW_{ft},\sigma_t,\bar{\tilde{z}}_{pt})-g_t) - [\frac{\partial \tilde{v}_t}{\partial NW_{ft}}\frac{\partial NW_{ft}}{\partial w_{ft}}]\gamma W_t^F}{(\tilde{v}_t(NW_{ft},\sigma_t,\bar{\tilde{z}}_{pt})-g_t)(\tilde{v}_t(NW_{ft},\sigma_t,\bar{\tilde{z}}_{pt})-g_t)} \tag{2.31}$$

$$\frac{\partial n_t^*}{\partial w_{ft}} = \frac{\gamma[(1-\tau_{ft})+(1-\tau_{mt})](\tilde{v}_t(NW_{ft},\sigma_t,\bar{\tilde{z}}_{pt})-g_t) - [(\tilde{z}_{ft})(1-\tau_{ft})]\gamma W_t^F}{(\tilde{v}_t(NW_{ft},\sigma_t,\bar{\tilde{z}}_{pt})-g_t)(\tilde{v}_t(NW_{ft},\sigma_t,\bar{\tilde{z}}_{pt})-g_t)} \tag{2.32}$$

Using that $z_{ft}^* = \tilde{z}_{ft} n_t^*$ and rearranging terms

$$\frac{\partial n_t^*}{\partial w_{ft}} = \frac{\gamma[(1-\tau_{ft})+(1-\tau_{mt})] - z_{ft}^*(1-\tau_{ft})}{\tilde{v}_t(NW_{ft},\sigma_t,\bar{\tilde{z}}_{pt})-g_t} \tag{2.33}$$

A Change in the Female Marginal Tax Rate

$$\frac{\partial n_t^*}{\partial \tau_{ft}} = \frac{\gamma w_{ft}(-1)(\tilde{v}_t(NW_{ft},\sigma_t,\bar{\tilde{z}}_{pt})-g_t) - \gamma W_t^F[\tilde{z}_{ft}(-1)w_{ft}]}{(\tilde{v}_t(NW_{ft},\sigma_t,\bar{\tilde{z}}_{pt})-g_t)(\tilde{v}_t(NW_{ft},\sigma_t,\bar{\tilde{z}}_{pt})-g_t)} \tag{2.34}$$

This yields

$$\frac{\partial n_t^*}{\partial \tau_{ft}} = \frac{w_{ft}(z_{ft}^*-\gamma)}{\tilde{v}_t(NW_{ft},\sigma_t,\bar{\tilde{z}}_{pt})-g_t} \tag{2.35}$$

Chapter 3

The Impact of the Labour Market on the Timing of Family Formation

3.1 Introduction

The main purpose of this chapter is to show how the labour market, education and other characteristics affect individual decision to marry/cohabit and have children. We check empirically some of the ideas developed in the theory to explain family formation. Do higher educated women experience a greater opportunity cost of having children? Is the fact of being employed a constraint on having children for women? Is this constraint reduced if women work part-time? Do female unemployment rates and temporary contracts cause a postponement of marriage and births leading to a decline in fertility? Is it true that high external income facilitates the expansion of the family? How do social and demographic variables affect the timing of marriage/cohabitation and births?

Low fertility rates have both social and economic origin. In recent history, there has been a negative relationship between the number of hours supplied in the labour market and the number of children in the household across individuals. Nevertheless, there is some growing evidence that this association is becoming positive in some countries (see Section 3.5). In fact, cross-country female employment *vs.* fertility correlations in developed economies have become positive. That is, those countries with higher female participation rates have higher fertility rates. Female education is also linked to having fewer children, both through its effect on employment opportunities and on the use of contraceptive methods.

Although some studies have been done on this topic (see Section 3.2), this chapter has two main contributions. First, it devotes special attention to the Spanish case since its

low fertility and female participation rates make this country an interesting one. We analyse two different cohorts in order to capture a potential generational change in behaviour in Spain. Second, we make a comprehensive comparison and harmonise research across countries. A complete section of Chapter 3 is based on a cross-country comparison between Belgium, West-Germany, Italy, Spain and Sweden. Although there is some work done for different countries, we are not aware of any complete study that makes a comparative analysis with the same data source. We use the Family and Fertility Survey[1] (FFS) and select those variables that are common across countries.

The rest of Chapter is organised as follows: in Section 3.2, we summarize the contribution of other authors on this topic. In Section 3.3 we focus on the empirical model. The aim is to analyse the timing of family formation with a hazard approach. Section 3.4 studies in detail the Spanish case. Section 3.5 makes a comprehensive study across countries. We then summarise our findings and conclude in Section 3.6.

3.2 Literature Review

There are several studies that analyse the female decision of fertility and work from a theoretical point of view (e.g Becker (1981), Cigno (1991), Galor and Weil (1996) and Apps and Rees (2001)). Becker (1981) uses the price of children and real income to explain why rise in the female wage reduces fertility. He also introduces the idea of an interaction between quantity and quality of children to analyse the demand for children. Cigno (1991) presents various models of fertility: some deal with the decision on the total number of children, and others model the timing of births. He emphasises the importance of the accumulation of human capital to determine the optimal period of childbearing. There are also authors that look empirically at the impact of observable characteristics (mainly female employment and education) on the timing and spacing of births. We next summarise some of these papers.

For the Scandinavian welfare states, Hoem and Hoem (1989) analyse the impact of women's employment on second and third births in Sweden. They find that the variables with the greatest impact on the hazard for the second birth are a woman's employment status, her educational level, and whether she is cohabiting or married. When looking at the third birth, the following regressors are found to be important: age at first birth and the elapsed interval between her first two births (demographic characteristics). Their marital status seems to be minor for the third birth. Their paper emphasises the preference

[1] We describe the data later in the text.

for two children ('two-child norm') in modern Sweden. They also describe the role of the Swedish public sector, which has improved job opportunities for women and has enabled both partners to combine homemaking with paid employment. This has allowed 80% of women with children in the kindergarten to work, many of them part-time. Surprisingly, they find no significant difference on the effect of working full or part-time on the hazard. One initially would think that more family oriented women tend to work part-time. They justify the result by an income explanation. Couples with women working full-time have a higher income and can afford to have more children. Heckman and Walker (1990) focus on the impact of wages on the timing and the number of conceptions in Sweden. They find that, whereas the female wage increases the time between, and reduce the total numbers of births, the male wage has the opposite effect. More recently, Kravdal (2000) studies the effect of unemployment, both at micro and macro level, on fertility in Norway between 1991 and 1998. She finds that unemployment has had a weak impact on births, which might be due to the fact that people are supported by a generous welfare system.

There are also studies for market-oriented economies. The paper by Harvey (1996) analyses the effect of female employment on the likelihood and timing of second and higher order pregnancies for the US. The author uses pregnancy as the unit of measure since he thinks that it is pregnancy and not birth that employed women try to avoid. The paper finds an important negative impact of full-time[2] employment on fertility for the second and fourth pregnancies, but not so for the third pregnancy. This suggests that something other than employment may be more crucial in determining the probability of a third than a second or fourth pregnancy for women who work full-time.

Also for the US, Hodson and Mooney (1981) write about the effects of the timing of marriage and first birth on the spacing of subsequent births. There are several factors that relate age at marriage with fertility. For example, fecundity has its peak at early ages and contraceptive methods will be expected to be used more effectively by older couples since they are more mature. The authors point out some aspects that make the relationship between the timing of marriage and first birth and subsequent child spacing misleading. For instance, those who use ineffective contraceptive methods are likely to marry earlier because they are induced to do so because of premarital conception. The results of their paper show that there exists a direct relationship between the number of births and the experience of rapid fertility. For example, about 80% of those who had three children at the time of the interview had their first child within two years of marriage, but only 35% of those who had one child at the time of the survey had that child

[2]Part-time employment impacts negatively but it is not significant.

within two years after marriage. The latter is rejected by Heckman, Hotz and Walker (1985),[3] which investigate whether it is true that the timing of marriage and the lengths of prior intervals affect the spacing of subsequent births once they control for unobserved heterogeneity. In fact, they find that if unobserved heterogeneity is taken into account, the pattern that longer preceding birth interval causes longer subsequent birth intervals' disappears.

Groat, Neal and Workman (1996) analyse the family formation of working mothers in the US. They find that the longer the marital work duration, the longer the interval between marriage and first child. Another result is that the lowest fertility level is among mothers who have worked the greatest proportions of their married lives, at high status jobs, and before the birth of the first child.

Cooman, Ermisch and Joshi (1987) focus on the probability of a birth given income in England and Wales. Their model confirms that not only demographic characteristics but also economic variables are important in explaining the fluctuations in fertility, in particular its timing. Del Bono (2001) has recently contributed into this area by looking at the impact of unemployment and employment expectations on fertility in the UK. She finds that a spell of unemployment induces women to delay childbearing. Those women who expect high future wages are more likely to postpone first birth, ceteris paribus. On the other hand, if women predict more favourable job opportunities, they bring forward the birth event.

After German unification, fertility patterns changed considerably in East Germany. Kreyenfeld (2000) analyses the impact of unemployment at micro level on the timing of first birth. Her paper concludes that spells on female unemployment actually increase the hazard for first birth in East-Germany, which goes in opposite direction of what Del Bono (2001) finds for the UK.

Both childcare and taxation policies affect the participation of mothers. Connelly (1992) shows that increased childcare costs lower the probability of employment, especially among mothers of preschoolers. Other papers analyse the impact of joint *vs.* separate taxation on employment. Colombino and Del Boca (1990) find that under a separate taxation the lost of hours worked with respect to a system without taxes is less than under joint taxation. Apps and Rees (2001) go further and look at the effect of the tax system on the simultaneous decision of fertility and participation. Their model shows that countries

[3]Their analysis is based on a Swedish sample.

with individual rather than joint taxation are more likely to have both higher female labour supply and higher fertility. The paper also demonstrates that support for families should be given by improved availability of domestic childcare and not through direct child payments.

Most of the papers focus on one single country and do not compare different economies. One exception is the thesis by Wetzels (1999) that analyses the timing of births in Sweden, Germany and Great Britain. Her results show that high education delays first child in these three countries. In Great Britain, women become mothers at a younger age compared to Sweden and Germany. She suggests that this is due to the fact that maternity benefits are lower in Great Britain, which makes the wait to obtain them less appealing, especially among low-educated women.

Less research has been done for Spain. We are aware of an important piece of work by Ahn and Mira (2001) who use the 1991 Spanish Socio-demographic Survey. They look at the the links between high male unemployment rates and the decline in fertility in Spain. Their results provide strong evidence that periods of non-employment for men have a significant negative effect on the probability of marriage. Part-time or temporary contracts have also played a negative role, which suggests that the instability of jobs among young men causes the delay of marriage and childbearing among the Spanish couples. Our analysis in Section 3.4 differs from theirs in several aspects. We focus on both females and males whereas they only investigate males. We also highlight changes in society by dividing our sample into two cohorts (1945–60 and 1961–77). Baizán, Aassve and Billari (2001) contribute to the Spanish case by modelling simultaneously first birth and cohabitation. They find evidence that these two events are correlated. Consequently, they claim that in order to obtain reliable estimates, studies should include a heterogeneity component that accounts for their mutual dependence. Looking at the economic variables, their results show that being employed reduces women's likelihood of marriage and first birth. The latter is true regardless of whether they take account of the unobserved factor influencing simultaneously first birth and first union.[4]

For a brief summary on the topic, it is worthwhile reading the paper by Gustafsson (2001). The author reviews the empirical and theoretical literature about the postponement of

[4]We would like to point out, however, that the impact of economic variables (e.g. education, employment and work experience) remains fairly constant with the same interpretation in the two specifications (with and without accounting for interdependence). Thus, we believe that if one is interested in the impact of this type of covariate, one need not be overly concerned about correlations between first birth and marriage in Spain.

maternity in Europe. First, there are models that deal with the timing and spacing of births and use female wages and male incomes to explain fertility decisions (e.g. Heckman and Walker (1990) for Sweden and Merrigan and St-Pierre (1998) for Canada). Second, there are dynamic models that compare the utility of having a child at time *t+1* rather than at time *t* with the period shadow price of giving birth (e.g. Ermisch (1990) and Walker (1995)). Finally, there is a literature that anayses the optimal age of maternity and relates it to career planning. For instance, Joshi (1998) studies the costs of children in Great Britain, namely, the direct forgone wages and the human capital loss during the time out of the labour market. Within this framework, Happel, Hill and Low (1984) find it optimal to begin fertility either very early or very late in marriage, depending on how much human capital depreciation women have after childbearing.

3.3 Empirical Model

Our purpose is to analyse the principal determinants of the decisions to get married and to have children. Since we are interested in the impact of employment, education and labour market characteristics on these decisions, we will mainly focus on these variables. To analyse the process, we model the timing between different demographic states (single to married,[5] married without children to one child, from one child to two children and from two to three). We use duration models to study the timing of marriage and births. Econometric duration models are used to analyse the main factors (observable and non-observable) that determine the duration in a given state. In other words, they analyse the probability of an event occurring at a particular time, given that the individual was at risk at that time. Fertility decisions are based on sociological factors, demographic characteristics, education and the employment trajectories. The hazard model applied to family creation tells us, given employment, education and other factors, the probability that a woman will get married in the next month.[6] When looking at the first child, it predicts the probability that a woman at risk with those characteristics will have a first child in the next month. The same interpretation is extended for the second and third child.

To summarize, these microeconomic models allow us to study how observable characteristics influence positively or negatively the chances that a woman gets married or increases the size of her family. These covariates can be either time-varying or fixed. Since we are interested in how the employment and education paths affect the family creation tra-

[5]Notice that Section 3.4 analyses the timing of marriage and Section 3.5 considers both marriage and cohabitation.

[6]We have monthly data.

jectory, we do have time-varying variables, which tell us at each period the employment status and the educational attainment of the woman. We also introduce regional unemployment rates that correspond to a particular month. This provides a measure of how a woman forecasts the risk of temporarily abandoning her job and how the economy is performing. Moreover, there are also some social factors that influence the hazard, which are taken as constant covariates (for instance, the number of siblings, religion and region). The hazard is not only a function of characteristics but also of the time a woman has already spent in a certain state.

The two basic concepts are: the survival and the hazard function. The survival function reveals the probability of 'surviving' (remaining) in a specific state. The hazard function specifies the probability of exiting (leaving) a particular state.

3.3.1 Hazard Functions

The hazard function, $h(t|x)$ is defined as

$$h(t|x) = \lim_{\Delta t \to 0} \frac{1}{\Delta t} Pr(t \leq T < t + \Delta t | T \geq t, x) \tag{3.1}$$

where x is the vector of explanatory variables (that might be dependent or independent of time) and T is a random variable of the exit time.

The hazard rate of marriage implies the conditional probability density function of leaving the status of being single to being married, given that the individual has been single until t and given her characteristics x. The hazard rate of first birth is the probability of exiting the state of being married with no children to the state of having one child, given that the particular couple has been married until t and given their characteristics x. One can reproduce this methodology to study the change of state from one child to two, from two to three, and so on.

Let $f(t|x)$ be the unconditional (with respect to the time) probability density function of exit from one state to another and $F(t|x)$ the cumulative distribution function for an individual with characteristics x. We can then write the hazard function $h(t|x)$ as:

$$h(t|x) = f(t|x)/(1 - F(t|x)) \tag{3.2}$$

The denominator in (3.2) is the survival function $S(t|x)$ representing the probability of 'surviving' in a specific state. Here the survival rate means, for example, the probability

at time t that a woman remains single.

As mentioned, the exit rate from a state depends upon the time spent in that state and the individual characteristics. Consider, for example, the exit rate from the state of being married with no children to the state of being married with one child. There are a number of factors that might cause the hazard rate to change (in both directions) during the spell of marriage with no child, implying duration dependence. The first is that the longer the couple has been married, the older is the woman and her husband. It is a biological fact that women and men become less fertile as they age. This implies negative duration dependence ($\delta h/\delta t < 0$). That is, the exit rate depends negatively on time. On the other hand, it is possible to find arguments that go in favour of positive time dependence ($\delta h/\delta t > 0$). For instance, some couples may wish to get settled before having children. Furthermore, some couples may require some kind of treatment to facilitate their reproduction. The existence of duration dependence has to be checked empirically. It might be that how long the couple has been married has no impact and it is only the individual characteristics of both members of the couple that determines the change of state. This will be in accordance with an exponential baseline hazard.

The most common assumption is to make the time profile of the hazard function independent of x. Then, h is formed by two factors: a function of regressor variables, x, given by $\Phi_1(x)$, and a function of time $h_0(t)$ (the baseline hazard):

$$h(t|x) = \Phi_1(x) * h_0(t) \tag{3.3}$$

This specification is the proportional hazard models (PH-models) since two different couples have hazards that are in fixed proportions for any t (Cox and Oakes (1984)).[7]

The hazard has to be positive. A way of achieving this is to take the factor Φ_1 as an exponential:

$$\Phi_1 = exp(x'\beta) \tag{3.4}$$

giving

$$h(t|x) = exp(x'\beta) * h_0(t). \tag{3.5}$$

[7]With time-varying covariates there is not, strictly speaking, such a thing as the proportional hazard model. However, it has become common in econometrics to call a hazard of the form in equation (3.3) as proportional hazard with time-varying covariates.

For the baseline hazard $h_0(t)$, one might adopt parametric or semi-parametric specifications (where it is not constrained to belong to a specific parametric family). Forcing the hazard baseline function to take a particular shape may be a disadvantage if the parametric function does not fit properly the duration dependence.[8] This is why we use the semi-parametric Cox model, which allows derivation of the coefficients for the explanatory variables, but places no restrictions at all on the shape of the baseline hazard. Then, depending on the form of the baseline, one could compare the results with a parametric specification. Two examples of parametric specifications are the Exponential and the Weibull. The former is a model with $h_0 = 1$. The exponential parameterisation assumes that the hazard is independent of time. One can generalise the Exponential model to the Weibull where

$$h_0(t) = \alpha t^{\alpha-1}, \alpha > 0. \tag{3.6}$$

The hazard rises or falls monotonically according as $\alpha > 1$ or $\alpha < 1$. The case $\alpha = 1$ comes back to the exponential model.

The appropriate likelihood function for our sample, derived by Lancaster (1979),[9] represents the likelihood of the events in the period during which the exit process is monitored, say L_i. Therefore, we may face complete and incomplete spells. For example, in the case of first birth, complete spells occur when the realised time of being married with no child, T_i, is less than the period of observation L_i. Their contribution to the likelihood function is through the density function evaluated at that point. With incomplete spells, there are two cases: left censored (when the moment the couple entered into the married with no child state is unknown) and right censored (when it is unknown when the couple left this state). Normally people do not consider left censored spells (they are eliminated from the sample). Under the current paper, we do not face the problem of the left-censored spells since we know the dates of marriages and births. Usually, when one talks about incomplete spells it is referred to right censored ones, which contribute to the likelihood by the survival function evaluated at L_i. Individuals who do not exit into a new state are censored at the interview date, when either they or their partners are sterilized, or when they separated, divorced or widowed.

[8] Ridder (1987) shows that a flexible baseline hazard is also favorable if we are concerned about unobserved heterogeneity.

[9] Also Lancaster (1990).

The likelihood can thus be written as:

$$\mathcal{L} = \prod_{N_U} f(T_i, x_i) \prod_{N_C} S(L_i, x_i) \tag{3.7}$$

where N_U stands for the uncensored cases, while N_C for the censored cases. An alternative way to write the likelihood function is

$$\mathcal{L} = \prod_{i=1}^{n} f_i(t_i|x_i)^{\delta_i} S_i(t_i|x_i)^{1-\delta_i} \tag{3.8}$$

where δ_i is the censor indicator (takes value 1 for uncensored observations, and 0 for censored ones).

Equation (3.8) can be written as a log-likelihood function in terms of the hazard and the cumulative hazard function:[10]

$$l = \sum_{i=1}^{n} \delta_i ln h(t_i|x_i) - \sum_{i=1}^{n} H(t_i|x_i). \tag{3.9}$$

The log-likelihood function is then maximised with respect to its parameters.

3.3.2 Kaplan-Meier Survival Estimation

The product limit estimator or the Kaplan-Meier estimator is based only on the data of the sample and is non-parametric. This estimator is computed as follows

$$\widehat{S}(t) = \prod_{j|t_j<=t}^{j} \left(\frac{n_j - d_j}{n_j} \right) \tag{3.10}$$

where n_j is the risk set at time j, d_j is the number of failures at time j, and the product is over all distinct failures times less than or equal to time j. The risk set at time $j(n_j)$ is the number of spells neither completed nor censored before time j.

Kaplan-Meier Survival estimates provide the probability of remaining in the same state (e.g. not to have an additional child) at a particular moment of time. Despite the fact these estimates omit characteristics, they are a useful first step to analyse the differences between two groups.

[10]The cumulative hazard function is defined as $H(t|x) = \int_0^t h(s|x)ds$.

3.4 The Spanish Case

3.4.1 Introduction

The starting point of the decline of the Spanish birth rate dates back to the late 1970s. Nowadays, fertility rates in Spain are lower than in any other country in the EU, except for Italy. In 2001, the US Bureau of Census reported that fertility rates were 1.15 for Spain, 1.18 for Italy, 1.53 for Sweden, 1.65 for the Netherlands, 1.72 for the UK and 2.06 for the US.

Part of the sharp decrease in Spanish fertility is due to the fact that women are now more educated and they are entering the labour market in larger numbers. However, other countries also experienced this phenomenon but their fertility rates never fell to the current Spanish levels (see Figure 3.11 in Appendix 3.9). This means that, although some percentage of the decline can be explained by mass entry into the labour force and the rise of education, one should also look for other possible reasons. This is what makes the Spanish case particularly interesting.

One hypothesis is that countries such as the US, the Netherlands and Sweden achieved a higher stable fertility rate (after their initial decline) than that in Spain thanks to their more flexible labour markets and their government policies. This means that in these countries being employed places less of a constraint on women having children. Moreover, they are characterised by lower unemployment rates and fewer temporary contracts, which allows them to marry (or cohabit) at a younger age.

Other nations have attained the 'two-child norm' (Hoem and Hoem (1989)) despite their increase in levels of education. In general, women start building a family at an older age compared to previous cohorts but they end up with two children. Therefore, further female education explains part of the decline of the Spanish fertility rates but not all. The impact of the level of education on the drop in fertility is strongly linked to the structure of the labour market: its flexibility and the number of opportunities it offers. In other words, if the Spanish labour market were more similar to that in other countries, then Spanish couples would probably form their own households before they currently do and educated women would end up with the same 'two-child norm'.

The previous statement is particularly true with regards to the US. Many American women go to university, work and have children. They know that the market offers them alternative chances after the birth of their children. Spanish women perceive a greater

opportunity cost of becoming pregnant at equivalent US educational levels since work opportunities for mothers are scarce. Spanish unemployment rates are huge[11] and by the time they get a permanent contract, which facilitates stability, they are already in their mid-thirties.

In 1984, the government decided to liberalize the labour market because of the rise in unemployment (Saint-Paul (2000)). However, rather than reducing dismissal costs for permanent workers, which is politically difficult to implement, they increased the use of temporary labour contracts. The result of this reform was that temporary contracts represent 95% of new hires. Later on, it was shown that this policy had not succeeded in its objective of reducing unemployment. Even if initially, there was a boost in hiring, in the following recession (mid-nineties) employment dropped rapidly since firms could take advantage of the temporary contracts and easily dismiss their workers. This attempt to increase flexibility affected mostly young people and consequently, young potential couples. Without a stable employment contract, they were not willing to start a family.

US fertility rates stabilised with many mothers working full-time whereas in the Netherlands they did with many women working part-time. The Netherlands has been taken as an example of a country where the labour market is flexible and people can voluntarily decide to work part-time. Under the latter option, women are able to combine both working and having children. In the Dutch society it is understood that either women or men take some time off in order to take care of their children, and companies are willing to offer this choice.

Sweden finally exemplifies the intervention of the government in childcare policy. This can be another alternative that helps prevent the observed Spanish tendency towards lower fertility. Both private and public Swedish companies are characterised by their provision of childcare and maternity leave. Moreover, the atmosphere in the labour market is such that firms are more willing to employ potential mothers.

To summarise, part of the recent drop in Spanish fertility rates can be explained by factors similar to those experienced by other countries such as the fast increase in female education. But the additional drop is due to the fact that educated women who wish to combine work with raising a family are discouraged from doing so by the labour market structure. The opportunity cost of having children at similar schooling levels is greater in Spain than in other countries because of high unemployment and labour mar-

[11]The OECD reports that unemployment rates in 2001 are 10.6% for Spain and 4.7% for the US.

ket instability. Fewer couples decide to marry, and they do it later. Furthermore, among married women, more remain without children since they are afraid of losing their careers.

The aim of this section is not to explain differences in fertility across countries (this is done in the next Section 3.5) but to provide further knowledge about fertility decisions in the Spanish case. The analysis is done for two groups, the old cohort (women born 1945–60) and young cohort (1961–77) since the role of women in society in Spain, especially as a worker, was quite different in these two periods. We also examine the role of men in family formation by looking at a male sample.

The outline of this Section is as follows: first, we explain the construction of variables in Subsection 3.4.2. Next, we describe the data in Subsections 3.4.3 and 3.4.4. Subsection 3.4.5 explains the estimation and the methods applied to overcome the endogeneity between fertility and female labour supply. The following Subsection summarises the main results and we conclude in Subsection 3.4.7.

3.4.2 Data and Constructed Variables

We use the 'Family and Fertility Survey', a data set collected by the Centro de Investigaciones Sociológicas (CIS) between June and November of 1995. The structure of the questionnaire was originally produced by the United Nations and applied in Spain in 1995. The sample is built at the national level with individuals aged between 18 and 49 years old. The number of valid interviews was 4021 for women and 1991 for men, obtained with a percentage of responses of 83.6% and 77% respectively.

CIS questioned individuals in the 17 regions (Comunidades Autónomas) in proportion to the population. Each individual responds to the survey at a particular moment of time. Then, they are asked to give information about their past. That is, the poll asks every person to build up her history: for instance, the dates of her marriage, first cohabitation, sequence of jobs (starting and ending date of her job for up to 30 different employments), calendar of children born and sequence of schooling (up to 10 different courses). In consequence, since it is a retrospective survey there will be errors coming from the individuals' lack of memory. Another shortcoming of this survey is the lack of wages and income variables.

In particular, we are interested in building the timing of their marriage and fertility, their job career and schooling in order to link the paths. We want to construct a monthly record of whether the female is single, married without family, or has one, two or more

children. Furthermore, we need to know the employment status and education achieved in each month. When the person is 15 years old, she is deemed to be in period 0. One month later, she is in period 1, and one year later she is in period 12. The reason why the counter begins at 15 is that initially we model the duration to marriage and there were only three persons in our sample who had married before. These cases were discarded.

The variables used in the analysis include time-varying dummy variables that reveal the employment status of the woman at each month (*Emplo*). That is, *Emplo* takes value one if the person was employed at the beginning of each period and zero otherwise. The variable *Schm* is one if the individual is at school and zero if not. For reasons we will explain later, we have constructed lag variables of *Emplo* and *Schm* for six and twelve months (*Emplo6*, *Emplo12*, *Schm6*, *Schm12*). Furthermore, since we are interested in timing, we have dummy variables for education that tells us the highest level the person had achieved by that specific month. The questionnaire provides information on if a woman is studying a certain qualification in that month and if she succeeded. Therefore, the variable created takes the value of the qualification at that month if she passed the qualification, and the inferior level if she did not. The scale of the degrees goes from zero to six in accord with the International Standard Classification of Education (ISCED). Level 0 starts at the age of 3, 4 or 5 and it lasts from one to three years. Category 1 in the ISCED refers to primary education and normally starts at the age of 5, 6 or 7 and continues five years. Levels 2 and 3 belong to the secondary school, to the first and second cycle (starting at 11 or 12, and 14 or 15, respectively). Level 4 is generally achieved four years after the individual is 17 or 18 and it is a vocational qualification. Finally, categories 5 and 6 refer to a university degree and postgraduate degree, respectively. From this variable, we have constructed four dummy variables *E1* (with value one if the maximum level is 0 or 1, and zero otherwise), *E2* (one if the individual belongs to category 2 or 3), *E3Voc* (one if she has level 4) and *E3GrPo* (one if she is at 5 or 6).

Furthermore, there are other time-varying variables that provide information about the occupational history of each female. First of all, in order to check if it makes a difference for the analysis to work part or full-time we have created the following three dummy variables: *NonE* is one if at that month the woman is not employed at all; *FTE* is one if the woman is employed 35 or more hours and *PTE* is one if she is employed less than 35 hours.

We believe that the evolution of unemployment has had a great impact on the fertility trajectory. The variable *Unemrf* links the regional female unemployment rate to a particular individual date. Unfortunately, regional time series are available only from

the second quarter of 1976 (Instituto Nacional de Estadística). Thus, prior to this date, we have computed the earliest regional unemployment rates in the following way. We take the ratio between each regional unemployment rate and the national unemployment rate in the earliest quarter available (third term of 1976). The regional to national unemployment ratio is assumed to be constant through time. Since there exists data on national unemployment rates, we can use these constant ratios to estimate the regional unemployment rates. For the same reason as *Emplo* and *Schm*, we construct *Unemrf6* and *Unemrf12*.

The atmosphere of job security may also influence the decision to build a family. In 1984, the Spanish government introduced a policy to liberalize the labour market. Following this reform, by 1990 temporary contracts accounted for 95% of new hires and 30% of employment. For this reason, we have included a variable that measures the percentage of female employees that have temporary contracts *Tempf* at national level. The lags of this covariate are *Tempf6* and *Tempf12*. This variable takes the value zero for quarters prior to 1984 since there were then no temporary contracts in Spain. Despite the fact this form of contract was initiated in 1984, there is no data available on number of employees under each type of contract before the second quarter of 1987. Thus, we have computed the missing values assuming the number of temporal contracts grew linearly from zero in the first quarter of 1984 to the number existing in the second quarter of 1987.

The rest of the explanatory variables are constant along the segment of a woman's life subject to study. These are social background factors such as the number of siblings (*Sibling*), if her parents were divorced (*DivPar*), if she is religious (*Religious*) and the region where she lived most of her time up to age 15. The latter has been constructed in seven dummy variables following the NUTS categorization.[12] There is no information on moving region. This is the reason why it is taken as a fixed covariate, enforced by the fact that Spain is not characterised by high migration. We incorporate a variable for the taste for work (*WorkTaste*) that takes value one if the person was at work one year after she completed education. Cohort dummies are included with five years' intervals.

When studying the timing to the first child, we add further fixed variables. Age of marriage *AgeMa*, which is accounted as months from the fifteenth birthday and education achieved by the partner (*E1P*, *E2P*, *E3VocP* and *E3GrPoP*) in dummy variables.

[12]NW (Galicia, Principado de Asturias, Cantabria); NE (País Vasco, Navarra, La Rioja, Aragón); C (Castilla León, Castilla la Mancha, Extremadura); CMadrid (Comunidad de Madrid); E (Catalunya, Comunidad Valenciana, Baleares); S (Andalucía, Murcia); Canaries (Canarias).

In the analysis of timing to the second child, apart from the partner's education, there is the age at first birth (*AgeAt1C*), the duration between the marriage and the first birth (*MenT1C*) and a dummy variable equal to 1 when the first child was a girl (*Girl*).

Finally, when looking at the third birth, the extra variables are age at second birth (*AgeAt2C*), the duration of the previous spell (*MenT2C*) and two dummy variables that take value 1 if the first two children were girls (*TwoGirls*) or boys (*TwoBoys*).

In the analysis of the probability of leaving the single state, individuals are censored at the date of the interview if they were still single. Period zero corresponds to the fifteenth birthday and the unit of time is months. Individuals who married before that time have been removed from the sample. For the estimation of the probability of having a first child, individuals were censored at the date of the interview, or at the time one of the members of the couple had had an operation to make pregnancy impossible. They were also censored at the time they separated, divorced or widowed. The same criterion was followed for the second and third child. Mothers who gave birth to twins were dropped out from the sample as well as births before the marriage.

One might think that, rather than being employed or not some time before the pregnancy or marriage, what really matters is the way a woman perceives her chances of getting back to work. This is the reason why we have constructed a variable that tells us the probability that a woman will be employed given her education and labour market behaviour. In order to compute the chances of this re-employment proxy, we have estimated a probit. The dependent variable takes value 1 if employed and 0 otherwise. Ideally, we would like to be able to set the dependent variable 0 when the person is unemployed (i.e. to compute the probability of employment given she is in the labour force), but in the data one is not able to distinguish between inactivity and unemployment.

Table 3.1 summarises the number of subjects, both who exit[13] and are censored, for the old cohort (born in 1945–60). Table 3.2 gives the same information for the young cohort (born in 1961–77).

[13]Individuals who exit are those who move from one state to another (e.g. from single to married). The censored individuals are those who you stop observing before they exit.

Table 3.1: Number of Subjects, Exits and Censored in Each State, Cohort 1945–60 — Spanish Females

	Marriage	1^{st} *Birth*	2^{nd} *Birth*	3^{rd} *Birth*
Total	1150	1041	1007	824
Exits	1072	1011	857	338
Censored	68	30	150	486

Table 3.2: Number of Subjects, Exits and Censored in Each State, Cohort 1961–77 — Spanish Females

	Marriage	1^{st} *Birth*	2^{nd} *Birth*	3^{rd} *Birth*
Total	2228	1024	821	436
Exits	1082	829	444	74
Censored	1146	195	377	362

3.4.3 Descriptive Statistics

Data show a postponing in the age of marriage. In the old cohort, by the age of 30, 93.4% of them were married whereas only 83.0% of the cohort 1961–65 was married at this age.[14]

There has been a substantial increase in Spanish female qualifications. For example, only 3.7% of women born between 1951 and 1955 had a university degree, whereas 11.1% of women born between 1961 and 1965 did.[15]

There is a positive correlation between education and age of marriage, which is much stronger in the young cohort. Data show also a rise in the levels of education for each age of marriage. For instance, among women who married between 15 and 19 years old, 12.9% did not finished the primary school in the old cohort. This percentage is only 5.3% for the young cohort. Among women who married between 25–29 years old, 6.1% obtained a university degree in the old group whereas 19.8% did so in the young group.

If one compares the two cohorts by levels of education, women with the same level of schooling tend to marry later in the young cohort. For instance, among graduate women, 52% of the old cohort marries between 20 and 25 years old, and 28% did between 25 and 30 years old. However, among the young cohort, 25% of graduate females get married in

[14]Note that for the calculation of this percentage we take a sub-sample of what we call young cohort (1961–77), since only women born before 1965 are observed beyond 30 years.

[15]Table 3.19 in Appendix 3.8 shows the evolution of female qualifications across cohorts.

the age interval 20–25 and 50% do so in the age interval 25–30. There are two possible explanations. First, one of the targets of women born before the 60s was to get married (at all education levels) because of the traditional society. Second, nowadays women are more demanding in their career aspirations and they wish to settle into their jobs before getting married. The Spanish labour market in the 80s and 90s did not help because of its huge unemployment rates and unstable contracts. This delays entry to the labour market by graduate women and thus postpones marriage.

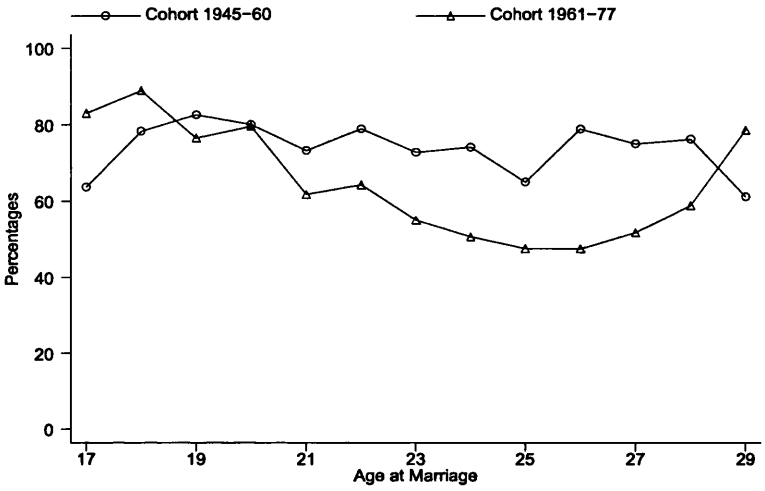
In both cohorts, higher education is linked to longer duration between marriage and first child. The main difference between the two cohorts comes in the levels of education 2, 3 and 4, respectively secondary school first level, secondary school second level and vocational studies. These education levels have a higher proportion of individuals that take more than two years to give birth from the date of marriage. For example, 7.1% of women with level 4 have a duration from marriage to first child longer than 2 years in the old cohort, whereas 51.9% do so in the young cohort.

In the relationship education *vs.* spell to second birth, those with the highest levels of schooling tend to spread the births over more than two years. As expected, high educated females delay first birth longer after marriage, this effect being stronger in *Cohort 1961–77*. Interestingly, the graduate group experiences an increase in the proportion of women having the second birth less than two years after the first one. For example, 93% of graduate mothers took more than two years after the first child to have their second one in *Cohort 1945–60*. The percentage is 61% for *Cohort 1961–77*.

Figure 3.1 represents the proportion of women who had the first child within two years of marriage by the age at marriage. Younger cohorts seem to have shorter durations when the age of marriage is less than 19 years old. From that age on, the old cohorts show a greater proportion of married women having children within two years of their marriage.

Hazard models allow us to search for the main features that influence the timing of births and compare among cohorts. Note that the picture refers to women who are married. Spanish women still generally marry before having children. In the old cohort 2.5% of the women had a baby before they got married. In the young cohort, the percentage is 5%. It is also interesting to study the timing to marriage, since fewer women get married and those who do, marry later. This plays an important role in fertility since fecundity has its peak at early ages. The later a couple cohabit together, the later they will have children and the shorter will be the fertile spell.

Figure 3.1: Proportion of Spanish Females having a First Birth Within Two Years of Marriage

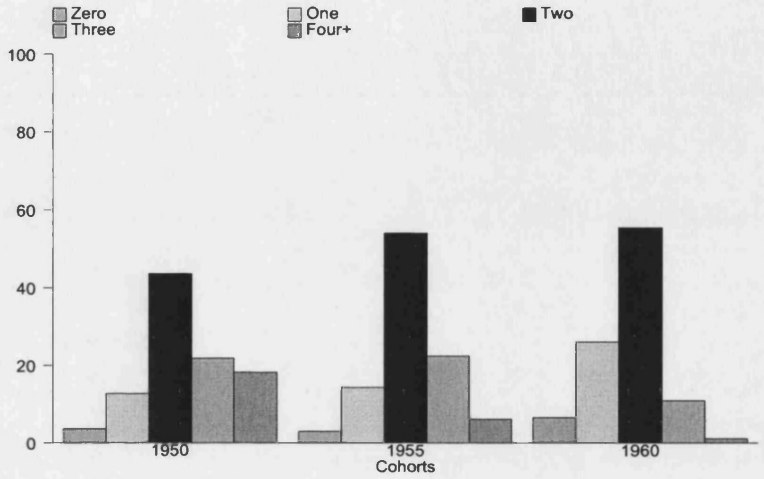


Female labour force participation influences family formation. In the old cohort, among those women who had at least one child at the time of the interview, 37% were employed when they married. For the sample 1961–1965,[16] 45% of women with at least one child were employed. If we focus on employed women, 98% of those who were employed in high skill profile jobs at the time of the marriage had at least one child by the time of the interview in the old cohort. This percentage is only 82% among women born between 1960 and 1965. Among low skill profile jobs, the percentages of women who had at least one child by the time of the interview are respectively 96% and 92% for the old and young cohort. There is a slight increasing tendency to remain childless. 64% of women in the old sample who were working in high profile jobs at the time of their first birth had a second birth in the old cohort whereas 45% had at least two children in the cohort 1961–1965. The percentages for low skill profile jobs are respectively 81% and 65% for the two cohorts. This shows a reduction of fertility among employed people or, at least, a postponement of family formation since the young cohort for this comparison is aged between 30 and 35 at the interview. Women employed in more skill demanding jobs have fewer children.

Despite the fact fertility has dropped, people in the two cohorts do not report significant differences in the ideal number of children (Table 3.14 in Appendix 3.8 summarises the

[16]In these statistics, we omit relevant information in the computation of number of children such as how old the woman is. For a fair comparison we take only individuals aged 30 or more at the interview for group 1961–1977.

Figure 3.2: Number of Children, Married Women at 35 Years Old — Spanish Females



women's preferences). Many women in the young cohort consider two children as an ideal number but they do not have them. Figure 3.2 shows the proportion of married women who have any, one, two, three and four or more children at 35 years old for three cohorts (1950, 1955 and 1960). The plot tells us that the percentage of women with any or only one child has increased whereas the percentage for three and four has diminished.

3.4.4 Kaplan-Meier Survival Graphs: a Cohort Comparison

Figure 3.3 represents the Kaplan-Meier Survival in the single state estimates for the two cohorts.[17] The young cohort shows a higher survival rate in the single state for all t, which reinforces our strategy of splitting the analysis between the two cohorts. This enables us to seek changes in the social and economic determinants of family formation across these two age groups. The same exercise is repeated for surviving in the married childless state (Figure 3.4), where time zero corresponds to the date of each woman's marriage. Figure 3.5 and Figure 3.6 show the Kaplan-Meier Survival estimation in the state of married with one and two children, respectively. These pictures provide evidence that the young cohort has a greater probability to survive in each state at all durations (note that these graphs do not incorporate the effect of the covariates). This is particularly true for the survival rate in the single state and the married with two children state. Therefore, we observe that the two cohorts behave differently, especially in their decision when to marry and the timing to the third child.

[17]The formulation for the Kaplan-Meier Survival estimates is given in Subsection 3.3.2.

Figure 3.3: Survival in the Single State, By Cohort — Spanish Females

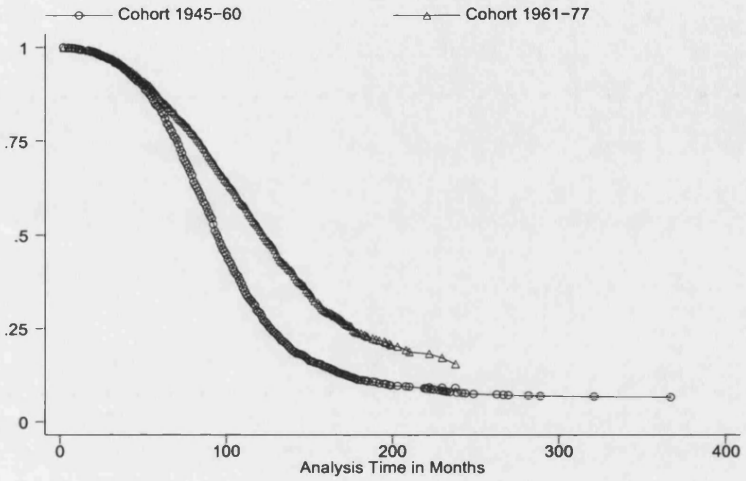
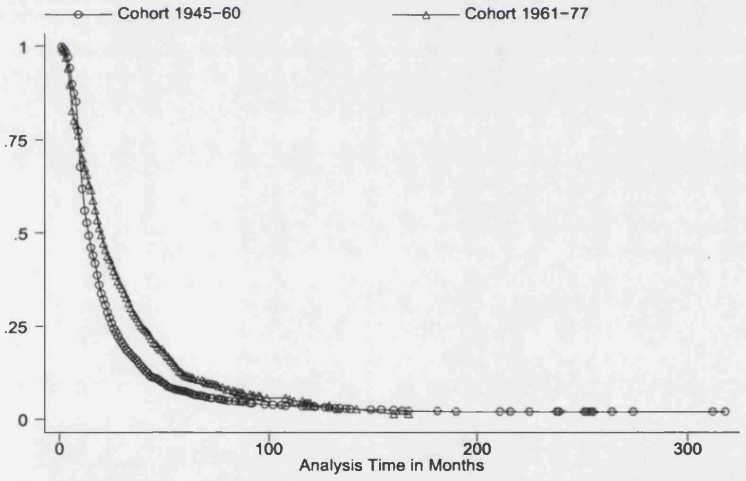


Figure 3.4: Survival in the Married Childless State, By Cohort — Spanish Females



As mentioned in Subsection 3.4.2, the survey was carried out in 1995 and historical information was collected retrospectively. This implies that older women in 1995[18] are in general observed over a longer time, which means that the number of censored individuals with respect to the total is expected to be larger in the young cohort. We would like to measure if differences in observed periods could lead to erroneous statements. In order to try to account for this effect, we have replicated the old cohort's Kaplan-Meier estimations by 'artificially' truncating data as the young cohort, building the histories for them only up to 1980 (even if women were questioned in 1995). Thus, the individuals who are

[18]Sample aged 18–49.

Figure 3.5: Survival in the Married With One Child State, By Cohort — Spanish Females

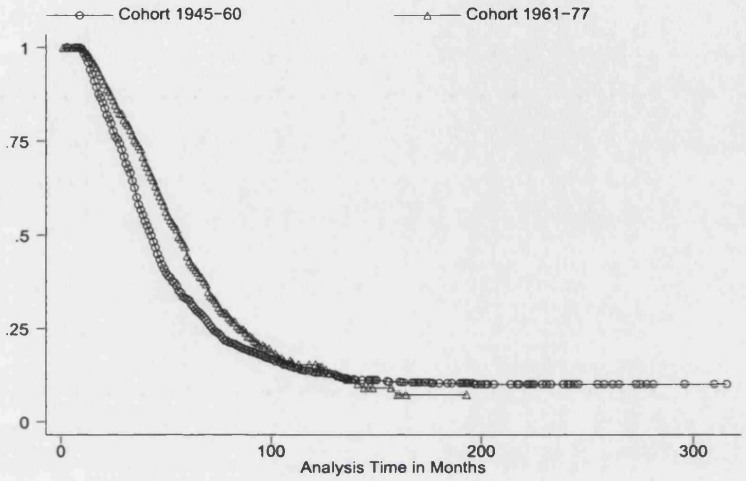
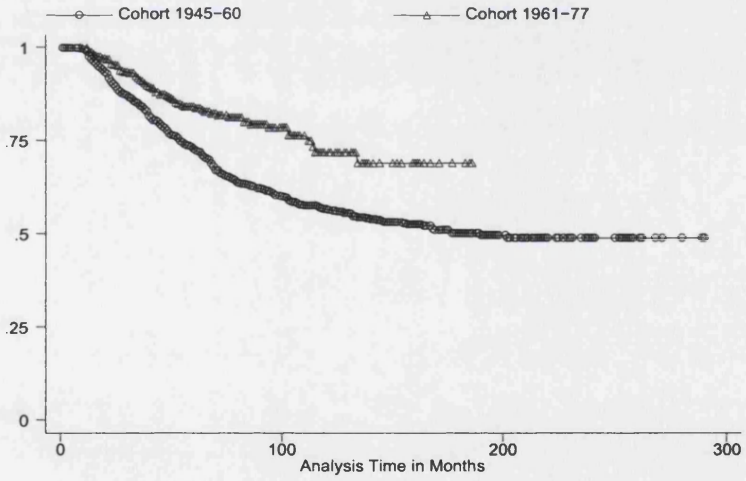


Figure 3.6: Survival in the Married With Two Children State, By Cohort — Spanish Females



observed further in both cohorts are aged 35. This 'artificial' exercise shows that these two groups still fall apart. Kaplan-Meier Survival curves for the old and young cohort are even more spread out, especially towards the third child. These graphs are in Appendix 3.9 (Figures 3.12 to 3.15).

3.4.5 Estimation

The decision to get married is taken some time before the big day. This is why most time varying variables are taken six months before the current time in the estimation for the

hazard of marriage. These are: *Schm6*, *Emplo6*, *Unemrf6* and *Tempf6*. Female education is also a time-varying variable. Nevertheless, its value in the estimation is not lagged since it can be accurately predicted at the time of decision. The decision to give birth is also taken some months before the child is born. Thus, there are also lag variables for the estimation of the birth timing: *Schm12*, *Emplo12*, *Unemrf12* and *Tempf12*.[19] By taking the lags of labour market covariates we also reduce the concern of fertility and employment being simultaneously decided.[20]

Note that the variables *Tempf6* and *Tempf12* are likely to be picking up a trend in the marriage or births timing since they only vary across time. In order to assess this effect, we have re-estimated all the hazards for the young cohort (where these variables are included) with a time trend. We indeed find that in those regressions where the proportion of temporary contracts had a negative and significant impact on the hazard, the coefficients were reduced once the trend was added. We also learn that this trend variable is not significant in any of the female hazard estimations, whereas it shows a significant and negative impact in the timing of marriage and first birth for the male sample. We explain more about this in Subsection 3.4.6.

One could be concerned about the fact that the decision of marriage and first birth are endogenous. Some research has been done in order to measure the importance of this effect. For example, Baizán et al. (2001) use a simultaneous hazard equations approach in order to overcome potential bias caused by the correlation between the process of first birth and union formation.

In order to validate how the mutual dependence of the decision could have an effect on our results, we have undertaken the estimation by taking time zero 7 months after the marriage. In this case, we select those women whose marriage was definitely not simultaneous to the birth. We find that our estimates are not significantly different from the estimation where the counter is taken at the marriage date. Thus, we claim that we do not have to be preoccupied that our results are misleading because of this potential endogeneity.

We believe that this is supported by Baizán et al. (2001) since they find minor changes in their economic explanatory variables once they control for an unobserved correlation process component. For instance, in their specifications (with and without allowing for

[19] We have also tried with a lag of nine months but the results were basically the same.

[20] Later we discuss how we tackle the problem of endogeneity between fertility and female labour supply.

mutual dependence), employment reduces the hazard of first birth and marriage, being the absolute value greater under the simultaneous model. Despite the fact that they show that correlation matters, the interpretation of their economic covariates is more or less unchanged.

Another drawback is the endogeneity between fertility and female labour supply.[21] This endogeneity is generated by the fact that the omitted characteristics will impact on both work and childbearing. For example, the omitted variable 'taste for home-life' or its opposite 'taste for work' will tend to have opposite effects on work and childbearing. Since they are omitted, they will thus generate a spurious negative addition to the coefficient on employment in a fertility equation even if the employment variable is dated prior to the birth.[22] The importance of this will depend on the extent to which variations in employment are driven by tastes as opposed to job-rationing in the labour market.[23]

If the former is important, then one way of capturing the 'taste for work' is to include a variable which reflects this, namely a dummy for whether or not the woman worked immediately upon leaving full-time education (*WorkTaste*). Of course, this is also an 'endogenous variable', but that is the point. Its purpose is to capture the effects of the omitted 'taste for work' variable. We are not interested in its coefficient, merely in the impact of recent employment (*Emplo12*) on fertility given we control for work tastes. Obviously this new variable may not be a complete control. But it should help.

Finally, if employment is fundamentally determined by job-rationing, it will not help since it will not capture tastes for work. But this does not matter since it will not be needed, employment being exogenous in this case. The additional variable will simply be insignificant.

The estimation of the parameters for the family timing for the female sample has been done under two different perspectives, which we call *Reduced* and *Structural form*. In the male sample we only use the former. We believe that one of the main variables that determine each demographic decision (overall in the young cohort) is the expectation of

[21] For instance, Angrist and Evans (1998) argue that female employment and childbearing are endogenous.

[22] Notice that women who decide to have a child might drop employment before the birth if they are home-oriented. This is why it is important to lag the employment status variable 12 months. We also estimate the hazard with a lag of 18 and 24 months to ensure that we account for this possibility.

[23] Job-rationing in the labour market definitely plays a main role in women's employment status. In order to test this, we have regressed women's employment status on personal and labour market characteristics. We have found that female regional unemployment rates are very important in explaining women's employment status.

being employed at each time ($\widehat{PEmplo}$). That is, if a woman decides to have a child, she is concerned about the probability she will remain employed at birth and after. Among several features, her expectation ($\widehat{PEmplo}$) depends primarily on her education and lagged employment characteristics. ($\widehat{PEmplo}$) is informative since it gives women's perception of her chances of being employed at each time.

($\widehat{PEmplo}$) is a time-varying variable, which results from a probit estimation of the probability to be employed given individual and labour market characteristics at each time. The dependent variable takes value one if the person is employed at that period and zero otherwise. The covariates for the estimation of ($\widehat{PEmplo}$) in the analysis of the timing to get married are the following:[24] regions (*NW*, *NE*, *CMadrid*, *C*, *E*, *Canaries*), *Siblings*, *DivPar*, education level (*E2*, *E3Voc* and *E3GrPo*, with omitted *E1*), *Religious*, *WorkTaste*, cohorts, *Schm6*, *Emplo6*, *Unemrf6* and *Tempf6*. Lag variables of 12 months instead of 6 months are used in the analysis of timing to give birth. There are also other demographic variables such as the age of marriage (*AgeMa*) as well as the partner's education.

The parameters of this probit estimation permit calculation of the individual probability of being employed each time: $\widehat{PEmplo} = f(\hat{\beta}x)$.

For explanatory purposes, we rewrite the previous equation as:

$$\widehat{PEmplo} = f(\hat{\beta}x + \hat{\beta}_e Emplo6 + \hat{\beta}_u Unemrf6) \tag{3.11}$$

where x is the vector of all explanatory variables except *Emplo6* and *Unemrf6*. This result is used as an explanatory variable in the estimation of the structural form.

Structural Form

The estimation of the exit rate in structural form incorporates $\widehat{PEmplo}$ as explanatory variable, together with many other covariates (x).

$$h_s(t|x, \widehat{PEmplo}) = h_0(t)exp(\alpha x + \gamma \widehat{PEmplo}) \tag{3.12}$$

The estimation of $\widehat{PEmplo}$ and h_s share all variables except two (*Emplo6* and *Unemrf6*) that we use to identify the equation. By doing this, we consider that these two covariates affect the hazard only indirectly through its effect on the chances of being employed at each time ($\widehat{PEmplo}$). This is of interest since it allows us to distinguish between the

[24] The description of each variable is done in Subsection 3.4.2 and in Appendix 3.7.

direct and indirect effect (through their influence on $\widehat{PEmplo}$) of the different variables. The *Reduced form* will only give the net effect of the two.

Reduced Form

Rather than introducing directly the variable $\widehat{PEmplo}$ into the estimation, the reduced form estimates a model that uses as explanatory variables those elements who determine $\widehat{PEmplo}$.

$$h_r(t|x, Emplo6, Unemrf6) = h_0(t)exp(\delta x + \delta_e Emplo6 + \delta_u Unemrf6) \tag{3.13}$$

Thus, the parameters of these variables provide joint net information about their direct and indirect impact on the hazard. For example, we may have that higher education is related to higher exit in the estimation of the structural form ($\hat{\alpha}_{ed} > 0$) but the opposite in the reduced form ($\hat{\delta}_{ed} < 0$). This means that higher level of education is negative in the reduced form estimation because it impacts positively on the expectation of being employed and the expectation has a negative effect on the hazard ($\hat{\gamma} < 0$). Once we control for it, higher education actually increases the chances of giving birth. Note that $\hat{\delta}_{ed} \approx \hat{\alpha}_{ed} + \hat{\gamma}\hat{\beta}_{ed}$ where $\hat{\delta}_{ed}$ is the estimate for education in the reduced form, $\hat{\alpha}_{ed}$ is the estimate for education in the structural form, $\hat{\gamma}$ is the estimate for $\widehat{PEmplo}$ in the structural form and $\hat{\beta}_{ed}$ is the estimate for education in the estimation of $\widehat{PEmplo}$. In this example, the negative indirect effect of education on the exit rate offsets the direct and positive one, giving a negative sign in the reduced form estimation.

The model is estimated under the reduced and structural form for the two cohorts.

3.4.6 Econometric Results

The explanatory variables are the same in the estimation of both old and young cohort, except for *Tempf6*, which tells the percentage of female employees with a temporary contract at national level for each period. This covariate is only present in the estimation for the young cohort. The reason is that these contracts only exist from 1984 onwards. Therefore, the majority of people in the old cohort have a zero value, making this variable meaningless. Once the variable is removed, the sign and significance of the rest of the variables is not modified, their coefficients slightly change and the comparison between the two groups is fair.

In none of the estimations do the sign of the coefficients of common variables between

reduced and structural form change, so both direct and net effect discussed in Subsection 3.4.5 go in the same direction.

Tables 3.3–3.6 report both the coefficient and the hazard ratio for the *Reduced model.* Analogous tables for the *Structural form* are in Tables 3.15 to 3.18 in Appendix 3.8.1. Exponentiated individual coefficients can be interpreted as the ratio of the hazards for a one-unit change in the corresponding covariate. For example, if the hazard ratio on variable 1-if-religious is 1.26, then religious women face a hazard 26% greater than non-religious and the hazard ratio=exp(coefficient of estimation) is 1.26.

In Subsection 3.3.2 we discussed the concern about the fact that the length of the history is longer in the old cohort, which causes the number of censored observations to be proportionally greater in the young cohort. Although the estimation takes this issue into account, one would like to check if the disparity in period of observation leads to different conclusions. This is why we have re-estimated for the old cohort following these individuals only up to 1980 (which makes the path equivalent to the young cohort). Results show that the coefficients are not significantly different from each other when applying the 'normal'[25] and the 'artificial' specification in the timing to marriage, first and second child. However, some of the estimates are significantly different in the estimation of the timing to the third child.[26] Fortunately, as we will explain later, results in the 'artificial' estimation do not contradict our statements. When different from the 'normal' estimation (only in the timing towards the third child), conclusions drawn from the 'normal' estimation are reinforced rather than reversed.

Female Sample Analysis

Timing to Marriage

Table 3.3 shows the results from the hazard of marriage. Our regional dummies suggest that a female from *S* (South: Andalucía and Murcia)[27] is slightly more likely to get married in the next month compared to other areas, except for *Canaries* and the *E.* However, this negative effect is only significant for *NE* in *Cohort 1945–60.* These differences in regions are in line with the fact that the South of Spain is the most traditional area of the country.

Individual social background is captured by the following variables: *Siblings*, *DivPar*

[25]We call 'normal' specification the one that uses all available information (up to 1995). The 'artificial' specification is the one that makes the fiction of observing the old cohort only up to 1980.

[26]This is expected since it is in this state where the two observed periods fall more apart.

[27]The definition of the regional categorical variables is done in Subsection 3.4.2.

Table 3.3: Timing to Marriage — Spanish Females

Variables		*Cohort 1945–60*		*Cohort 1961–77*	
		Haz. Ratio	*Std. Error*	*Haz. Ratio*	*Std. Error*
	NW	0.850	0.127	0.962	0.136
Regions	*NE*	0.937	0.118	0.710**	0.129
Omitted	*CMadrid*	0.963*	0.116	0.799	0.134
Category	*C*	0.977	0.111	1.082	0.109
is S	*E*	1.016	0.099	0.893	0.101
	Canaries	1.276	0.175	1.083	0.163
Siblings		1.009	0.013	1.016	0.015
DivPar Yes=1		0.904	0.202	1.132	0.143
Religious Yes=1		1.261**	0.101	1.324**	0.087
WorkTaste Yes=1		1.087	0.073	0.755**	0.071
Female	*E2*	0.935	0.069	0.769**	0.079
Education	*E3Voc*	0.804*	0.134	0.684**	0.138
Omitted E1	*E3GrPo*	0.975**	0.177	0.630**	0.144
Schm6 Yes=1		0.480**	0.148	0.258**	0.113
Emplo6 Yes=1		0.827**	0.073	1.271**	0.071
Unemrf6		0.969**	0.008	0.989**	0.006
Tempf6				0.991*	0.005
Cohorts	*1950–54*	1.037	0.088		
Omitted 1945–49 and	*1955–60*	1.570**	0.109		
1961–65 for Old and	*1966–70*			0.962	0.105
Young respectively	*1971–77*			0.803	0.187
Log likelihood		-6657.6		-7148.8	
N subjects		1150		2228	
N observations		133006		214516	

*Significant at 10% level.

**Significant at 5% level.

and *Religious*. Neither the number of siblings nor the fact of having divorced parents are significant determinants of the hazard rate. However, a religious woman has a hazard rate 26% greater than a non-religious at any time in the old cohort and 32% greater in the young cohort.

Education level postpones marriage in both cohorts, especially in *Cohort 1961–77*. For instance, at each time and controlling for the other variables, in the young cohort, a woman with a graduate or post-graduate degree has an exit rate which is 37% lower than that of somebody who only achieved primary school.

Another variable that has a strong and significant negative impact on the exit rate to marriage is the dummy that reports at each time if the individual was or not at school six months before (*Schm6*) the period under consideration. In *Cohort 1945–60*, a woman who was enrolled in education six months before, has an exit rate around 48% that of a woman who was not. In *Cohort 1961–77*, this negative effect is even greater with a hazard ratio of 0.26. This is not surprising since students are unable to live independently due to the lack of own resources.

Taste for work is not significant in *Cohort 1945–60* but it impacts negatively in *Cohort 1961–77*. The covariate that specifies at each time if the individual was employed or not six months before (*Emplo6*) has a totally different effect on the hazard in the two cohorts. In *Cohort 1945–60*, this variable has a negative and significant effect on the exit rate, with a hazard rate equal to 0.83. By contrast, this variable has a positive and significant effect on the hazard in *Cohort 1961–77*, with a hazard rate equal to 1.27. That is, old-cohort employed women (lagged six months) have less chances of marrying in the next month at all times. In the young cohort, to be employed increases substantially the chances of getting married. Baizán et al. (2001) find that being employed reduces the intensity of marriage in their sample. However, they do not distinguish between the two cohorts and apparently the effect of the old cohort seems to prevail if the whole group is merged. The advantage of our study is that it allows us to analyse whether some variables have a different impact in family formation in these two well-defined groups.

Theory predicts opposite effects of women in employment on marriage. On the one hand, one might expect a positive coefficient since female employment actually increases economic resources that are needed to form a family. On the other hand, it might have a negative effect, especially in more traditional societies, if employment means female independence. Our results show evidence that the former (positive) prediction might be valid for *Cohort 1961–77* whereas the latter (negative) prediction might be applied to *Cohort 1945–60*. This could imply a change of mentality in the Spanish society. Before, the main target of a woman was to get married and they abandoned their job prospect in order to do it (employment was a signal of self-reliance and was conceived as a 'bad' characteristic for marriage). Nowadays, women study further and they want to develop a job career. Thus, they do not marry before they are settled in the labour market. Simultaneously, there has also been a generalised increase in the demand for a high standard of living and an increase in housing costs, which makes the salary of the woman necessary as a source of income in the household. This agrees with the view that female employment is required to leave the parental home since it increases resources available and, consequently affects

positively the hazard of marriage.

We would also like to point out that the dummy *Emplo6* might be capturing different effects in the two age groups. The old cohort is characterised by lower unemployment rates around union formation compared to their young cohort counterparts.[28] This means that non-employment (i.e. *Emplo6*=0) in *Cohort 1945–60* is more likely to refer to inactivity, whereas non-employment in *Cohort 1961–77* entails both unemployment and inactivity. The latter might contribute in explaining the opposite sign since in the young cohort there might be not only a choice option but also an economic issue.

The *Structural form* estimation informs about how the six-month in advance forecast of being employed affects the hazard. This variable is estimated to influence negatively in the old cohort and positively in the young one. This means that the higher the expectancies of working in six months time, the smaller is the probability of marrying next month in the old cohort and, the greater is this probability in the young one.

Regional female unemployment rates (*Unemrf6*) describe the labour market risks and opportunities. We would expect this variable to reduce the likelihood of marriage. The coefficient for this estimate is negative and significant for both cohorts. For example, an increase of one percentage point in the female unemployment rate reduces the hazard rate by 1.1% in *Cohort 1961–77*. This shows evidence that the more unstable the labour market, the lower the chances a woman will marry in the next month. Another potential reason why the Spanish marry so late is the lack of job security. The latter aspect is enforced with the variable that reveals the percentage of female employees that work on temporary contracts (*Tempf6*). This covariate is negative and significant. That is, the greater the proportion of women working on temporary contracts, the smaller is the probability of marriage. However, as explained in Subsection 3.4.5, the variable *Tempf6* is likely to be picking up some of the trend in the timing of marriage. If we include a time trend in the estimation, we find that this variable becomes less negative (the new hazard ratio is 0.997 instead of 0.991).

We also control for five-year cohort bands. In our old cohort estimation, women born between 1955–1960 are more likely to exit into marriage. In our young cohort, latter generations reduce the intensity of the hazard, although the coefficients are not significant.

[28]The proportion of women employed, unemployed and inactive has changed substantially since 1970. For example, 22% married women aged 20–30 were employed in 1977, 1% were unemployed and 77% were inactive. In 1987, the rates were 30%, 13% and 57%, respectively. In 1997, the proportions were 40%, 20% and 40%.

Timing to First Child — Spanish Females

Table 3.4 shows that region does not have a significant effect on the probability of having a first child in the next month in *Cohort 1945–60.* However, it has an impact on *Cohort 1961–77*, where all regions have a lower probability of exiting relative to the *S. NW*, *NE*, *CMadrid* and *E* have a significant coefficient. This is again probably due to the fact that the South has remained more traditional and people might be using less effective contraceptive methods. Data from the sample seem to corroborate this hypothesis. For example, without differentiating among regions, 71% of women took contraceptive precautions in their first complete intercourse in the young cohort. However, 63% did so in the South. By contrast, 75% took precautions in the East and 82% in the North East. The equivalent percentages were much lower in the old cohort with an overall of 35% using contraceptive methods in the first intercourse. In the South, the percentage was 26% and in the East and North East was 47% and 32% respectively.

The number of siblings increases significantly the hazard of first child in *Cohort 1945–60.* Parents separation has no impact in either of the two cohorts.[29] Finally, *Religious* is positive in both cohorts although it is only significant in the young cohort. In the latter group, a woman who defines herself as religious has a hazard rate 32% greater than a woman who does not. Nowadays, being religious seems to create more disparity among people. That is, those who define themselves as religious do indeed subscribe to a particular ideology. In the old cohort, people (religious or not) were more generally influenced by the traditional society and the fact of calling themselves religious did not imply that they were more likely to follow traditional patterns of behaviour than the remainder.

Demography foresees that age of marriage is negatively related to the timing of the first child. Our results partly corroborate this expectation since we obtain negative (although insignificant) signs. In the old cohort, an extra year on the age of marriage has a hazard ratio of 0.99. That is, each year delaying the marriage reduces the exit rate by 1% (ceteris paribus). In the young cohort, the ratio is 0.94.

Female education is strongly linked to fertility trajectory. If a woman has achieved a graduate or postgraduate degree, she has a high value in the labour market. This increases her opportunity cost of building a family since having a child implies taking some time off. The awareness of this opportunity cost is augmented if the labour market is neither promising (i.e. high unemployment rates) nor flexible, which enlarges women's

[29]Notice that the number of disruptions in Spain in the period covered is still rather low (2% in the old cohort and 4% in the young one).

Table 3.4: Timing to First Child — Spanish Females

Variables		*Cohort 1945–60*		*Cohort 1961–77*	
		Haz. Ratio	*Std. Error*	*Haz. Ratio*	*Std. Error*
	NW	0.958	0.132	0.646**	0.159
Regions	*NE*	0.983	0.124	0.715**	0.156
Omitted	*CMadrid*	1.028	0.121	0.620**	0.157
Category	*C*	1.222*	0.114	0.874	0.125
is S	*E*	0.889	0.105	0.669**	0.118
	Canaries	1.096	0.183	0.957	0.181
Siblings		1.035**	0.014	0.999	0.017
DivPar Yes=1		0.871	0.212	0.995	0.108
Religious Yes=1		1.006	0.106	1.315**	0.105
AgeMa		0.991	0.014	0.940	0.022
WorkTaste Yes=1		0.993	0.070	0.759**	0.092
Female	*E2*	0.967	0.070	0.900	0.099
Education	*E3Voc*	1.288	0.152	0.659**	0.184
Omitted E1	*E3GrPo*	0.813	0.151	0.651**	0.203
Partner	*E2P*	0.932	0.141	0.956	0.229
Education	*E3VocP*	0.994	0.199	1.082	0.334
Omitted E1P	*E3GrPoP*	0.731*	0.182	1.050	0.257
Schm12 Yes=1		0.873	0.177	0.972	0.145
Emplo12 Yes=1		0.829**	0.070	0.854**	0.076
Unemrf12		0.992	0.007	0.988*	0.007
Tempf12				1.001	0.005
Cohorts	*1950–54*	0.973	0.092		
Omitted 1945–49 and	*1955–60*	1.034	0.117		
Cohort 1961–65 for Old and	*1966–70*			0.810	0.115
Young respectively	*1971–77*			1.172	0.245
Log likelihood		-6103.6		-4958.4	
N subjects		1041		1024	
N observations		26176		25452	

*Significant at 10% level.

**Significant at 5% level.

professional career risk aversion of motherhood. While a higher education level is not significant for the timing of first child in *Cohort 1945–60*, it has a negative and significant impact on the probability of having a first child next month in *Cohort 1961–77*. For example, a woman with an undergraduate or postgraduate degree has a hazard rate that is 65% of that of a woman with a primary qualification. This shows evidence that the opportunity cost increases with the level of education, particularly when females are

more attached to the labour force (i.e. *Cohort 1961-77*). Educational enrolment lagged twelve months is not significant since most women get married once they have abandoned education.

Being employed lagged twelve months reduces the hazard of first child[30] in both cohorts, ceteris paribus. The hazard ratio is 0.83 and 0.85 for the old and young cohort respectively. There are theoretical opinions that predict the impact of employment on fertility in both directions. On the one hand, female employment raises resources and should increase the likelihood of first child. On the other hand, employed women find it hard to combine work and family and they postpone childbearing. The latter is especially true if policies that facilitate reconciliation between family and work are missing and if there is both instability and inflexibility in the labour market. Our results suggest that female employment is a brake on family formation in Spain. This has political implications for the Spanish government who could implement broader family-friendly policies.

In Subsection 3.4.5 we discussed the general concern about the endogeneity of fertility and labour supply. In order to overcome it, we lag[31] the employment covariate and we control for the individuals' work preferences with the variable *WorkTaste*.[32] Those women with higher preference for work are less likely to have a first child in the next month, being strongly significant in the young cohort. We believe that this variable reduces the possibility that the impact of employment status *Emplo12* is misleading.

Intuition indicates that women who work part-time are more family oriented. This is why the model was also estimated taking into account job status: i.e. part-time *vs.* full-time. The effect on the probability of having a child in the next month was found to be similar under the two categories.[33] Recent work by De la Rica, Ariza and Ugidos (2002) using the European Community Household Panel (ECHP) finds that part-time (compared to full-time) does not increase intensities of Spanish first birth. This is due to the fact that part-time jobs are not common in Spain and in any case they are typically not

[30]This result is consistent with other empirical studies (for example, Kalwij (2000) for the Netherlands, Hoem and Hoem (1989) for Sweden and Harvey (1996) for the US).

[31]We also lag employment 18 and 24 months to exclude the possibility of home-oriented women leaving employment far before the birth, which will reverse the causality. We find that our employment covariate lagged 18 is negative and significant in both cohorts. The employment covariate lagged 24 months reduces the hazard to first child but it is not significant. We believe that there is evidence for employment causing postponement of fertility since employment status far ahead from the birth date affects negatively the hazard.

[32]The preference for work is a dummy value that equals 1 if the individual is working one year after completing school and 0 otherwise.

[33]Since we found no significant difference between part and full-time we decided to merge them into one single category (employed).

based on a voluntary decision. The percentages of part-time jobs vary a lot in Europe. Greece, Portugal, Italy, Ireland and Spain are those EU countries where this typology is less frequently used. By contrast, in the North and Centre of Europe they are much more prevalent. In the latter group, the government's intervention to reconcile family and work, rather than the production structure, has favoured the development of part-time jobs (Consejo Económico y Social (1996)). Moreover, among those countries where part-time jobs are most frequent (e.g. Great Britain and the Netherlands), most people who work part-time prefer this to full-time work (e.g. Nickell and Van Ours (2000)). We would expect to find that these two job statuses influence differently the chances of childbearing in countries with more flexibility in working hours. De la Rica et al. (2002) compare the effect of working status on first birth in Great Britain, the Netherlands, Ireland and Spain. They find evidence that Spain is the country with the largest part-time negative effect on fertility.

Theory by Becker (1960) predicts that the husbands' income should impact positively on fertility. Ariza and Ugidos (2002) estimate the timing of first birth in Spain with 'Encuesta Continua de Presupuestos Familiares' (Spanish Household Survey Panel Data). They find that partner's income affects positively the hazard. Income information is missing in our data and we use husbands' education as a proxy since one expects that higher education is linked to higher wage. Results from the estimation show that this variable is not significant for first birth.

Female regional unemployment rates have a negative effect on the timing to the first birth, with significance in the young cohort. An increase of one percentage point in female unemployment in a particular region in *Cohort 1961–77* reduces the hazard rate by 1.2%. Therefore, precarious labour market conditions are translated into fertility postponement. Recall that, ceteris paribus, being at work postpones births and high unemployment rates also delay childbearing. The latter might sound controversial but it is not. It means that given two women with the same characteristics except for their regional unemployment rates, the woman with lowest unemployment rate has a greater probability of having a birth since it is easier for her to have a job whenever she wants. Potential mothers care not only of their employment status but also in their expected possibilities to work afterwards.

Even though the proportion of female temporary contracts had a negative influence in the timing to marriage, it does not have an impact on first birth.

The *Structural model* shows that the forecast of being employed in twelve months time

generates a negative and significant sign in both cohorts. This suggests that combining family and work does not seem complementary tasks for Spanish mothers.

Timing To Second Child — Spanish Females

Table 3.5: Timing to Second Child — Spanish Females

Variables		*Cohort 1945–60*		*Cohort 1961–77*	
		Haz. Ratio	*Std. Error*	*Haz. Ratio*	*Std. Error*
	NW	0.628**	0.152	0.571**	0.244
Regions	*NE*	0.626**	0.138	0.914	0.219
Omitted	*CMadrid*	0.835**	0.132	0.565	0.238
Category	*C*	0.825	0.125	0.678**	0.167
is S	*E*	0.754**	0.115	0.687**	0.171
	Canaries	0.862	0.194	0.670	0.260
Siblings		1.020	0.014	1.031	0.023
DivPar Yes=1		0.967	0.233	0.987	0.141
Religious Yes=1		1.111	0.125	1.087	0.153
AgeAt1C		0.986	0.011	1.017	0.031
MenT1C		0.839**	0.031	0.950	0.046
Girl Yes=1		0.997	0.073	0.875	0.099
WorkTaste Yes=1		1.013	0.073	0.923	0.104
Female	*E2*	1.126	0.081	0.744**	0.124
Education	*E3Voc*	1.469**	0.168	0.945	0.254
Omitted E1	*E3GrPo*	1.077	0.207	1.663*	0.271
Partner	*E2P*	1.053	0.147	0.951	0.284
Education	*E3VocP*	1.006	0.222	0.955	0.395
Omitted E1	*E3GrPoP*	1.124	0.199	1.116	0.328
Schm12 Yes=1		0.770	0.275	0.648	0.370
Emplo12 Yes=1		0.726**	0.083	0.812*	0.107
Unemrf12		0.993	0.007	0.989*	0.010
Tempf12				0.992	0.007
Cohorts	*1950–54*	0.937	0.107		
Omitted 1945–49 and	*1955–60*	0.848	0.143		
1961–65 for Old and	*1966–70*			0.942	0.173
Young respectively	*1971–77*			0.806	0.349
Log likelihood		-5220.4		2519.0	
N subjects		1007		821	
N observations		58893		36986	

*Significant at 10% level.

**Significant at 5% level.

In Table 3.5 we observe generalised evidence that women who do not live in the South

have a smaller hazard rate of having a second child. Both the number of siblings and parents divorced are not significant. Neither is religion.

Demographic explanations are captured by the age at first child and the spell from marriage to first child. There is the generalised view among demographic papers that variables such as the timing of marriage and the lengths of prior births spells impact strongly on the spacing of subsequent births. However, Heckman et al. (1985) show that these demographic explanations are not valid in the timing to a second child once they control for unobserved heterogeneity in a parametric specification of the hazard.[34] We find similar results to theirs. In the young cohort, there is evidence that neither of the two is significant. In the old cohort, only the duration between marriage and first child is. An extra year implies a reduction of the hazard rate by 16%.

Some authors find that higher values of education tend to delay the onset of childbearing and then compress the span of births into fewer years. A high level of female education has been related to faster timing to the second child (e.g. Hoem and Hoem (1989)).[35] Once a woman has a first child, theory suggests that a high-educated woman will have a shorter spell towards the second child. The reason is that they compress the births when it is optimal for their professional life. This prediction is fulfilled in *Cohort 1945–60*, where the coefficients are positive although only significant among women with a vocational qualification. In *Cohort 1961–77*, those women who finished with a secondary qualification have a negative and significant coefficient, and their exit rate is 26% smaller than the exit rate of a woman who only got the primary qualification. Women with a vocational qualification have a non-significant negative coefficient.

By contrast, those women who obtained a graduate or post-graduate degree have greater chances to have a second child in the following month, compared to somebody with a primary qualification. The coefficient is positive and significant with a hazard ratio of 1.66. Thus the theory is confirmed for those women who have a university degree. They will compress the spell between the first two births. This does not imply that women with a graduate or post-graduate degree have more children than those with only primary school. The result means that women with a university degree that had a first child are more likely to have a second child faster. These are a special sub-group among graduate women whose jobs and personality allowed themselves to have a first child and then, they are likely to have a second child faster. As the human capital theory predicts,

[34]Notice that using a flexible baseline hazard reduces the impact of unobserved heterogeneity on the covariate effects (Ridder (1987)).

[35]Other authors find that education affects negatively the hazard rate in all births.

they try to have the second child quicker in order to compress the time spent off their jobs.

To be employed twelve months before reduces the likelihood of having a second child in the next month in both cohorts. The hazard ratios are 0.73 and 0.81 for the old and young cohort respectively. Similarly to the timing of first birth, there were no significant differences between part and full-time. Thus, employment is a constraint to expand the family, even after controlling for taste for work. The same reasons suggested for first birth (i.e. labour market flexibility, regulations and childcare provisions) can be applied to second birth.

Labour market situation is measured by regional female unemployment rates and the proportion of female fixed-term contracts. In the two cohorts, the higher the unemployment is, the less chances to have a second child in the following month. This is particularly the case in *Cohort 1961–77* where the hazard ratio is 0.989, which means that an increase of one percentage point in regional female unemployment rates reduces the hazard by 1.1%. The impact of fixed-term contracts on second birth, although negative, is non-significant. Here, the coefficient becomes actually more negative with the time trend in the estimation.

Despite the fact that high levels of the husband's education (proxy for income) are foreseen to reduce the time to a second child, our results do not support this theory. Coefficients appear to be insignificant.

Timing to Third Child — Spanish Females
Table 3.6 shows that in general those living in the South have a greater probability of having a third child in the next month. The number of siblings increases the hazard rate significantly in *Cohort 1945–60.* Neither divorced parents nor religion are significant.

Previous literature (e.g. Harvey (1996)) found that demographic variables have a major role in the timing to the third child whereas employment and education are less important. Our results are in line with theirs since both coefficients of the age at second child and the duration of the spell from the first child to the second child are negative and significant. For instance, the hazard ratios for the birth interval are 0.81 and 0.79 for the old and young cohort respectively. That is, an extra year in the spell first to second child reduces the hazard by 19% in *Cohort 1945–60.*

We find that there exists a significant preference for boys in *Cohort 1945–60.* Couples with two girls have a probability to have a third child 38% greater than couples with one

Table 3.6: Timing to Third Child — Spanish Females

Variables		*Cohort 1945–60*		*Cohort 1961–77*	
		Haz. Ratio	*Std. Error*	*Haz. Ratio*	*Std. Error*
	NW	0.458**	0.250	0.151**	0.752
Regions	*NE*	0.622**	0.227	1.160	0.457
Omitted	*CMadrid*	0.481**	0.216	0.356	0.698
Category	*C*	0.734*	0.183	1.229	0.367
is S	*E*	0.590**	0.175	0.617	0.400
	Canaries	1.077	0.263	1.300	0.660
Siblings		1.054**	0.021	1.004	0.051
DivPar Yes=1		0.884	0.358	0.602	0.455
Religious Yes=1		0.776	0.206	1.459	0.427
AgeAt2C		0.992*	0.024	0.897**	0.063
MenT2C		0.811*	0.043	0.787**	0.100
TwoGirls Yes=1		1.383**	0.154	1.594	0.306
TwoBoys Yes=1		0.956	0.127	1.381	0.291
WorkTaste Yes=1		1.214**	0.117	1.197	0.271
Female	*E2*	0.862	0.132	0.486**	0.290
Education	*E3Voc*	0.580**	0.310	1.682	0.615
Omitted E1	*E3GrPo*	0.980	0.387	0.158**	1.135
Partner	*E2P*	0.661**	0.195	1.026	0.633
Education	*E3VocP*	0.887	0.344	0.394	1.039
Omitted E1	*E3GrPoP*	0.911	0.299	2.461	0.748
Schm12 Yes=1		1.235	0.432	1.719	0.654
Emplo12 Yes=1		0.808	0.150	0.746	0.330
Unemrf12		0.985	0.011	0.965	0.025
Tempf12				1.001	0.016
Cohorts	*1950–54*	0.703**	0.160		
Omitted 1945–49 and	*1955–60*	0.638**	0.224		
1961–65 for Old and	*1966–77*			0.494	0.473
Young respectively					
Log likelihood		-2014.6		-374.3	
N subjects		824		436	
N observations		78561		28289	

*Significant at 10% level.

**Significant at 5% level.

or two boys. The dummy for boys is not significant in any of the cohorts. This corroborates a predilection for boys and not for variety of sexes in the old group. It seems that in *Cohort 1961–77*, the sex of the children is minor in the decision to have a third child.

High levels of education, especially at graduate and post-graduate levels, strongly decrease the exit rate for both cohorts. This shows evidence that graduate women at parity two choose the two-child norm. That is, those graduates who have children prefer indeed to discontinue childbearing after the second birth.

Lagged employment status is negative but not significant. This means that at parity two other factors (i.e. education, region and demographic covariates) rather than employment are more crucial in determining the probability of a third pregnancy. The precarious labour market plays a minor role on the exit rates (female unemployment rates impact negatively but are insignificant). Therefore, labour markets and employment mainly affect fertility at earlier parities.

Once more we do not find evidence that partner's education increases the hazard rate, which is contra-intuitive. Notice (as explained in Subsection 3.4.2) that this variable is taken at the interview's date and it is an approximation.

Being born in later cohorts reduces the intensity of a third birth, ceteris paribus. Cohort effects only play a role in second parity for the old cohort.

Some of the coefficients in the 'artificial' estimation for the old cohort are significantly different from the 'normal' estimation. However, they do not affect the nature of our conclusions. Coefficients that were significant under the 'normal' specification still are under the 'artificial' one and they do not change sign.

Male Sample Analysis

Up to now the paper deals with the decision to marry and have children from the women's perspective, controlling for their social and labour market characteristics. Note that partner's information is scarce since we can only account for their education. The reason is that there is no retrospective records about partner's characteristics in the female sample.

We are aware that men's contribution to the drop in fertility should be further explored. That is, it is not only women's labour market situation but also men's that has caused the decline in fertility in Spain. The increase in unemployment rates and temporary contracts has occurred in both sexes. Theory forecasts a negative relationship between male unemployment and fertility.

Since the FFS survey was also undertaken for a sample of men, it is worth analysing

their family formation. Unfortunately, the size of the sample is smaller (there are 1992 completed interviews compared to 4021 we had for women), which makes only reasonable the estimation up to first child. We proceed as in the female study by splitting the estimation into two cohorts: *Cohort 1945–60* and *1961–77*. Our variables are practically the same except for the fact that we do not include *TasteWork*.[36] Accordingly, we control for male regional unemployment rates and the proportion of total male contracts that are temporary.

Table 3.7: Number of Subjects, Exits and Censored in Each State — Spanish Males

	Cohort 1945–60		*Cohort 1961–77*	
	Marriage	1^{st} *Birth*	*Marriage*	1^{st} *Birth*
Total	784	639	1204	374
Exits	676	614	396	267
Censored	108	25	808	107

Timing to Marriage

Results in Table 3.8 show that the main determinants of marriage in *Cohort 1945–60*[37] are the fact of being at school, which increases the duration to marriage, and being employed, which reduces it.[38] An individual who is employed has a probability of exit to marriage in the next month twice as large the probability of an individual who is not. Being enrolled in education decreases the hazard by 53%. Regional unemployment rates are not significant. Neither is the education level. Religion increases the hazard by 16%.

In *Cohort 1961–77*, a man with a graduate or postgraduate degree has an exit rate that is 50% smaller than the one of someone with only a primary qualification. Enrolment in education reduces the hazard of marriage by 67%. A religious person has a probability of exit to marriage 49% greater than a non-religious one.[39] Employed men have an exit rate much greater than non-employed men. Both the regional unemployment rates and the

[36]As discussed by Angrist and Evans (1998) and Ahn and Mira (2001), male employment is certainly exogenous in fertility choices. Consequently, we do not need to deal with corrections for potential endogeneity between participation and fertility as we did for our female's sample.

[37]The estimation has been also done with the fiction of censoring individuals in 1980 so as to make it comparable to *Cohort 1961–77* in terms of censoring. The target of this exercise is to check if the estimates are significantly different under both specifications (old cohort and 'artificial' old cohort). Results show that they are not, which means that one can rely more on the description and comparison of both old and young cohort.

[38]Both variables are lagged six months.

[39]Similar to women, religion seems to play a greater role in the young cohort. This may be due to the fact that, in previous generations, everybody 'had' to be religious and follow the 'rules' of society. Nowadays, differences in behaviour between those who are or are not religious are probably greater.

Table 3.8: Timing to Marriage — Spanish Males

Variables		Cohort 1945–60		Cohort 1961–77	
		Haz. Ratio	Std. Error	Haz. Ratio	Std. Error
	NW	0.830	0.159	0.958	0.241
Regions	NE	0.632*	0.167	0.586**	0.263
Omitted	CMadrid	0.800	0.178	0.649**	0.255
Category	C	0.684**	0.152	0.764	0.210
is S	E	0.962	0.127	1.253	0.191
	Canaries	1.150	0.239	1.262	0.177
Siblings		1.0004	0.017	1.075**	0.024
DivPar Yes=1		0.927	0.127	0.995	0.149
Religious Yes=1		1.165**	0.085	1.488**	0.108
Male	E2	1.035	0.093	0.846	0.136
Education	E3Voc	0.969	0.190	1.177	0.272
Omitted E1	E3GrPo	1.076	0.152	0.501**	0.256
Schm6 Yes=1		0.471**	0.206	0.329**	0.238
Emplo6 Yes=1		2.527**	0.139	1.603**	0.139
Unemrm6		0.990	0.009	0.981	0.013
Tempm6				0.988	0.011
Cohorts	1950–54	1.272**	0.110		
Omitted 1945–49 and	1955–60	1.312**	0.144		
1961–65 for Old and	1966–70			0.884	0.176
Young respectively	1971–77			0.859	0.349
Log likelihood		-3980.93		-2350.3	
N subjects		784		1204	
N observations		121438		131938	

*Significant at 10% level.

**Significant at 5% level.

proportion of temporary contracts negatively affect the hazard rate but their coefficients are not significant. Note, however, that the negative effect of temporary contracts on the hazard disappears once a time trend is included in the regression. The worsening of the male labour market has partly contributed to the delay in marriage and, consequently, the postponement of births in the young cohort.

Our results suggest that unemployment at micro level (note that spells of non-employment are highly related to unemployment in the male's sample) rather than at macro level (unemployment rates) is the main individual reason for postponing marriage. We therefore observe that being employed is crucial for getting married in both cohorts. This is dif-

ferent from the female analysis in the old cohort. In that case, working women were less likely to get married in the next month, ceteris paribus.

Timing to First Child

Table 3.9: Timing to First Child — Spanish Males

Variables		*Cohort 1945–60*		*Cohort 1961–77*	
		Haz. Ratio	*Std. Error*	*Haz. Ratio*	*Std. Error*
	NW	0.714**	0.166	0.639	0.297
Regions	*NE*	0.735*	0.173	0.384**	0.349
Omitted	*CMadrid*	0.674**	0.195	0.598	0.325
Category	*C*	0.883	0.164	0.795	0.263
is S	*E*	0.631**	0.137	0.450	0.236
	Canaries	0.934	0.256	0.290**	0.364
Siblings		1.012	0.018	1.011	0.033
DivPar Yes=1		0.931	0.121	0.992	0.305
Religious Yes=1		1.081	0.091	1.181	0.135
AgeMa		1.015	0.014	0.908**	0.041
Male	*E2*	1.001	0.104	1.355	0.395
Education	*E3Voc*	0.675*	0.212	1.729	0.389
Omitted E1	*E3GrPo*	1.109	0.173	1.461	0.385
Partner	*E2P*	1.329*	0.172	0.558	0.395
Education	*E3VocP*	1.112	0.239	0.423*	0.520
Omitted E1P	*E3GrPoP*	1.021	0.255	0.422*	0.473
Schm12 Yes=1		1.550**	0.218	1.324	0.312
Emplo12 Yes=1		1.197	0.153	0.735*	0.182
Unemrm12		0.983*	0.009	1.000	0.016
Tempm12				1.009	0.013
Cohorts	*1950–54*	1.145	0.119		
Omitted 1945–49 and	*1955–60*	1.051	0.151		
1961–65 for Old and	*1966–70*			0.657**	0.210
Young respectively	*1971–77*			0.882	0.429
Log likelihood		-3413.90		-1315.66	
N subjects		639		374	
N observations		17303		9130	

*Significant at 10% level.

**Significant at 5% level.

Table 3.9 shows that any region has a smaller exit rate to first birth relative to the South in both cohorts. An extra year on age of marriage has no impact on the hazard in *Cohort 1945–60* but it significantly reduces the intensity in *Cohort 1961–77*.

In general, higher levels of male education affect the hazard positively, although coefficients are not significant. In our female sample we obtained the reverse effect. It is interesting to observe that partner's education (which here implies female's education) postpones significantly first child in *Cohort 61-77*, which is in accordance with our finding in the female sample.

Surprisingly, being employed does not increase the hazard of first birth. Regional unemployment rates only affect negatively in the old cohort. It seems that the major impact of economic indicators on fertility comes through their influence on the timing to marriage. That is, non-employment partly causes the drop of fertility through the delay in marriage and consequently, in births (since the age of marriage increases the duration to the birth of the first child, although only in the young cohort). Thus, spells of unemployment reduce indirectly fertility by postponing marriage. These results are consistent with the paper by Ahn and Mira (2001). Although they use a different survey with annual units of time, they also show that non-employment spells reduce the probability of getting married. In their analysis, being employed has a minor effect on births due to sample selection. Those who do not have jobs will not marry, which means that they are not eligible for births. The same explanation can be applied to our findings.

3.4.7 Summary and Conclusions

The aim of this section is to analyse the effects of labour market instability, employment status, education, social and demographic characteristics on the timing of family formation. Our motivation is to understand further the low fertility rate in Spain. We focus on both female and male individuals and separate our sample into two different cohorts: *Cohort 1945–60* and *Cohort 1961–77*. We next summarise our main findings.

The labour market both at the individual and at the aggregate level is crucial for family formation and its impact is different for men and women.

We have some evidence that the phenomenon of the late-leaving of the parental home in Spain has been enforced by the unstable labour market, particularly from the woman's perspective. Whereas regional unemployment does not affect the timing of marriage and first child for men, it significantly postpones both states for women. The increased proportion of temporary contracts also reduces the likelihood of women marrying, although it has a small effect.

Employment at the individual level is a key factor for marriage. Men who are employed marry faster in both cohorts. However, employed married men do not have a greater probability of having a birth, ceteris paribus. Male employment accelerates family formation through increasing the likelihood of marriage.

Interestingly, a woman's employment status has a different impact on the likelihood of getting married in the two cohorts. While being employed has a negative impact on the chances of marrying in *Cohort 1945–60*, it has a positive effect in *Cohort 1961–77*. One explanation could be that the role of women in society has changed substantially. Before, women left their jobs in order to build up a family. Nowadays, women wish to develop a working career and do not marry until they are well settled in their job. Modern women work both for personal development and economic reasons (caused by an increase in living standards and housing prices). This view is supported by the fact that a taste for work is not significant in the timing of marriage in the old group but it delays marriage in the young cohort. A complementary reason is related to the meaning of individual non-employment. Female unemployment rates have risen in the last two decades and were very high when the young cohort was at the standard age of marriage. Thus, individual-non-employment is more likely to imply inactivity in *Cohort 1945–60* than in *Cohort 1961–77*. We expect this to have an effect on our estimates.

Married women who work postpone having their first child in both cohorts, ceteris paribus. This is due to their greater opportunity cost of having children and the lack of facilities to enable employed women to combine job and family. Female employment status also affects negatively the chances of having a second child in both cohorts. We find that working part-time does not impact differently on our hazards since part-time work is hardly an option in Spain (e.g. in 1987, 13.7% work part-time and one third of those involuntary). Thus, the Spanish government may have a role in developing policies that help to reconcile fertility and participation such as the provision of childcare or an increase in the flexibility of working hours (i.e. the voluntary choice of full *vs.* part-time hours).

Demographic factors rather than employment status are the main contributors in the hazard of third child. In fact, age at second child and the duration of the spell between first and second child, together with female's education explain the timing of third birth. A similar result was found by Harvey (1996). Interestingly, in the old cohort, the wish to have a boy in the family influences positively the hazard to the third child.

Becker (1960) suggests that a high level of education is linked to low fertility because

of the implied higher opportunity cost of having children. We find that education postpones marriage in *Cohort 1961–77* and by delaying household formation it negatively affects fertility. Furthermore, we observe that highly educated married women delay the first birth, especially in *Cohort 1961–77.*

The impact of education on the timing of the second child is less clear-cut. In *Cohort 1945–60*, the coefficient of education in the hazard function is positive and significant among those who have a vocational qualification. It is interesting to notice that in *Cohort 1961–77*, women with a graduate or post-graduate degree are far more likely to compress their first and second child. This suggests that those graduate women who overcome the barrier of first birth are faster to their second birth, compared to women with a primary qualification. The coefficient of education turns out to be negative in the estimation of the hazard rate for the third child, which implies that graduate and post-graduate women who have children prefer the so-called 'two-child norm'.

Household income that is exogenous to women's employment is expected to influence positively the probability of expanding the family (Becker (1960)). We use partner's education as a proxy. However, we do not find the predicted values. Among our social background covariates, religion is the most important since it significantly reduces the time to marriage for both men and women.

The stylised factors in Spain since the 70s are: a rise of female employment, an increase of overall unemployment, a fall in male employment, a rise in temporary contracts and an increase in education. In our analysis, we show that male employment reduces the timing to marriage. Since male employment rates have fallen, we expect a decline in fertility by delaying demographic processes. We observe that a rise in instability (i.e. unemployment and temporary contracts) postpones female marriage, which in turn impacts negatively on fertility. We have also evidence that female employment postpones childbearing. Since female employment rates have risen since the 70s, we again expect a drop in fertility. Simultaneously, we find that higher levels of female education postpones marriage and first birth. Therefore, the growing years in female schooling also explains the decline in family size.

All these factors have contributed to the drop in fertility. If we would like to reverse the declining path in fertility, we need to accomplish three things: first, we should reverse the impact of female employment on childbearing. The fact that female employment postpones motherhood suggests that there is lack of reconciliation between family and work.

We believe that the government should introduce policies that facilitate the combination of participation and fertility. This can be achieved by increasing both the availability of public childcare and flexibility of the number of hours in periods of childcare. Second, we should reduce female instability in the labour market. Third, we should implement policies to raise male employment.

3.5 European Comparison

3.5.1 Introduction

In recent years, the decline in fertility has been substantial in some European countries. This has been extensively attributed to women entering into the labour market. However, we nowadays observe in Europe that those countries with higher female employment are those with higher fertility. Therefore, it seems to be the case that in some countries individual employment status and/or other institutional characteristics make female participation and fertility positively related (see Chapter 2). We investigate the impact of the labour market at the individual level, which could in turn contribute to understanding the aggregate picture.

The main purpose of this section is to show how the labour market, education and other characteristics affect the individual decision to marry/cohabit, have a first and second child in Belgium, West-Germany, Italy, Spain and Sweden. We aim to discover whether being employed delays the demographic process or whether, on the contrary, it brings it forward. This depends on specific policies, such as public childcare availability, taxation and flexible hours schemes, and makes cross-country comparison essential. Since welfare and taxation policies differ across these countries, we expect to find differences in the way individual characteristics affect the spacing of births. We also investigate the impact of the economic environment on fertility by analysing if female unemployment rates cause a postponement of family formation.

This section is organised as follows: Subsection 3.5.2 describes the data and the construction of the variables. Subsection 3.5.3 explains the methodology and Subsection 3.5.4 presents the main results. Finally, Subsection 3.5.5 concludes.

3.5.2 Data and Constructed Variables

We use the Family and Fertility Survey (FFS). The structure of the questionnaire was originally produced by the United Nations but the collection was undertaken by different

institutions.[40] This has caused variations in the available explanatory variables since not all the proposed questionnaire sections were applied on all countries. Despite this drawback, these data have the advantage that whenever we have coinciding variables, they derive from the same question and have the same interpretation. For our analysis, we have selected those relevant explanatory variables that existed in all five countries in order to estimate the timing of marriage/cohabitation, first and second birth. Further details of this survey can be read in Subsection 3.4.2. We would like to point out that part of this section will sound familiar for those who read Section 3.4. However, we think that those who look at the sections independently will find this reiteration useful.

We next summarise country-data collection:

Belgium: Flemish and Brussels capital region

Belgian[41] data were collected in the Flemish and Brussels capital region between 1991 and 1992. Therefore, our results are not representative for the whole Belgium, but only for the Flemish and Brussels capital region. The number of valid interviews was 2088 for women and 1319 for men, obtained with a percentage of responses of 69.2% and 66.3% respectively. Individuals were between 20 and 41 years old.

West-Germany

The survey file contains information on 5036 persons (2024 men and 3012 women) born between 1952 and 1972, aged 20–39 on 1^{st} January 1992. Interviewing took place in 1992.

Italy

The target population was women and men aged 20–49 years old. The interviews were carried out between November 1995 and January 1996. There were 4824 women interviewed and 1206 men.

Spain

The data set was collected by the Centro de Investigaciones Sociológicas (CIS) between June and November of 1995. The sample is built at the national level with individuals aged between 18 and 49 years old. The number of valid interviews was 4021 for women and 1991 of men, obtained with a percentage of responses of 83.6% and 77% respectively.

[40] We obtained FFS directly from the United Nations. We have FFS project number 93, approved by the FFS commission.

[41] From now on, any time we talk about Belgium we only refer to the Flemish and Brussels capital regions.

Sweden

The Swedish Family Survey conducted in 1992/93 consists of eight cohorts: women born in 1949, 1954, 1959, 1964 and 1969; men born in 1949, 1959 and 1964. The interviews took place at the end of 1992 and at the beginning of 1993. A total of 4229 women and 2177 men were included in the sample, altogether 3318 women and 1666 men were interviewed.

A major effort has been undertaken to select those explanatory variables[42] that are meaningful across our countries. These are the following: size of the city of origin (*City*), being religious (*Religious*), education, cohorts, age of marriage or first cohabitation (*AgeMaCo*), taste for work (*WorkTaste*)[43] and monthly employment status (*Emplo*). The latter is a time-varying covariate.[44] The scale of the qualifications in education goes from zero to six in accord with the International Standard Classification of Education (ISCED). From this variable, we have constructed four dummy variables *E1* (with value one if the maximum level is 0 or 1, primary school), *E2* (one if the individual belongs to category 2 or 3, secondary school), *E3Voc* (one if she has level 4, vocational qualification) and *E3GrPo* (one if she is at 5 or 6, graduate or post-graduate degree). Our reference category is the lowest level *E1*. Notice that category *E3Voc* does not exist either in Italy nor in Sweden. Table 3.19 in Appendix 3.8 shows the evolution of education attainment across cohorts for each country. It is interesting to observe the improvement in qualifications in Spain and the high level of graduates in Sweden.

In order to make our sample consistent across countries, we select cohorts born between 1951 and 1970 and observable calendar years up to 1993. Surveys in Spain and Italy were undertaken in 1995, which means that individuals of the same cohort might be observed longer compared to the other countries.[45] We restrict those individuals to be followed-up until 1993. In Sweden, we have women for five specific cohorts: 1949, 1954, 1959, 1964 and 1969. This means that we have not been able to completely homogenise cohorts. Nevertheless, we believe that our results are fairly comparable.

[42]Full description of the variables in Appendix 3.7.

[43]It takes value one if the person was at work one year after she completed education, and zero otherwise.

[44]Note that education is not at time-varying covariate but it is taken at the date an individual completes school. We were obliged to take this measure since schooling calendar is missing in Belgium, West-Germany and Italy. In the latter countries, only the highest level of education at completion date is reported. Despite this, we believe that this variable is adequate since it captures the expectation of the level of human capital achieved for those observed months before the school abandonment.

[45]Notice that we have a retrospective survey.

We think that the growth in unemployment has had a great impact on fertility patterns, especially in countries with high female unemployment rates. The variable *Unemrf* accounts for the female national unemployment rate of a particular individual date. Unemployment rates have been collected from Eurostat Publications, the Instituto Nacional de Estadística (Spain) and Statistiska Centralbyrån (Sweden).

Since the decisions of marriage/cohabitation and births are taken well before hand, we have constructed lag variables of *Emplo*, and *Unemrf* for twelve months[46] (*Emplo12* and *Unemrf12*). Lagging the employment status (*Emplo12*) partly overcomes the problem of fertility and employment being simultaneously decided. Furthermore, one could be concerned that more family oriented women abandon employment in advance, which would still cause a misleading result. That is, if we assume that the employment variable is endogenous because 'taste for work' is omitted and 'taste for work' has a positive impact on employment and a negative impact, ceteris paribus, on fertility, we need to control for 'taste for work'. Thus, we include a covariate taste for work in our regression. This variable (*WorkTaste*)[47] captures the the relevant preference and leaves our time-varying *Emplo12* less prone to spurious interpretation. If *Emplo12* turns out to be negative and significant, this implies that being at work reduces the likelihood of having a further child at that time, no matter what is your career taste.

The proportion of women who have cohabited at least once is 10.5% in Belgium, 34.5% in West-Germany, 3.5% in Italy, 5% in Spain and 47% in Sweden. Because of this, we study the timing of marriage or cohabitation to account for each country's sociological pattern.[48] Therefore, a change of state occurs when a woman either marries or starts cohabiting with her partner. We also analyse the timing of first birth from the date of marriage or cohabitation (depending on each woman case) and the timing of second birth.

Table 3.20 in Appendix 3.8 summarises the number of subjects, both who exit[49] and are censored, for each country.

[46]Lags of 6, 9 and 12 months were tried without different results.

[47]It takes value one if the person was at work one year after she completed education.

[48]Notice that in Spain and Italy there are no differences in results when only considering marriage since cohabitation is very rare.

[49]Individuals who exit are those who move from one state to another (e.g. from single to cohabiting). The censored individuals are those who you stop observing before they exit.

3.5.3 Methodology

We study the timing of marriage/cohabitation, first and second birth with a hazard model, as described in Section 3.3. The exit or hazard rate of marriage/cohabitation (M–C) implies the conditional probability density function of leaving a status of being single to being M–C, given that the individual has been single for a certain time and given her characteristics. The exit or hazard rate of a first birth is the probability of exiting the state of M–C with no children to the state of having one child, given that the particular couple has been married for a specific period and her characteristics. Finally, the hazard rate of a second birth is the likelihood of leaving the state of one child, given the duration of that state and her observable characteristics. We estimate our hazards for each country and we find how each covariate influences the timing of family formation.[50]

It is interesting to observe the path of the survival rates across countries. Kaplan-Meier Survival estimates (Figures 3.7 and 3.8) give the probability of remaining in the same state (e.g. single) at a particular moment of time.[51] In Figure 3.7, exiting implies getting married, whereas in Figure 3.8, exit is either marriage or cohabitation. Despite the fact these estimates omit characteristics, they are a useful first step to analyse the differences between countries. We observe that focusing only on marriage has a complete different behaviour that exiting at both marriage and cohabitation in Sweden. Whereas just about 40% women end up being married, most of them have been cohabiting. In West-Germany, cohabitation is also noticeable and it is surprising their high rate of 25% of women who do not marry nor cohabit. Belgian women marry (and cohabit) faster than Italy or Spain, although these countries converge at a similar rate of 11–13% of women who do not marry.

In Figure 3.9 we represent the survival Kaplan-Meier estimates for a group of women from the time they got married or first cohabited. We observe that Spain and Italy have a similar pattern and have the fastest shifts to first child. This is not in line of what current fertility data suggest since Italy and Spain have nowadays late mean age of first birth. Note, however, that this analysis merges women from cohorts 1951–70, and, consequently, entails births occurred in the 70s, characterised by high fertility in both Italy and Spain. In Section 3.4, we have actually found that there are significant postponements of marriage and first birth in later cohorts in Spain. Interestingly, West-Germany has 23% of childless married or cohabiting women,[52] far above the other countries rates. In Belgium, 10% stay without children after marriage or cohabitation. These percentages

[50] We describe the meaning of each variable in Appendix 3.7.

[51] The formula for the Kaplan-Meier Survival estimation is explained in Subsection 3.3.2.

[52] This number is in line with Beets (1997) who finds that in West-Germany 25% of women older than 34 years old from cohort 1950 have not yet become mothers.

Figure 3.7: Survival in the Single State, Exit being Marriage — Country Comparison

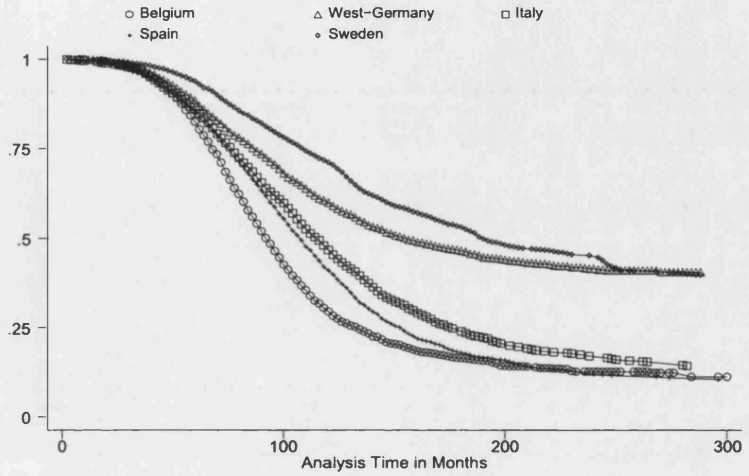
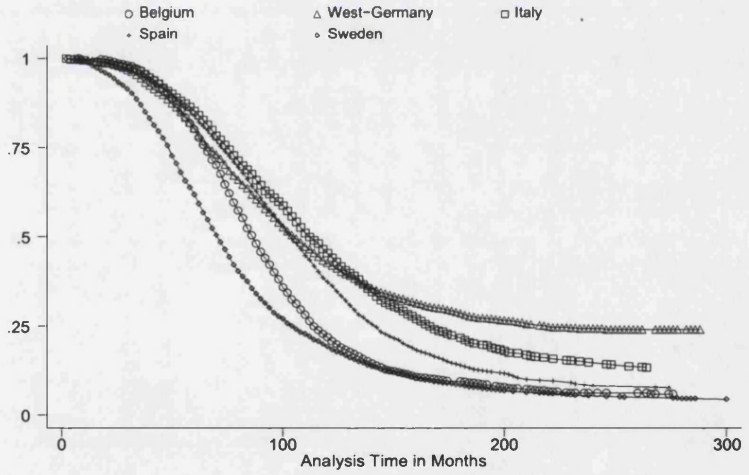


Figure 3.8: Survival in the Single State, Exit being Marriage or Cohabitation— Country Comparison



are 9% in Italy, 6% in Spain and 12% in Sweden.

Figure 3.10 shows the survival Kaplan-Meier estimates for staying with only one child. Swedish are the group with the lowest rate with about 10% women remaining with a single child. Spain follows with 13%. Italy and Belgium are very close with 19% and 18% women who never exit into a second birth. Finally, West-Germany is again the country with the highest proportion of women (30%) who survive in the state of only one child.

Figure 3.9: Survival in the Married or Cohabiting Childless State — Country Comparison

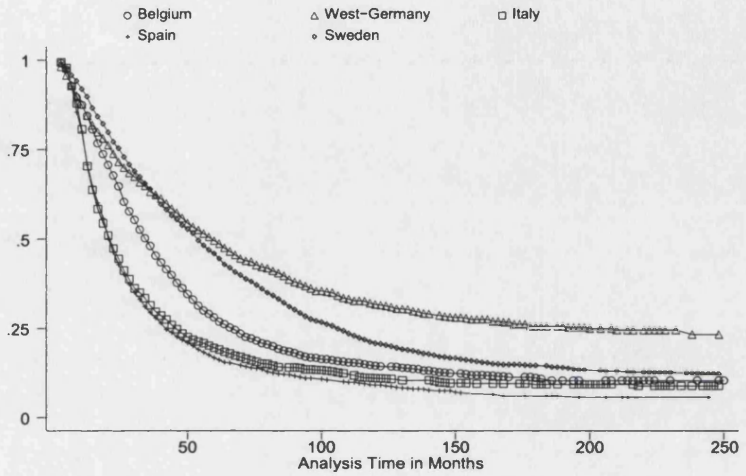
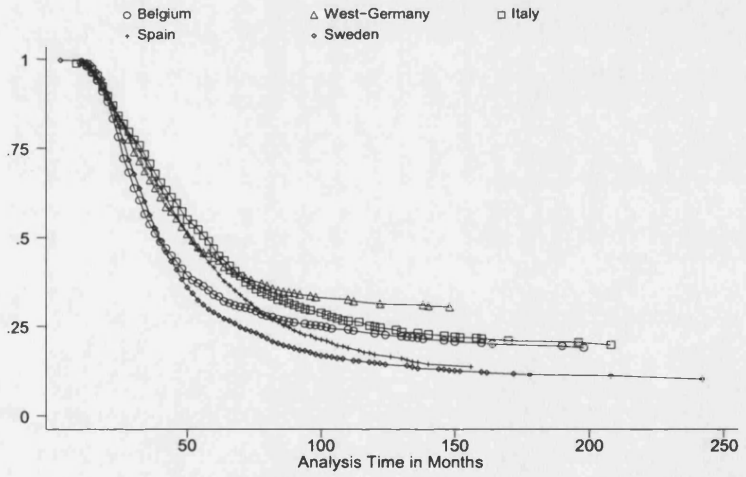


Figure 3.10: Survival in the Married or Cohabiting With One Child State — Country Comparison



3.5.4 Econometric Results

We represent hazard ratios, which are the exponential of the coefficients of the hazard estimation. An explanation of how to interpret the hazard ratios is given in Subsection 3.4.6. We use the *Reduced form* estimation described in Subsection 3.4.5 and focus only on females.

Timing to Marriage or First Cohabitation

Table 3.10 shows the impact of our explanatory variables on the probability of marriage/cohabitation (*M–C*) in the next month. We first comment about how labour characteristics impact on couple formation. We observe that employment (lagged 12 months) increases the probability of *M-C* in the next month in all countries. For example, employed Belgian women have a probability of *M-C* next month 274% greater than their non-employed counterparts. Hazard ratios are 1.64, 1.46, 1.16 and 1.27 for West-Germany, Italy, Spain[53] and Sweden respectively. Unemployment rates provide information about the labour market opportunities and economic situation. An increase of one percentage point of unemployment decreases the hazard in all countries, being significant in West-Germany, Italy and Spain.

We also examine more carefully if the unemployment rates are actually picking up the tendency for late marriage instead of the effect of precarious labour markets on family formation. For this purpose, we re-estimate the hazards including a variable for trend. We find that coefficients for *Unemrf12* are rather similar (although they decline in Belgium and in Spain) which suggests that unemployment rates indeed postpone *M-C* and are not merely a trend.[54]

Concerning female human capital, we find that a high level of education delays *M-C* in Belgium, Italy and Spain. In these countries women with graduate and post-graduate degree have a probability of *M-C* much smaller than their lowest educated women counterparts. This is not the case in West-Germany and Sweden. We do not have a clear-cut reason for West-Germany and Sweden being different. A priori, we thought that this could be due to the fact that in these two countries cohabitation is far more common and start already at university, under parental support. Under this case, achieving higher education would not be a limitation for cohabiting. However, if we look at the timing of marriage only (*M*),[55] we find that high levels of education do not postpone marriage in West-Germany and Sweden either, which weakens our proposed explanation.

We have also estimated the timing of *M-C* initiating the analysis time at the date of completing education, instead of at the age of fifteen. For those countries where educa-

[53]Notice that in Section 3.4 we found the interesting result that being at work brings forward marriage in cohort 1945–60, whereas it has the opposite effect for cohort 1961–77. In this estimation, we consider cohorts 1951–70.

[54]The trend variable is negative and significant in all countries, except in Belgium, where it is negative but not significant.

[55]Table 3.21 in Appendix 3.8 shows the hazard ratios for the timing of marriage.

Table 3.10: Timing to Marriage/Cohabitation — Country Comparison

Variables	*Hazard Ratios*[1]				
	Belgium	*W-Germany*	*Italy*	*Spain*	*Sweden*
City[2]	1.040 (0.060)	0.818** (0.040)	0.916* (0.045)	0.987 (0.045)	0.799** (0.036)
Religious	0.983 (0.064)	0.964 (0.047)	1.033 (0.078)	1.055 (0.063)	0.794**(0.031)
WorkTaste[3]	0.881** (0.052)	1.116* (0.070)	0.849** (0.040)	0.909** (0.042)	0.831** (0.034)
Education[4]					
E2	0.725** (0.052)	1.270 (0.193)	0.648** (0.039)	0.802** (0.044)	1.319** (0.154)
E3Voc	0.510** (0.041)	0.976(0.198)		0.483** (0.045)	
E3GrPo	0.482** (0.054)	1.006 (0.178)	0.368** (0.033)	0.463**(0.046)	1.009 (0.122)
Emplo12	2.738** (0.147)	1.644** (0.098)	1.459** (0.067)	1.163**(0.056)	1.274**(0.054)
Unemrf12	0.993 (0.005)	0.919** (0.012)	0.958**(0.009)	0.980**(0.006)	0.948 (0.036)
Cohorts[5]					
1954[6]					1.065 (0.065)
1956-60[7]	1.066 (0.075)	1.037 (0.071)	1.025 (0.067)	1.402**(0.101)	1.061 (0.063)
1961-65[8]	1.044 (0.095)	1.158*(0.100)	1.065 (0.092)	1.467** (0.167)	1.005 (0.067)
1966-70[9]	0.772** (0.073)	0.856 (0.089)	0.737** (0.072)	1.260 (0.181)	0.992 (0.062)

*Significant at 10% level.

**Significant at 5% level.

[1]Standard errors in brackets.

[2]Dummy (1 if individual's locality up to 15 had >=100.000 inhabitants).

[3]Dummy (1 if individual show preference for work).

[4]Omitted category is the lowest level (*E1*).

[5]Omitted category is *Cohort 1951-55* (*Cohort 1952-55* for West-Germany and *Cohort 1949* for Sweden).

[6]*Cohort 1954 for Sweden only.*

[7]*Cohort 1959 for Sweden.*

[8]*Cohort 1964 for Sweden.*

[9]*Cohort 1969 for Sweden.*

tion postpones *M-C*, we aim to know if high education has an additional impact on the timing of *M-C*, apart from the effect due to the fact that people do not start cohabiting before the end of their studies. Interestingly, we find that education has roughly the same negative impact on the hazard, which means that the delaying effect of education on *M-C* is not only because of more time required but also of being more highly educated itself. For West-Germany and Sweden, coefficients of education with the two origins are approximately the same. Thus, especially in Sweden, the positive impact of human capital on the hazard of *M-C* might be caused by both more students starting cohabition and the education itself afterwards.

Except for West-Germany, our estimates show that females with a taste for work de-

lays *M-C*. Religion does not play any role in the probability of *M-C*, except for Sweden, where being religious delays this event. Interestingly, religion increases substantially the probability of couple formation through marriage only (see Table 3.21 in Appendix 3.8) in all countries. Notice the change of sign for Sweden, which suggests that, in this country, religion is a very important determinant of marriage and deterrent to cohabitation. In Table 3.21 we observe that later cohorts have a strong negative impact on the timing of marriage in Sweden, which implies that getting married is becoming less common. Finally, there is a generalised result that coming from a city postpones *M-C*, this effect being stronger when looking at the probability of marriage.

Timing to First Child

In Table 3.11 we observe the impact of employment on the timing of first child among those women who are married or cohabiting. Results suggest that being at work (lagged 12 months) increases the probability of having a first birth in Sweden. For example, an employed Swedish women has a probability of having a first birth in the next month 50% greater than her counterpart, ceteris paribus.[56] On the other hand, we find that being at work decreases the likelihood of motherhood in Belgium, Italy and especially Spain, being irrelevant in West-Germany. Therefore, there is some evidence that employment status affects birth decisions differently across countries. Sweden is the country with the most generous and flexible labour and public childcare schemes, which facilitates the combination of family and work. Interestingly, Sweden is also the country where female employment brings the first baby forward. In West-Germany, although being at work is not positive, it is not reducing the hazard either, which means that it does not raise constraints on first birth. Female unemployment rates reduce the likelihood of first birth in all countries.[57] Therefore, precarious economic environment have negative impact on childbearing.

High levels of education delays the first birth in all countries. This is in line with other papers, which find that women with more schooling find it optimal to postpone motherhood (e.g. Wetzels (1999)).

Results show that religious couples have a higher probability of giving birth and that

[56]Heckman et al. (1985) find that working delays first and second birth with another dataset. However, they use working at current duration as covariate, instead of lagging this variable to avoid capturing women on leave and endogeneity. In fact, if we take the same definition as theirs, we also obtain a negative effect. But we believe that lagging employment status is necessary in this context.

[57]The coefficients are reduced in Spain and in West-Germany when a trend variable is incorporated in the model.

Table 3.11: Timing to First Child — Country Comparison

Variables	*Hazard Ratios*[1]				
	Belgium	*W-Germany*	*Italy*	*Spain*	*Sweden*
City[2]	0.825** (0.073)	0.927(0.058)	0.906* (0.051)	0.847** (0.043)	0.747** (0.042)
Religious	1.276** (0.104)	1.174** (0.074)	1.527** (0.142)	1.393** (0.095)	1.164** (0.053)
WorkTaste[3]	0.896 (0.0628)	0.993 (0.080)	0.799** (0.043)	0.945 (0.048)	0.816** (0.040)
AgeMaCo	0.970** (0.011)	0.980 (0.013)	0.965** (0.009)	0.981* (0.011)	0.998 (0.007)
Education[4]					
E2	0.852** (0.066)	0.982 (0.190)	0.892* (0.058)	0.891** (0.051)	0.799* (0.101)
E3Voc	0.900 (0.081)	0.819 (0.214)		0.790** (0.085)	
E3GrPo	0.654** (0.087)	0.750 (0.171)	0.803** (0.085)	0.604** (0.071)	0.779* (0.102)
Emplo12	0.882* (0.058)	0.991(0.075)	0.837** (0.042)	0.803** (0.040)	1.500** (0.084)
Unemrf12	0.972** (0.006)	0.992(0.020)	0.973** (0.009)	0.984** (0.006)	0.867** (0.033)
Cohorts[5]					
1954[6]					1.072 (0.067)
1956-60[7]	1.019 (0.072)	1.065 (0.094)	1.024 (0.070)	0.998 (0.081)	0.935 (0.061)
1961-65[8]	0.864* (0.071)	1.065(0.124)	0.963 (0.086)	0.936 (0.113)	0.904 (0.065)
1966-70[9]	0.607** (0.074)	0.178 (0.177)	0.876 (0.095)	0.822 (0.126)	0.707** (0.069)

*Significant at 10% level.

**Significant at 5% level.

[1]Standard errors in brackets.

[2]Dummy (1 if individual's locality up to 15 had >=100.000 inhabitants).

[3]Dummy (1 if individual show preference for work).

[4]Omitted category is the lowest level (*E1*).

[5]Omitted category is *Cohort 1951-55* (*Cohort 1952-55* for West-Germany and *Cohort 1949* for Sweden).

[6]*Cohort 1954 for Sweden only.*

[7]*Cohort 1959 for Sweden.*

[8]*Cohort 1964 for Sweden.*

[9]*Cohort 1969 for Sweden.*

those living in cities at the age of fifteen postpone motherhood. Finally, the older a woman starts her union, the later she has her first birth.

For the timing of first birth, we have also estimated the hazard with origin of the analysis time at the age of fifteen, instead of at the age of first marriage or cohabitation. The impact of our explanatory variables on the probability of having a first birth is approximately the same as in Table 3.11, except for the employment status in Belgium. With this new origin, we find that being at work increases the likelihood of first birth. This implies that in Belgium the positive effect of being employed on *M-C* prevails on its negative effect on first birth. This is not the case neither in Italy nor Spain, where employment

status postpones first birth also with the origin of the analysis at the age of fifteen.

Timing to Second Child

Table 3.12: Timing to Second Child — Country Comparison

Variables	*Hazard Ratios*[1]				
	Belgium	*W-Germany*	*Italy*	*Spain*	*Sweden*
City[2]	0.842* (0.076)	0.869* (0.088)	0.979 (0.072)	0.898* (0.056)	0.864** (0.059)
Religious	1.010 (0.106)	1.043 (0.088)	1.344** (0.175)	1.299** (0.120)	1.128** (0.059)
WorkTaste[3]	1.028 (0.088)	0.948 (0.094)	0.775** (0.053)	0.980 (0.059)	1.144** (0.066)
AgeAt1C	0.875** (0.076)	1.065 (0.155)	1.161 (0.120)	0.984 (0.071)	1.059 (0.083)
MenT1C[4]	1.019** (0.008)	0.991 (0.012)	0.986* (0.009)	0.999 (0.006)	0.996 (0.007)
Education[5]					
E2	1.112 (0.105)	0.767 (0.180)	0.778** (0.057)	0.960 (0.064)	0.799* (0.101)
E3Voc	2.165** (0.238)	0.844 (0.281)		1.314** (0.177)	
E3GrPo	2.976** (0.471)	1.061 (0.298)	1.056 (0.142)	1.152** (0.187)	0.822 (0.118)
Emplo12	0.753** (0.050)	0.863*(0.077)	0.750** (0.048)	0.755** (0.049)	1.229** (0.073)
Unemrf12	0.996** (0.007)	1.036(0.029)	0.979* (0.011)	0.980** (0.008)	0.963 (0.041)
Cohorts[6]					
1954[7]					1.050 (0.071)
1956–60[8]	1.113 (0.079)	1.005 (0.111)	1.029 (0.080)	0.981 (0.091)	1.309** (0.092)
1961–65[9]	1.079 (0.093)	0.974 (0.142)	1.128 (0.112)	0.899 (0.119)	1.598** (0.142)
1966–70[10]	1.758** (0.388)	0.831 (0.184)	1.047 (0.159)	0.735 (0.141)	1.518** (0.272)

*Significant at 10% level.

**Significant at 5% level.

[1]Standard errors in brackets.

[2]Dummy (1 if individual's locality up to 15 had >=100.000 inhabitants).

[3]Dummy (1 if individual show preference for work).

[4]Months between marriage/cohabitation and first birth.

[5]Omitted category is the lowest level (*E1*).

[6]Omitted category is *Cohort 1951–55* (*Cohort 1952–55* for West-Germany and *Cohort 1949* for Sweden).

[7]*Cohort 1954 for Sweden only.*

[8]*Cohort 1959 for Sweden.*

[9]*Cohort 1964 for Sweden.*

[10]*Cohort 1969 for Sweden.*

Table 3.12 shows the hazard ratios for the timing to the second child measured from the birth of the first child. We learn that being at work delays second birth in all countries, except for Sweden. There is also evidence that high female unemployment rates also have a negative impact on further confinements except in West-Germany.[58]

[58]The coefficient for Belgium disappears if a trend is added into the model.

Interestingly, we observe a change of pattern in the effect of high education. In Belgium and Spain, we observe that women with tertiary education are more likely to have a second child, which means that they compress fertility. This does not imply that women with further education have more children, but suggests that within this skill group, those who have one child tend to have the second one faster. Unexpectedly, we do not get the same evidence for the other countries. Hoem and Hoem (1989) actually found this compressing effect in Sweden using another data set.

3.5.5 Conclusions

In this section, we aim to analyse the impact of education, employment status and economic atmosphere on the timing of family formation in Belgium, West-Germany, Italy, Spain and Sweden.

We find empirical evidence that employment (lagged 12 months) increases significantly the probability of marriage/cohabitation in the next month, ceteris paribus, in all countries. This implies that those countries with lower female employment rates are expected to postpone their first cohabitation.

Results show that being at work rises the likelihood of first birth in Sweden, but it reduces it in the rest, especially in Italy and Spain. Therefore, there are significant differences in the relationship between employment and motherhood across countries. Sweden is well-known for its public childcare and family allowances, which moderates female's time constrain. Similarly, Swedish are characterised by more flexibility in the number of hours at work, which facilitates the combination of employment (even if shorter hours) with childcare. Wage disparity between males and females is likely to be smaller too, increasing female's opportunity cost to stay at home. This suggests that if the other countries (particularly Spain and Italy) became closer to Sweden, we would also observe that employment brings the first birth forward.

Finally, it is common across countries that precarious economic opportunities postpone family formation since women perceive the risk of losing their jobs. Thus, countries with higher female unemployment rates are expected eventually to have lower fertility rates.

3.6 Summary of Main Findings

This chapter has comprised an extensive empirical investigation of key aspects relating to the timing of family formation. Using the Family and Fertility Survey, we test some of the ideas developed in demographic economics. Among others, we look at whether being employed imposes a constraint on having children, whether economic instability postpones fertility or whether high educated female find optimal to postpone births.

From the Spanish analysis, we summarise the main findings as follows:

- Spanish male employment reduces the timing to marriage. Since male employment rates have fallen since the 70s, we expect a decline in fertility by delaying demographic processes.
- A rise in job instability captured mainly by the unemployment rates postpones female marriage and eventually fertility.
- There is evidence that female employment rates in Spain postpones childbearing. Since female employment has increased since the 70s, we expect a drop in fertility.
- Higher levels of female education postpones marriage and first birth in Spain. Consequently, the rise in female schooling also contributes to the decline in family size.

All these factors that postpone motherhood have evolved in the direction of decreasing fertility since the 70s. If we would like to reverse this declining path, we need to accomplish the following: first, reverse the negative impact of female employment on the timing of births through the introduction of policies that facilitate the combination of family and work. Second, we need to reduce female instability in the labour market. Third, we should increase male employment.

From the European comparison, we learn that:

- It is possible for female employment to impact positively on the timing of births as happens in Sweden. In order to increase fertility in the other countries, especially in Italy and Spain, we should follow the Swedish case and implement policies that reverse the sign of female employment on the timing of births.
- A precarious job market is shown to have a negative impact on fertility in all countries.

3.7 Appendix A: Labels for the Variables

Table 3.13: Variable Labels, FFS

E1	Dummy (1 if highest education is primary degree; omitted category)
E2	Dummy (1 if highest education is secondary degree)
E3Voc	Dummy (1 if highest education is vocational tertiary degree)
E3GrPo	Dummy (1 if highest education is university degree)
*E1P**	Dummy (1 if partner's highest education is primary degree; omitted)
*E2P**	Dummy (1 if partner's highest education is secondary degree)
*E3VocP**	Dummy variable (1 if partner's highest education is vocational degree)
*E3GrPoP**	Dummy (1 if partner's highest education is university degree)
*City***	Dummy (1 if individual's locality up to 15 had >=100.000 inhabitants)
Religious	Dummy (1 if individual's is religious)
*Siblings**	Number of siblings
WorkTaste	Dummy (1 if working one year after completing school)
*DivPar**	Dummy (1 if parents divorced)
*AgeMa**	Age of marriage
*AgeMaCo***	Age of marriage or first cohabitation
AgeAt1C	Age at first child
*AgeAt2C**	Age at second child
MenT1C	Months between marriage and first child
*MenT2C**	Months between first child and second child
*Girl**	If first child was a girl
*TwoGirls**	If both first and second children were girls
*TwoBoys**	If both first and second children were boys
Emplo12	Dummy (1 if employed 12 months ago)
*Schm12**	Dummy (1 if at school 12 months ago)
Unemrf12	Female regional unemployment rates 12 months ago
Tempf12	Female proportion of temporary contracts at national level 12 months ago
Unemrm12	Male regional unemployment rates 12 months ago
*Tempm12**	Male proportion of temporary contracts at national level 12 months ago
*NW**	North-West region
*NE**	North-East region
*CMadrid**	Madrid region
*C**	Centre region
*E**	East region
*Canaries**	Canaries Islands region
*S**	South region (Omitted category)
Cohort X–Y	Individual is born between year X and Y

*Variable only for the Spanish analysis.

**Variable only for the European comparison analysis.

3.8 Appendix B: Tables

3.8.1 The Spanish Case

Table 3.14: Ideal Number of Children for a Spanish Family[1] 1960–77

Number of Children	*Cohort 1945–60*	*Cohort 1961–77*
0	0.5%	1.1%
1	3.4%	5.6%
2	47.7%	53.2%
3	20.0 %	17.8%
1 or 2	3.1%	4.0%
2 or 3	16.0%	11.9%

[1]Table does not show % for more than 3 children.

Table 3.15: Timing to Marriage, Structural Form — Spanish Females

Variables		*Cohort 1945–60*		*Cohort 1961–77*	
		Haz. Ratio	*Std. Error*	*Haz. Ratio*	*Std. Error*
	NW	1.079	0.112	1.150	0.111
Regions	*NE*	1.027	0.117	0.742**	0.125
Omitted	*CMadrid*	1.068	0.114	0.886	0.123
Category	*C*	1.073	0.108	1.165	0.102
is S	*E*	1.180*	0.094	0.952	0.091
	Canaries	1.286	0.175	1.126	0.163
Sibling		1.008	0.013	1.016	0.015
DivPar Yes=1		0.910	0.201	1.116	0.143
Religious Yes=1		1.310**	0.100	1.337**	0.087
Female	*E2*	0.923	0.069	0.783**	0.079
Education	*E3Voc*	0.788*	0.134	0.669**	0.138
Omitted E1	*E3GrPo*	0.965	0.178	0.651**	0.144
Schm6 Yes=1		0.488**	0.149	0.257**	0.115
$\widehat{PEmplo}$ *Yes=1*		0.836 **	0.078	1.201**	0.087
Tempf6				0.991*	0.005
Cohorts	*1950–54*	0.965**	0.085		
Omitted 1945–49 and	*1955–60*	1.187	0.083		
1961–65 for Old and	*1966–70*			0.928	0.101
Young respectively	*1971–77*			0.729*	0.180
Log likelihood		-6666.1		-7158.5	
N subjects		1150		2228	
N observations		133001		214492	

*Significant at 10% level.

**Significant at 5% level.

Table 3.16: Timing to First Child, Structural Form — Spanish Females

Variables		*Cohort 1945–60*		*Cohort 1961–77*	
		Haz. Ratio	*Std. Error*	*Haz. Ratio*	*Std. Error*
	NW	1.035	0.118	0.759**	0.128
Regions	*NE*	1.012	0.122	0.776*	0.148
Omitted	*CMadrid*	1.061	0.119	0.703*	0.142
Category	*C*	1.245*	0.112	0.943	0.116
is S	*E*	0.931	0.100	0.753**	0.104
	Canaries	1.119	0.182	0.999	0.181
Sibling		1.034*	0.013	0.999	0.017
DivPar Yes=1		0.888	0.212	0.999	0.106
Religious Yes=1		1.0003	0.106	1.324**	0.105
AgeMa		0.981*	0.010	0.929**	0.022
WorkTaste Yes=1		0.997	0.070	0.789**	0.097
Female	*E2*	0.973	0.072	0.918	0.010
Education	*E3Voc*	1.297*	0.154	0.682**	0.186
Omitted E1	*E3GrPo*	0.845	0.186	0.678*	0.202
Partner	*E2P*	0.916	0.141	0.971	0.228
Education	*E3VocP*	0.987	0.200	1.140	0.308
Omitted E1P	*E3GrPoP*	0.728*	0.182	1.088	0.256
Schm12 Yes=1		0.868	0.177	0.951	0.150
$\widehat{PEmplo}$ *Yes=1*		0.745**	0.104	0.774**	0.124
Tempf12				1.001	0.005
Cohorts	*1950–54*	0.954	0.089		
Omitted 1945–49 and	*1955–60*	0.973	0.088		
1961–65 for Old and	*1966–70*			0.786**	0.114
Young respectively	*1971–77*			1.069	0.204
Log likelihood		-6104.0		-4959.9	
N subjects		1041		1024	
N observations		26064		25435	

*Significant at 10% level.

**Significant at 5% level.

Table 3.17: Timing to Second Child, Structural Form — Spanish Females

Variables		*Cohort 1945-60*		*Cohort 1961-77*	
		Haz. Ratio	*Std. Error*	*Haz. Ratio*	*Std. Error*
	NW	0.682**	0.130	0.793	0.181
Regions	*NE*	0.642**	0.135	1.083	0.206
Omitted	*CMadrid*	0.874	0.126	0.728	0.199
Category	*C*	0.856	0.121	0.769*	0.155
is S	*E*	0.791**	0.109	0.834	0.143
	Canaries	0.872	0.193	0.714	0.259
Sibling		1.021	0.014	1.029	0.022
DivPar *Yes=1*		0.985	0.233	0.982	0.143
Religious *Yes=1*		1.112	0.125	1.082	0.153
AgeAt1C		0.976**	0.011	1.002	0.030
MenT1C		0.839**	0.031	0.950	0.046
Girl *Yes=1*		0.996	0.073	0.872	0.099
WorkTaste *Yes=1*		1.014	0.073	0.938	0.104
Female	*E2*	1.128	0.082	0.752**	0.125
Education	*E3Voc*	1.496**	0.168	1.018	0.257
Omitted E1	*E3GrPo*	1.104	0.208	1.727**	0.274
Partner	*E2P*	1.061	0.147	0.967	0.283
Education	*E3VocP*	1.032	0.222	0.944	0.396
Omitted E1	*E3GrPoP*	1.139	0.199	1.135	0.328
Schm12 *Yes=1*		0.765	0.275	0.992	0.270
$\widehat{PEmplo}$ *Yes=1*		0.676**	0.099	0.763*	0.143
Tempf12				0.992	0.104
Cohorts	*1950-54*	0.892	0.095		
Omitted 1945-49 and	*1955-60*	0.767**	0.096		
1961-65 for Old and	*1966-70*			0.873	0.169
Young respectively	*1971-77*			0.710	0.341
Log likelihood		-5220.7		-2520.8	
N subjects		1007		821	
N observations		58859		36951	

*Significant at 10% level.

**Significant at 5% level.

Table 3.18: Timing to Third Child, Structural Form — Spanish Females

Variables		*Cohort 1945–60*		*Cohort 1961–77*	
		Haz. Ratio	*Std. Error*	*Haz. Ratio*	*Std. Error*
	NW	0.538**	0.217	0.268	0.631
Regions	*NE*	0.665*	0.221	1.345	0.446
Omitted	*CMadrid*	0.514**	0.210	0.521	0.642
Category	*C*	0.773	0.179	1.489	0.342
is S	*E*	0.640**	0.165	0.849	0.335
	Canaries	1.103	0.262	1.417	0.653
Sibling		1.054**	0.021	1.003	0.051
DivPar Yes=1		0.873	0.357	0.611	0.458
Religious Yes=1		0.770	0.206	1.256	0.412
AgeAt2C		0.905**	0.020	0.886**	0.063
MenT2C		0.807**	0.043	0.777**	0.100
TwoGirls Yes=1		1.386**	0.154	1.592	0.307
TwoBoys Yes=1		0.970	0.126	1.388	0.290
WorkTaste Yes=1		1.206	0.117	1.174	0.269
Female	*E2*	0.859	0.132	0.509**	0.289
Education	*E3Voc*	0.577**	0.311	1.729	0.621
Omitted E1	*E3GrPo*	0.986	0.388	0.163**	1.138
Partner	*E2P*	0.660**	0.195	0.982	0.634
Education	*E3VocP*	0.885	0.344	0.401	1.039
Omitted E1	*E3GrPoP*	0.917	0.299	2.573	0.751
Schm12 Yes=1		1.270	0.431	1.563	0.650
$\widehat{PEmplo}$ *Yes=1*		0.800	0.171	0.709	0.410
Tempf12				0.999	0.016
Cohorts	*1950–54*	0.634**	0.140		
Omitted 1945–49 and	*1955–60*	0.514**	0.153		
1961–65 for Old and	*1966–77*			0.474	0.470
Young respectively					
Log likelihood		-2015.5		-375.3	
N subjects		824		436	
N observations		78474		28182	

*Significant at 10% level.

**Significant at 5% level.

3.8.2 European Comparison

Table 3.19: Evolution of Qualifications,[1,2] FFS — Country Comparison

		Belgium	*West-Germany*	*Italy*	*Spain*	*Sweden*
		Females				
	E1	11.5%	4.1%	24.9%	39.7%	7.4%
Cohort 1951–55	*E2*	60.7%	81.9%	63.1%	49.7%	53.2%
Cohort 1949 for Sweden	*E3Voc*	23.1%	4.4%		6.9%	
	E3GrPo	4.7%	9.6%	12.0%	3.7%	39.4%
	E1	10.1%	2.5%	16.2%	25.3%	3.4%
Cohort 1956–60	*E2*	56.1%	82.5%	70.7%	58.6%	54.3%
Cohort 1954 for Sweden	*E3Voc*	26.7%	3.8%		8.8%	
	E3GrPo	7.1%	11.2%	13.1%	7.3%	42.3%
	E1	6.7%	4.0%	9.1%	15.0%	0.9%
Cohort 1961–65	*E2*	54.3%	85.1%	79.2%	65.1%	62.0%
Cohort 1959 for Sweden	*E3Voc*	30.6%	3.5%		8.8%	
	E3GrPo	8.4%	7.5%	11.7%	11.1%	37.1%
		Males				
	E1	12.0%	1.6%	17.4%	41.0%	14.6%
Cohort 1951–55	*E2*	60.0%	61.3%	69.6%	43.4%	51.7%
Cohort 1949 for Sweden	*E3Voc*	15.5%	11.8%		5.2%	
	E3GrPo	12.5%	25.3%	13.0%	10.4%	33.7%
	E1	10.6%	3.4%	9.9%	18.2%	
Cohort 1956–60	*E2*	60.3%	69.5%	75.2%	64.2%	
No data for Sweden	*E3Voc*	17.0%	4.5%		4.9%	
	E3GrPo	12.1%	17.6%	14.9%	12.7%	
	E1	6.8%	2.3%	3.5%	11.2%	1.1%
Cohort 1961–65	*E2*	61.4%	79.3%	82.9%	72.9%	68.4%
Cohort 1959 for Sweden	*E3Voc*	18.8%	7.5%		5.7%	
	E3GrPo	13.0%	10.9%	13.6%	10.2%	3.5%

[1]Note that *E3Voc* is not reported either in Sweden nor in Italy.

[2]West-Germany, Italy and Sweden have longer university degrees. This explains the decline in percentage for *E3GrPo* in *Cohort 1961–65* since some individuals may have not completed the degree by the time of the interview.

Table 3.20: Number of Subjects, Exits and Censored in Each State — Country Comparison

	M–C^1	M^2	$1B^3$	$2B^4$
	Belgium			
Total	3233	3230	2651	1946
Exits	2651	2403	1946	1264
Censored	582	827	705	682
	West-Germany			
Total	2990	3000	1794	1089
Exits	1794	1331	1089	601
Censored	1196	1669	705	488
	Italy			
Total	3223	3227	2367	1901
Exits	2367	2304	1901	1179
Censored	856	923	466	722
	Spain			
Total	2669	2672	2148	1789
Exits	2148	2046	1789	1189
Censored	521	626	359	600
	Sweden			
Total	3273	3313	2937	2140
Exits	2937	1546	2140	1563
Censored	336	1767	797	577

[1]State of marriage or cohabitation.

[2]State of marriage only.

[3]State of first birth.

[4]State of second birth.

Table 3.21: Timing to Marriage — Country Comparison

Variables	*Hazard Ratios*[1]				
	Belgium	*W-Germany*	*Italy*	*Spain*	*Sweden*
City[2]	0.781** (0.050)	0.785** (0.044)	0.892** (0.045)	0.934 (0.044)	0.732** (0.049)
Religious	1.248** (0.090)	1.206** (0.069)	1.309** (0.106)	1.241** (0.078)	1.418** (0.073)
WorkTaste[3]	0.851** (0.053)	1.049 (0.078)	0.822** (0.039)	0.879** (0.042)	0.769** (0.044)
Education[4]					
E2	0.666** (0.049)	1.237 (0.222)	0.625** (0.038)	0.806** (0.044)	1.041 (0.144)
E3Voc	0.542** (0.045)	0.994 (0.234)		0.479** (0.046)	
E3GrPo	0.438** (0.053)	0.810 (0.171)	0.342** (0.032)	0.419** (0.044)	0.988 (0.143)
Emplo12	3.083** (0.179)	1.780** (0.127)	1.410** (0.066)	1.200** (0.059)	1.042 (0.058)
Unemrf12	0.988** (0.006)	0.870** (0.014)	0.954** (0.009)	0.978** (0.006)	0.709 (0.034)
Cohorts[5]					
1954[6]					0.705** (0.049)
1956–60[7]	1.056 (0.076)	1.043 (0.081)	1.015 (0.067)	1.360** (0.100)	0.573** (0.043)
1961–65[8]	0.975 (0.092)	1.047 (0.108)	1.099 (0.096)	1.424** (0.165)	0.540** (0.045)
1966–70[9]	0.601** (0.061)	0.779* (0.101)	0.737** (0.074)	1.172 (0.171)	0.305** (0.038)

*Significant at 10% level.

**Significant at 5% level.

[1]Standard errors in brackets.

[2]Dummy (1 if individual's locality up to 15 had >=100.000 inhabitants).

[3]Dummy (1 if individual show preference for work).

[4]Omitted category is the lowest level (*E1*).

[5]Omitted category is *Cohort 1951–55* (*Cohort 1952–55* for West-Germany and *Cohort 1949* for Sweden).

[6]*Cohort 1954 for Sweden only.*

[7]*Cohort 1959 for Sweden.*

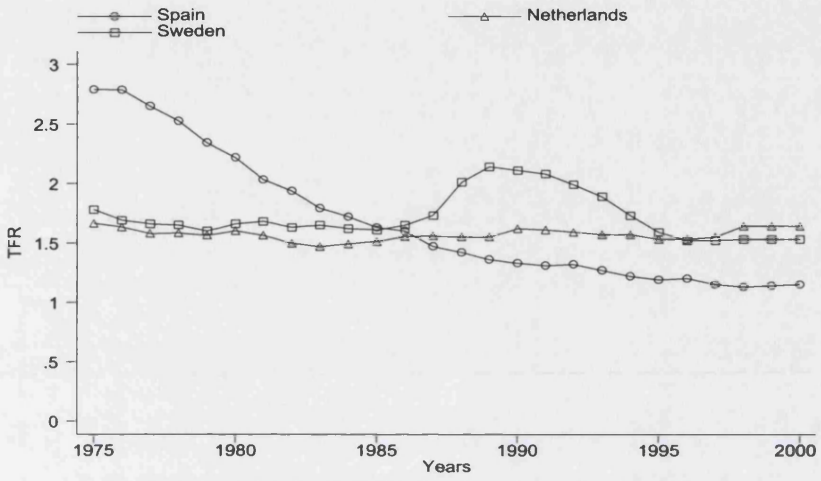
[8]*Cohort 1964 for Sweden.*

[9]*Cohort 1969 for Sweden.*

3.9 Appendix C: Graphs

3.9.1 The Spanish Case

Figure 3.11: Evolution of Total Fertility Rates: US, Netherlands and Spain



Kaplan-Meier Survival Estimation with Cohort 1945–60 observed 'artificially' up to 1980

Figure 3.12: 'Artificial' Survival in the Single State, By Cohort — Spanish Females

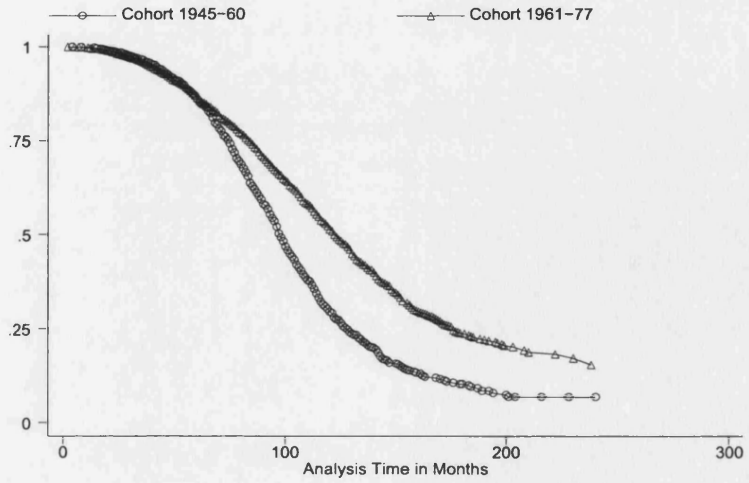


Figure 3.13: 'Artificial' Survival in the Married Childless State, By Cohort — Spanish Females

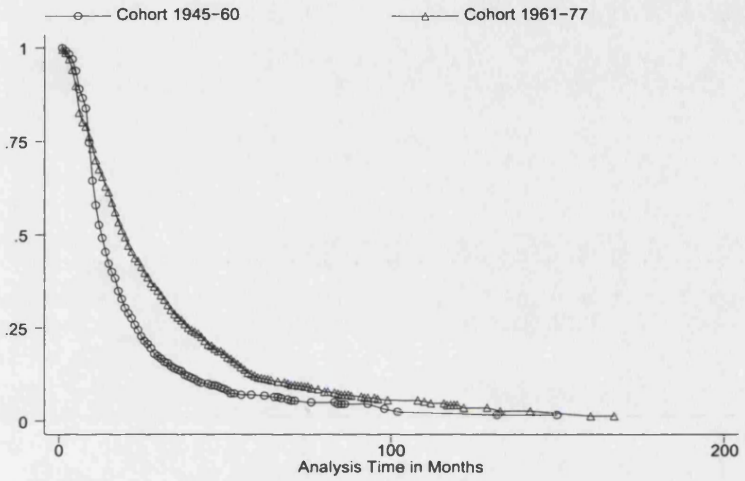


Figure 3.14: 'Artificial' Survival in the Married With One Child State, By Cohort — Spanish Females

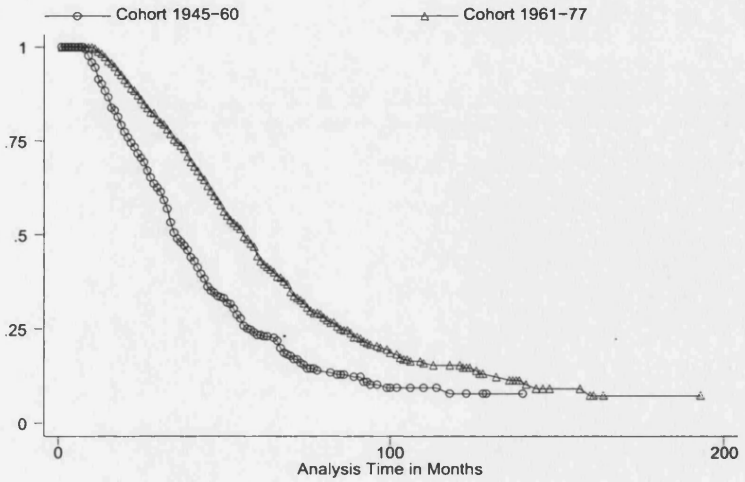
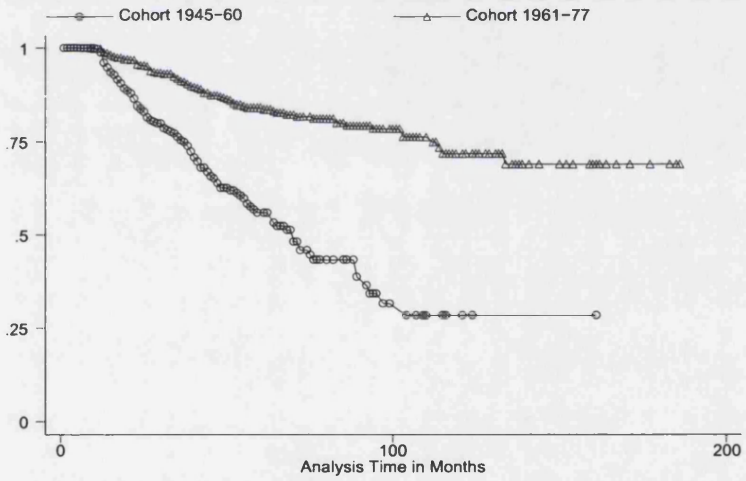


Figure 3.15: 'Artificial' Survival in the Married With Two Children State, By Cohort — Spanish Females



Chapter 4

Employment Transitions after Motherhood

4.1 Introduction

The employment transitions that mothers experience after childbearing are crucial to the understanding of the relationship between fertility and female labour force participation. These transitions after a birth may take different forms. For instance, some women move from employment to non-employment (either they become unemployed or inactive). We define this as a *Career Break* and it can be either temporary or permanent. Women may also experience *Downward Occupational Mobility.* That is, even if a woman remains employed, she may end up in an occupation that is below the one held before birth in terms of quality, payment and responsibility.

The are studies relating the incidence of *Downward Occupational Mobility* to motherhood in Britain (Newell and Joshi (1986) and Dex, Joshi, McCulloch and Macran (1998)). However, there are no similar studies for Spain. Part of the contribution of this chapter is to fill in this gap.

Turning now to *Career Breaks*, there is theoretical evidence that labour and family policies have an impact on female labour supply, especially amongst mothers. Becker (1981) models female labour supply taking into account family decisions. Women with children allocate their time between the labour market and childcare. There are several factors that determine their choice: preferences and cultural aspects, the price of childcare, possible substitutes for childcare and family taxation policies. All these elements play a fundamental role in a mother's employment decision and consequently, in the transitions from employment to non-employment after first birth. In order to evaluate how various policies

affect female participation around childbearing, cross-country and cross-time comparison is important.

Transitions to non-employment after childbearing matter because they are likely to cause a loss in human capital and future wages, and this effect is expected to be larger the longer the time spent out of paid work.[1] For example, Beblo and Wolf (2002) find evidence that discontinuous employment caused by maternal leave reduces the wage for females, ceteris paribus. Depending on the economic conditions and governmental rules, women might face barriers against returning to work after a period of maternity or childcare leave.

This Chapter is organised as follows: in Section 4.2 we summarise some key work on this literature. Section 4.3 describes the labour market, maternity leave and taxation regimes in Belgium, West-Germany, Italy, Spain and Sweden. In Section 4.4 we analyse the probability of employment after motherhood, given females' observed characteristics and labour market conditions. In Section 4.5 we restrict the transitions analysis to the Spanish case. Country comparison follows in Section 4.6. We then conclude in Section 4.7.

4.2 Related Literature

Downward Occupational Mobility through breaks in employment (in particular linked to childbearing) has mainly been studied in the UK. Most studies point out that the length of time spent not working prior to re-entry and taking part-time jobs are the principal reasons for *Downward Occupational Mobility.* For example, Newell and Joshi (1986) focus on British women born in 1946 to study occupational downgrading after childbearing. Although some recent mothers had not completed the transition back to paid work at the interview date,[2] they observe that three out of ten of the completed transitions experienced downward mobility. They argue that mothers who move to part-time work have higher risk of downward mobility compared to full-time returners. The same result is found by Perry (1988), who concludes that working part-time after birth increases the likelihood of downward occupational mobility. Dex et al. (1998) uses the 1958 National Child Development Study cohort to model employment transitions around childbearing in Britain. They find that education is the main factor that secures women's job continuity after motherhood. Contrary to what the authors expected, delaying motherhood helps high-educated women to remain at work but it is not essential.

[1] Notice that we will use 'work' as a synonymous of 'paid work'.

[2] Mothers are 32 years old at the interview date.

Most of the research on employment transitions around motherhood focuses on the withdrawal of women from work (*Career Break*) which can be either temporary or permanent. For the US, Desai and Waite (1991) test whether occupational sex composition[3] determines the likelihood that recent mothers are employed. They find that the probability of being employed after childbearing depends mainly on those occupational characteristics that raise the opportunity cost of being out of the labour force, independently of sex composition. They also distinguish between women with high and low work commitment depending on their answer to the question whether they plan to work at the age of 35. As expected, they find that those who said yes had a greater probability of remaining at work after motherhood. However, women with low commitment were more responsive to financial pressures and worked when they had to.

Ondrich, Spiess and Yang (1996) study the return to work after childbirth in Germany using a hazard approach. They focus on the legal parental leave period and the post-parental leave. Their results show that once the protection expires, mothers with strong labour force attachment (measured by years of experience and pre-birth full-time contracts) are more likely to return.

There are several studies for the Scandinavian countries. For instance, Rönsen and Sunström (1996) study mother's employment transitions around birth in Sweden and Norway. They use a hazard approach to analyse the entry into employment after birth, with special focus on the effect of parental leave policies. Albrecht, Edin, Sunström and Vroman (1999) estimate the effects of different types of time career interruptions on wages by gender. They test whether human capital depreciation is the main cause for wage drops. Since they find that parental leave is not negative for female's whereas it is for male's, they propose signaling as an alternative explanation. Bernhardt (1986) analyses women's home attachment at first birth, using a logistic model for three educational groups. She concludes that the likelihood of being at home 12 months after confinement is significantly affected by education, marital status, early labour-force withdrawal and duration of the union. Furthermore, the paper shows that low educated women have become, over time, closer to other educational groups in terms of home attachment. Bernhardt (1988) writes about the increasing tendency to reduce working hours among one-child mothers, particularly among women with a low level of education. Part-time work has become the 'combination strategy' (family and work) for both women who previously would have selected the 'home strategy' and for those who would have followed the 'career strategy', as the author defines it.

[3]They call female occupations those with a majority of women in the market.

Similar results are developed in Ellingsaeter and Ronsen (1996) and Kravdal (1992) for Norway. In the 80s, Norwegian labour force participation rates for mothers with the youngest child under 3 years increased substantially from 47% to 69%. This increase was accompanied by a rise in part-time work, partly thanks to the state, which is a good creator of part-time jobs.

Adam (1996a) uses the Spanish Household and Expenditure Survey (ECPF) for the period 1985–90 to study married women's labour force transitions in Spain. The advantage of our data (FFS, see Subsection 4.5.2) compared to the ECPF is that it has richer information about women and comprises longer periods.[4] But the greatest weakness of our data compared to hers is that there are no income covariates. In Adam (1996a), the author concludes that children are the main reason for mothers' abandoning the labour force in Spain. However, the principal cause of re-entry is the insecurity of husband's employment rather than children.

Although the vast majority of research has been done for single countries, there are, however, three main references that deal with more than one country. Gustafsson, Wetzels, Vlasblom and Dex (1996) and Wetzels (1999) compare women's labour force transitions related to childbirth in Germany, Sweden and Great Britain. They use different panels for each country: the GSOEP for Germany, the Swedish HUS and the British BHPS. Their results show that German and British women have higher full-time employment pre-first-birth. German women stay longer at home with children because of their 'bread-winner regime'.[5] They also find evidence that the accumulation of human capital is a main determinant for re-entry in Germany and Great Britain whereas it is not in Sweden. Their paper shows a crucial relationship between the timing of re-entry into employment and country-specific policies.

Another cross-country study by Saurel-Cubizolles, Romito, Escribà-Agüir, Lelong, Pons and Ancel (1999) describes the return to work after childbirth in France, Italy and Spain, and its relationship to their different maternity leave policies. Their results show that the percentage of women coming back to work within a year after birth is around 80% in both France and Italy. The proportion is lower in Spain[6] (53%). The gap of post-birth

[4]Adam (1996b) points out in her paper the shortcoming of ECPF, which is the lack of female's education, experience and regions.

[5]This implies a strict division of labour. That is, the husband is perceived as the earner and the wife as the carer.

[6]Their study is based on urban and rural areas around Valencia city in 1992. Therefore, their work can not be generalised to the entire Spanish population since their sample only covers the Valencian region.

employment break was related to each country's policies. For example, Italian women returned to work later, which they say is due to their longer post-birth maternity leave.[7]

4.3 Labour Market, Taxation and Welfare Policies

In this section we report 'family friendly' policies across countries that are relevant for mother's employment. We summarise in Table 4.1 the main characteristics of maternity/parental leave[8] and benefits in these countries. We also provide information on childcare leave[9] in Table 4.2. These data are a subset of those used by Gauthier (2000). Besides maternity and childcare leave, countries differ substantially concerning daycare provision. For example, Moss and Deven (1990) report that 31% of one-year-old children with working mothers were in the collective daycare system in France, whereas less than 10% are in Italy or Spain.

Table 4.1: Maternity Leave and Benefits — Country Comparison: 1975–97[1]

	Duration of leave[2]				*Cash benefits*[3]			
Countries	1975	1985	1990	1997	1975	1985	1990	1997
Belgium	14	14	14	15	60	80	80	77
Germany	14	14	14	14	100	100	100	100
Italy	22	22	22	22	80	80	80	80
Spain	12	14	16	16	75	75	75	100
Sweden	30	51	51	64	90	70	71	62

[1]Source: Gauthier (2000) and Moss and Deven (1990).
[2]Duration of the leave in weeks.
[3]Cash benefits as a percentage of regular wages.

Table 4.3 shows that Spain, Italy and Germany are the countries with less public funded childcare.[10] But not only the quantity and cost of childcare matters but also if it fits working mothers' conditions. Hank and Kreyenfeld (2000) find that the availability of childcare does not increase female participation in West-Germany. They argue that, despite high rates of available childcare, the opening hours are too limited to satisfy the

For the same reason their results are not directly comparable to ours since we look at the national level.

[7]The authors seem to use surveys that consider women on maternity leave as not working. This is different from our survey, which accounts women on maternity leave as working, except for Sweden.

[8]The term maternity/parental leave refers to paid leave during the period immediately prior and after childbirth.

[9]Childcare leave refers to optional extended leave after maternity/parental leave.

[10]Although this might be partly endogenously driven, we believe that it provides evidence for differences in public funded childcare.

Table 4.2: Childcare Leave Schemes in 1999 — Country Comparison[2]

Countries	*Duration*[2]	*Cash Benefits*[3]	*Flexibility*
Belgium	3	37%	Up to the child's fourth birthday
Germany	36[4]	24%	Immediately after paid maternity leave
Italy	6	30%	Up to the child's ninth birthday
Spain	36[4]	Unpaid	Immediately after paid maternity leave
Sweden	15	66%	Up to the child's eighth birthday

[1]Source: Gauthier (2000).
[2]Duration in months.
[3]Cash benefits as % of wage.
[4]Duration includes the post-birth period covered by the maternity leave.

Table 4.3: Children in Public Funded Childcare in 1993 — Country Comparison[1]

Countries	*Under age of 3*	*Age 3 to school age*
Belgium	30%	95%
Germany[2]	5%	65%
Italy	6%	97%
Spain	5%	84%
Sweden	33%	79%

[1]Source: Gauthier (2000), Moss and Deven (1990) and Tietze and Cryer (1999).
[2]Data from 1988.

needs of an employed woman.

Gauthier (2000) summarises public policies affecting fertility and families in the 15 EU members. She finds that across all family types, cash support for family tends to be low in Portugal, Spain and the UK. Furthermore, she points out that these cash trends over time are relatively stable, except for some increase in Belgium, Denmark, Germany and Luxembourg. Finally, flexible arrangements provided by firms is another way to facilitate the combination work and family. Table 4.4 summarizes data on flexible working arrangements in enterprises as it appears in OECD (2001). Italy and Spain have the lowest percentage of employees reporting that they work flexi-time.

There is also an impact of different taxation systems on the incentives in couple families. The basic issue is whether the income is calculated on the basis of the sum of the two earned incomes (*Joint*) or on the basis of the two earned incomes separately (*Separate*).

Table 4.4: Indicators of Family-friendly and Relevant Flexible Working Arrangements in Enterprises in 1995–96 — Country Comparison[1]

Countries	*Employer provision for child day-care*	*% of employees reporting they work flexi-time*	*% of women part-time on a voluntary basis*
Belgium	14%	26%	21%
Germany	16%	33%	27%
Italy	5%	19%	11%
Spain	8%	20%	8%
Sweden	1%	32%	20%

[1]Source: OECD (2001).

Table 4.5: Evolution of the Taxation Type — Country Comparison[1]

Countries	*1970*	*1980*	*1990*
Belgium[2]	Joint	Joint	Separate
Germany	Joint	Joint	Joint
Italy[3]	Joint	Separate	Separate
Spain[4]	Joint	Joint	Separate
Sweden[5]	Joint	Separate	Separate

[1]Source: OECD (1993).
[2]Belgium moved to *Separate* system in 1990.
[3]Italy moved to *Separate* system in 1977.
[4]Spain moved to *Separate* system in 1989.
[5]Sweden moved to *Separate* system in 1971.

Whatever form of joint tax system is used, there is a priori a reduced incentive for the partner with lower potential earnings to work to increase his/her labour supply. This is because the tax system is progressive and, if a couple is taxed jointly, they will probably face a higher tax rate for the sum of their earnings, compared to a situation where their earnings are taxed individually. In Table 4.5 we report the type of taxation regime in each country. Except for West-Germany, all countries moved from a *Joint* to *Separate* system between 1970 and 1990. *Joint* taxation has been linked to a 'breadwinner' model (see Sainsbury (1994) for further details), which is characterised by the strict division of labour. That is, the husband is perceived as the earner and the wife as the carer. Apart from the type of taxation system, there are other family-based tax reliefs and benefits that are relevant for re-entry into employment after motherhood. Table 4.27 in Appendix 4.9 summarises some standard tax reliefs in 1990.

4.4 Empirical Specification

The empirical model aims to determine how a woman's observed characteristics before her first birth affect her probability of working after the baby is born. We are interested in transitions from employment (12 months before the birth event) to non-employment.[11] Mothers who were at work before birth decide monthly after birth if they participate in the labour market. They maximise their utility subject to their budget and time constraint (see Becker (1981) for further details on family-labour supply models). For given preferences, family and taxation policies have an impact on the mother's budget (e.g. subsidies for childcare) and time constraint (public available child-care or flexible hours),[12] and these policies could make it more likely that women participate, ceteris paribus (see Chapter 2 for a theoretical perspective). Simultaneously, mothers who choose to be active are affected by job opportunities (i.e. unemployment rates) that resolve if they are employed. These job opportunities also differ across countries. In our analysis, we estimate a reduced form model for the probability of employment after childbearing that embodies both the decision process and the economic conditions.

We estimate a probit model that takes into account the sample selection that arises from being employed or not before birth, using the Heckman approach. We first determine the characteristics that make it more likely that women belong into the sub-sample of being at work before birth and then the factors that determine whether this sub-group is employed or not after birth. In the selection equation we control for the national female unemployment rates at one year before birth in order to identify the model. By doing this, we assume that these unemployment rates have no direct effect on the probability of being employed after birth, given that we are controlling for year dummies after birth (which capture the unemployment rates at that time).

We use the Latent Variable Model for Binary Variables.[13] We observe a binary variable E_{it}, which is the labour force status of a woman i at time t. This variable E_{it} can only be observed in two states: a woman is at work (E_{it}=1) or not (E_{it}=0). Nevertheless, not all women in the labour force are there with the same certainty. That is, a woman might be observed as E_{it}=1 but be very close to leave employment, whereas another woman might be also observed as E_{it}=1 and be very attached to her decision.

[11] *Downward Occupational Mobility* is not modelled but only described for the Spanish case in Section 4.5. This is because occupational categories are missing for the other countries under analysis.

[12] Notice that if women have fully flexibility on the number of hours, they face a continuous time constraint. By contrast, if they must either work full-time or not work at all, they face a kink in the time constraint that could lead them to non-participation with higher probability.

[13] We base our model description on Long (1997).

We suppose that there is an unobserved or so-called latent variable E_{it}^* that generates the observed E_{it}'s. Those women who have larger values of E_{it}^* are observed as E_{it}=1, while those with smaller values of E_{it}^* are observed as E_{it}=0. The idea of a latent E_{it}^* is that there is an underlying propensity to work that generates the observed state through the following measurement equation:

$$E_{it} = \begin{cases} 1 & if \quad E_{it}^* > \tau \\ 0 & if \quad E_{it}^* \leq \tau \end{cases} \tag{4.1}$$

where τ is the *threshold.*

The latent E_{it}^* is assumed to be linearly related to the observed characteristics x_{it} by the structural model:

$$E_{it}^* = x_{it}\beta + \epsilon_{it} \tag{4.2}$$

Although we are not able to observe E_{it}^*, a change in E_{it}^* results in a change in what we indeed observe, namely, whether a woman is at work at that time. Some characteristics, for example, the number of children in the household, will modify the woman's propensity to be employed as opposed to working at home. We would expect that a new birth will diminish the propensity to work up to a point to overcome a threshold that makes this woman decide to leave the labour force and stay at home.

Since E=1 when $E^* > 0$ and $E^* = x\beta + \epsilon$,

$$Pr(E = 1|x) = Pr(E^* > 0|x) = Pr(x\beta + \epsilon > 0|x) = Pr(\epsilon > -x\beta|x).^{14}$$

We assume that our errors follow a normal distribution with $E(\epsilon|x) = 0$, which results in the probit model. The normal distribution is symmetric, meaning that $Pr(E = 1|x) = Pr(\epsilon \leq x\beta|x)$. This is the cumulative density function of the error distribution evaluated at $x\beta$. Consequently,

$$Pr(E = 1|x) = \Phi(x\beta) \tag{4.3}$$

These models permit us to compute how different explanatory variables affect the probability that an individual belongs to a particular status (categorical dependent variable). Here, the probit estimation has the target to determine the probability of a woman with certain characteristics being at work or not. Since we are interested in the evolution of a woman's career following the first birth, we estimate a monthly probit[15] from the moment

[14]We take the threshold τ as zero. There is no loss of generality here because the threshold is absorbed into the constant term.

[15]We assume that the errors are normally distributed.

of birth onwards.

If observations are independent, the general likelihood function of a probit model is:

$$L(\beta/E,X) = \prod_{E=1} \Phi(x_i\beta) \prod_{E=0} (1 - \Phi(x_i\beta)) \tag{4.4}$$

E is a random variable that takes value 1 if the individual is employed and 0 otherwise. In our probit, we have the following specification:

$$L(\beta/E,X) = \prod_{E=1} \Phi(\alpha_t D_t + \sum_k \beta_k x_{kit}) \prod_{E=0} (1 - \Phi(\alpha_t D_t + \sum_k \beta_k x_{kit})) \tag{4.5}$$

D_t is a matrix with 96 columns, one for each month after motherhood.[16] For example, D_1 is a column vector that takes value 1 for each individual at the month one after birth and 0 otherwise. Similarly, D_2 takes value 1 at month 2 after confinement and 0 otherwise, and so on. x_{kit} is a vector of explanatory variable k for each individual i and time after birth t. β_k is the vector of the coefficients of the explanatory variables and α_t is the vector with the coefficients of the duration effects. If we maximise the log-likelihood of the previous expression, we will find the estimates for β_k and α_t.

Note that we do not observe all individuals after first motherhood up to 96 months, which means that the contribution of each individual to the whole explanatory matrix does not have the same length. We are aware that observing individuals over a heterogenous period of time might produce misleading estimates because there may be a systematic relationship between period of stay in the sample and employment status. In order to check this, we re-estimate the same model and restrict the sample to those individuals who appear throughout the whole period (older individuals). Results (see Table 4.30 in Appendix 4.9) are numerically similar to those estimated with the whole sample (Table 4.22), which suggests that we do not need to be preoccupied by observing individuals over different length of time.

To facilitate the interpretation of the results, we will plot the predicted probability path of being at work for different representative individuals (called RI). The estimated probability of being employed at each month after first birth is given by the next expression, where we substitute our selected values for x_{kRIt}.

[16] We analyse post-birth labour force status up to 96 months after the confinement.

$$Prob(E=1)_{RIt} = \Phi(\hat{\alpha}_t D_t + \sum_k \hat{\beta}_k x_{kRIt}) \tag{4.6}$$

We reduce the duration dummies to D_3, D_6, D_{12}, D_{24}, D_{48}, and D_{96} and plot the probability of being employed at each of these post-birth periods.

4.5 The Spanish Case

4.5.1 Introduction

Although there are some studies of employment transitions and *Downward Occupational Mobility* after motherhood in Europe, especially in the UK (see Section 4.2), little research has been done on this topic for the Spanish case. We are aware of one piece of research by Adam (1996a) that uses the Spanish Household and Expenditure Survey (ECPF) for the period 1985–90 to study married women's labour force transitions. Our analysis differs from hers in that we investigate both transitions from employment to non-employment (temporary or permanent *Career Break*) and *Downward Occupational Mobility* after childbearing. We use different data sources (see later in Subsection 4.5.2) that allow us to study when these transitions are more likely to occur and how they have evolved between the 70s and the 90s. This is important since the society, labour market institutions and the jobless rate have changed considerably over this period.

There are several potential reasons why *Downward Occupational Mobility* may happen, both on the supply and the demand side. On the one hand, mothers may be willing to take jobs that involve fewer responsibilities so as to be able to take care of their children. On the other hand, employers may be reluctant to hire mothers for high profile positions since they think that their family role may absorb their energy and interfere with their productivity. Employers may also think that the skills of mothers deteriorate when they are on maternity leave. Furthermore, in some countries, women return to part-time jobs after childbearing and, for whatever reason, these part-time jobs tend to be more concentrated in low qualified occupations.[17]

The outline of this section is as follows: the next subsection presents the data. In Subsection 4.5.3 we describe the employment transitions in the sample. Subsection 4.5.4 summarises the factors under which transitions to non-employment are more likely to happen. We finally conclude in Subsection 4.5.5.

[17]This may be a supply phenomenon from the mother's side.

4.5.2 Data and Constructed Variables

In order to provide a more comprehensive analysis of the employment behaviour of women around first birth we exploit three complementary datasets: 'Family and Fertility Survey' (FFS), 'Encuesta de Población Activa' (EPA), which is the Spanish Labour Force Survey, and 'European Community Household Panel' (ECHP). We next explain how the use of all of them compensates in part for their individual deficiencies.

The FFS allows us to analyse some of the factors that determine the likelihood of returning to work after first birth and how these transitions have evolved across time. However, although the FFS is rich in demographic and social variables, it lacks precise information about some job-related characteristics. For example, it does not specify tenure or type of contract (permanent *vs.* fixed-term). Since our focus is to explore how pre-birth job and personal features affect post-birth labour force status, we would like to have a complement to the FFS that incorporates these covariates into the analysis. This is done with the EPA, which contains broad information on job-related characteristics and it is available with panel structure since 1987. Individuals are followed for six quarters with interviews every three months, which means that we can build up a woman's history for a year and a half.

Limitations of the FFS and the EPA make it desirable to combine both of them in order to explore post-birth employment transitions. On the one hand, the FFS allows us to construct long life histories, and it contains social and partners' education variables. But some details on job features are missing. On the other hand, the EPA has further labour market variables but it lacks long histories and social covariates. By using both surveys, we are able to describe more accurately the patterns of employment transitions after childbearing. We undertake two independent analyses (one estimation with the FFS and another with the EPA) and complement results. These two surveys share the same drawback, which is the lack of income and wage data. For this reason, we need a third survey (ECHP) in order to rank occupations.

FFS

A full description of the 'Family and Fertility Survey' is given in Subsection 3.4.2 of Chapter 3. For our estimation we select those women who gave birth at least once (1941 individuals).

The explanatory variables[18] are the following: region dummies (*NW*, *NE*, *C*, *CMadrid*, *E*, *Canaries* and *S*), being religious (*Religious*), education (*E1*, *E2*, *E3Voc* and *E3GrPo*), cohorts, partner's education,[19] monthly working experience from 15 years old to the last job before birth (*Experience*), national proportion of temporary contracts (*Temporary*), age at first birth (*AgeAt1C*) and its square (*AgeAt1C2*), age at first job (*AgeAt1Job*) and a dummy for the occupation held one year before birth. The latter variable has been classified initially into four categories *High*, *Moderate*, *Low* and *Very Low* for the descriptive statistics. However, in the estimation of the model, we reclassify the occupational ladder into one dummy variable (*OcHIGH*) by joining the two highest categories (*High* and *Moderate*) into one (*HIGH*) and the two lowest levels (*Low* and *Very Low*) into one (*LOW*). All explanatory variables are taken at one year pre-birth, except for the proportion of temporary contracts, which is a time-varying variable.

EPA

For the EPA analysis, we have constructed our sample in the following way. We take females who are between 16 and 49 years old. We pool interviews from 1987 to 1996. Then, we select those women who had a birth between the third and fourth quarter in their sequence of interviews. The reason why we only consider birth transitions in the middle of the observed history is that we would like to have labour force status information for at least six months before birth and at least six months after. In fact, what is observed at quarter 1 will imply employment characteristics between six and nine months before birth, without being able to be more precise on that. The same is true for post-birth labour force status. The total number of women in our sample who had a birth between the third and fourth quarter are 2016. For 722 of them, this was their first birth.

Some explanatory variables[20] refer to job features at quarter 1: *Employer* is a dummy that takes value one if the woman was employer and zero if employee; *Public* is one if

[18]Full description of the variables in Table 4.24 in Appendix 4.8.

[19]Partner's education is a covariate that refers to the partner at the interviews' date and not at the birth date. A female could have changed partner in between, which would imply that the education collected is not the father's one. However, we believe that the correlation of education between partners is expected to be high. That is, for those few who changed companion, education of the current partner should be a good proxy for the father's education. It is also possible that in 1995 the mother does not have a companion anymore because of being widowed, separated or divorced. In this situation, partner education will be missing (6% of our cases). There are two plausible solutions. First, we can discard these individuals and proceed with our estimation. Second, we can make missing values take a particular value (e.g. $E1P$=1) and create simultaneously a dummy variable that takes value one whenever partner's education is missing. We have undertaken both estimations and we have found that in any option the rest of the estimates were affected. Our results are presented in the latter alternative since we believe that it is worth keeping our sample size greater.

[20]Description of the variables in Table 4.25 in Appendix 4.8.

she was employed in the public sector; *Permanent* is one if the person had a permanent contract; *Fulltime* takes value one if she worked more than 35 hours per week; *Tenure* is the number of months she was working at that particular job; *OcHIGH* if the person was previously employed in a *HIGH* position. Other variables correspond to values at quarter 6: *Age* and its square *Age2*; educational dummies *E1*, *E2*, *E3Voc*, and *E3GrPo*;[21] *Nationality* takes value one if she is Spanish; a dummy for marital status (*Married*); regional dummies *NW*, *NE*, *C*, *CMadrid*, *E*, *Canaries* and *S*, being the latter the omitted category; temporal dummies *Year 1988–90*, *Year 1991–93* and *Year 1994–96* with the former as the reference level.

ECHP

The analysis of a child-birth job transitions requires the construction of an occupational ranking. One criterion to build the ranking of occupations would involve ordering them according to wages of workers in the sample. Since the FFS does not have wage information, we must find an alternative approach in order to construct a proxy for occupation ranking. We take the wave 1994–95 of the data set ECHP (which contains wages), create the classification for a comparable sample in the ECHP,[22] and apply the same ordering rule to the FFS and the EPA sample. The construction of the ranking is done as follows. We first estimate a logarithmic wage equation on age, square of age, and occupation dummies.[23] Then, we use the coefficients of this estimation to order the different jobs into four categories.

The first and highest position (called *High*) in terms of wages is formed by the following occupations: legislators, senior officials and corporate managers, physical, mathematical, engineering science, life science, health, teaching and other professionals. The next group (named *Moderate*) are: teaching and other associate professionals, office clerks and customer services clerks, metal, machinery and related trades workers, precision, handicraft, printing and related trades workers. The third category (*Low*) is formed by physical, engineering science, life science and health associate professionals, general managers, personal and protective services workers, models, salespersons and demonstrators, extraction and building trades workers, other craft and related trade workers, stationary-plant and related operators, machine operators and assemblers, drivers and mobile-plant operators. The lowest position on the occupation ladder (*Very Low*) is occupied by market-oriented skilled agricultural and fishery workers, subsistence agricultural and fishery workers, sales

[21]The omitted category is the lowest level.

[22]The sample consists of employed women between 16 and 49 years old.

[23]The survey follows the ISCO occupations' classification.

and services elementary occupations, agricultural, fishery and related labourers, workers in mining, construction, manufacturing and transport.

4.5.3 Descriptive Statistics

We have already introduced the possibility of two types of employment transitions: the complete abandonment of employment after a first birth (either towards inactivity or unemployment) and the movement towards a lower rung of the occupational ladder (but remaining employed). We called the former temporary or permanent *Career Break* and the latter *Downward Occupation Mobility*. We next describe the incidence of these transitions in Spain making a simultaneous use of both the FFS and the EPA data.

Temporary or Permanent Career Break

Figure 4.1: Employment Rates Around First Birth — Spanish Mothers

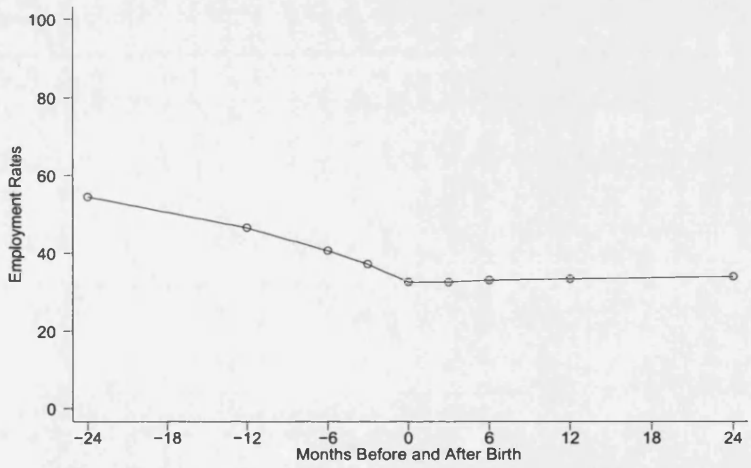


Figure 4.1 shows mother's employment rates (in the FFS sample) at different periods of time surrounding the first birth, starting two years before and finishing two years after.[24] This graph confirms that there exists an important permanent *Career Break* after childbearing since there are a large number of women who do not return to paid work. Employment rates fall drastically from 57% twenty-four months before birth to 33% afterwards. In the EPA[25] sample, the proportion of women who are at work between six

[24]Employment rates are computed taking into account censoring. For example, there are some women not observed two years after birth. Thus, they have been subtracted from the total number of mothers in order to compute the rates.

[25]In Subsection 4.5.2 we explained the gain of complementing the FFS analysis of employment transitions with the EPA. This survey contains more detailed information on pre-birth job characteristics

Table 4.6: Staying-on-rates at Work After First Birth — Spanish Females

Survey	*EPA*[1]	*FFS*[2]		
Months After Birth	*6-9*	*12*	*24*	*60*
%	65	60	59	56
n observations	308	1125	1077	906

[1]Conditioned of Employment 6–9 Months Before 1^{st} Birth.
[2]Conditioned of Employment 12 Months Before 1^{st} Birth.

and nine months before their first child (quarter 1) is 42.7%. This result is analogous to the one we have in the FFS's statistics (see Figure 4.1). Employment rates are 41.4% at quarter 2, 37.8% at quarter 3, 33.8% at quarter 4, 32.4% at quarter 5 and 32.5% at quarter 6.[26] Notice that the EPA survey classifies women in maternity leave as being employed. This means that we could observe drops from the labour force a quarter after birth. The reason is that some women might stop working just after their maternity leave period expires and considered as employed until then.[27]

Table 4.6 shows the staying-on rates of those women who were employed one year before first birth: 65% of women who were employed at first quarter were employed at quarter 6. In the FFS, around 60% of women who worked one year before birth worked one year after, which seems in line with the EPA output. The advantage of EPA is that we are able to disentangle transitions from employment to unemployment from those from employment to inactivity. In our sample, we observe that among those women who were employed at first quarter, 11% are unemployed at quarter six and 24% are inactive. Therefore, there is a significant proportion of women that experience unemployment after childbearing. Furthermore, the job characteristics of women who were working before motherhood play an important role in the chances these women will be employed after. This information is summarised in Table 4.7.

For example, tenure at work is a positive determinant of returning to job: 41.2% of women who said to have been in their pre-birth job for less than 12 months stayed at work. The percentage is 64.6% for tenure more than 12 months. As expected, 77.9% of those mothers with a pre-birth permanent contract are at work in quarter 6, whereas 49.7% is the

(e.g. tenure, type of contract or sector are not present in the FFS) and disentangles unemployment from inactivity. However, the period of observation after motherhood is limited to 6–9 months.

[26]Recall that births in EPA occur between quarter 3 and 4.

[27]Maternity leave in Spain lasts for 16 weeks. Women must take at least 6 weeks after the delivery, and no duration is mandatory before birth.

Table 4.7: Staying-on-rates at Work After First Birth By Characteristics, EPA — Spanish Females

Characteristics		%
Public Sector	*Yes*	85
	No	60
Tenure	*>12 Months*	65
	<12 Months	41
Type of Contract	*Permanent*	78
	Fixed-Term	50
Daily Hours	*Full-time*	67
	Part-time	45
Education Level	*Graduate*	87
	Non-Graduate	57

equivalent percentage for those with a fixed-term contract. Pre-birth full-time jobs also contribute positively to the likelihood of being employed, with percentages 45% and 67% for part-time and full-time respectively. A pre-birth job in the public sector also increases enormously the proportion of women who are employed afterwards: 84.8% of women previously in the public sector work after childbearing whereas only 59.8% do among those in the private sector before birth. Education level is, however, a key factor. 87.2% of women with a graduate education degree are employed at quarter 6, the percentage being much lower for non-graduates.

The employment rate after birth seems to stabilise at around 35%. In fact, the employment rate 10 years after the first birth calculated from our FFS sample is 34.3%. This excludes the possibility that women are coming back to work in large numbers after a break of two years or more. Data demonstrate that rather than women returning slowly to work, mothers who left work at birth are not returning at all (the employment rates remain flat). Therefore, there is evidence of the so-called permanent *Career Break* (total abandonment of the employment history). This is in line with the paper by Adam (1996b),[28] which finds that Spanish mothers tend to withdraw from the labour force after childbearing and are likely to remain outside. Interestingly, her results show that women whose husbands' are unemployed return to the labour force with greater probability.

We would like to know if employment rates around motherhood differ across cohorts. In Figure 4.2 we compare employment rates close to birth for cohorts 1945–54 and 1955–64. Although both groups share approximately the same level of employment two years before

[28]The author uses the Spanish Household and Expenditure Survey (ECPF) from 1985 to 1990.

Figure 4.2: Employment Rates Around First Birth, By Cohort — Spanish Mothers

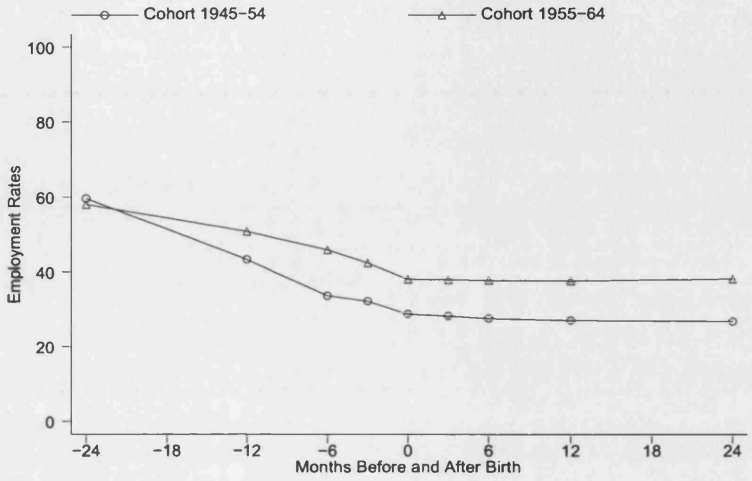
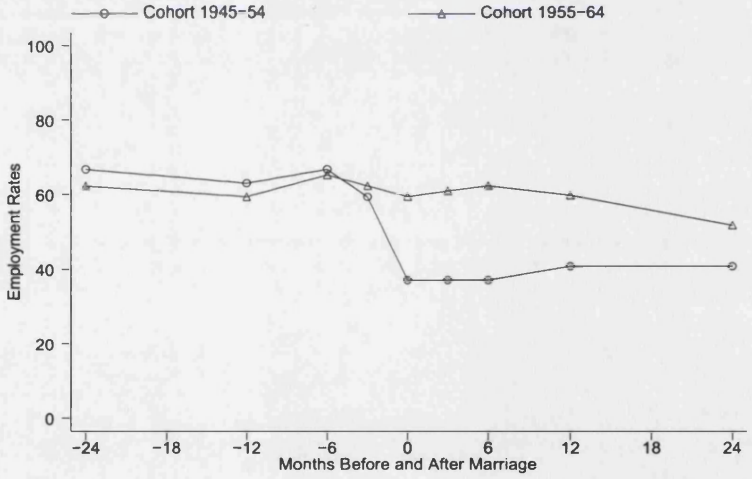


Figure 4.3: Employment Rates Around Marriage for Women Without Children, By Cohort — Spanish Females



birth (60% for women born between 1945–54 and 58% for those born between 1955–64), they converge to a rather different level two years after. Employment rates 24 months after childbearing are 27% and 38%, respectively. This shows that the negative impact of family formation on female's employment has diminished in younger generations. We can also calculate the proportion of women who were at work one year before birth and still are two years after. We find that approximately 56% of women who were employed before are employed after in cohort 1945–54. The proportion is about 66% for the cohort 1955–64. Thus, transitions from employment to non-employment are reduced in younger generations.

Table 4.8: Staying-on-rates[1] at Work By Cohort, FFS — Spanish Females

	After Marriage[2]		*After 1st Birth*	
Cohorts	*1945-54*	*1955-64*	*1945-54*	*1955-64*
%	59	84	56	66

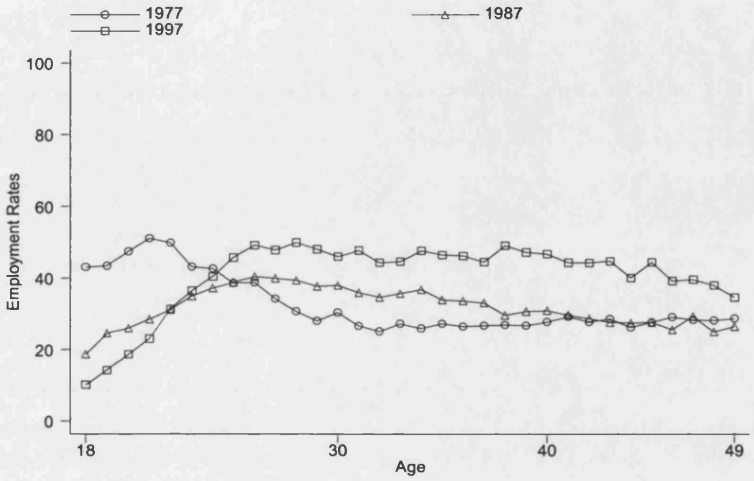
[1]Staying-on rates stands for the percentage of women who were employed 12 months before the event and they are employed 24 months after.
[2]Women without children.

Note that employment rates initiate their decline some time before birth, which is probably caused by women abandoning their work at marriage. In order to disentangle the effect of birth on employment from the effect of marriage, we need a control group. We look at employment rates around marriage for those women without children. Pooling all cohorts we calculate employment rates close to marriage for childless women. The rate of employment for this control group is 64% 24 months before marriage and 58% 24 months after. Therefore, there is a drop in employment caused by the fact of getting married. We similarly compute these rates for cohorts 1945–54 and 1955–64 in order to check for generational changes. This is done in Figure 4.3.[29] Employment rates move from 67% two years pre-marriage to 41% two years post-marriage for women born between 1945–54. Rates decline from 62% to 52% for women born between 1955–64. This is evidence that the negative impact of marriage on female employment rates (i.e. traditional society) diminishes in younger cohorts. Notice that the decline is sharper at marriage among women born between 1945–54. Therefore, the exit rate from the labour market around first child is shown to be stronger caused by the birth itself in later generations. In Table 4.8 we summarise the staying-on rates after marriage[30] and first birth by cohort.

In Figure 4.4 we provide further information on the evolution of female employment rates in Spain by age in 1977, 1987 and 1997. In 1977, we observe that employment rates for females in their early 20s are about 50% and they decline considerably afterwards. The profile for 1987 is rather different, with a rising trend up to the age of 27 (at about 40%) and a slight decline afterwards. Finally, in 1997, employment rates increase sharply up to the late 20s (at about 50%) and they remain fairly constant afterwards. Thus, Figure 4.4 shows that the pattern of employment rates by age (which also reflects family formation and education) is changing over time. The increase of women's education explains the

[29]We must point out that the sample size for the construction of this graph is very small: 27 individuals for the cohort 1945–54 and 69 for cohort 1955–66.
[30]This is done for a control group of women who are married without children.

Figure 4.4: Evolution of Employment Rates By Age, EPA — Spanish Females



rising trend up to the age of about 28 years in cross sections 1987 and 1997. In 1977, however, women were employed at a fairly young age and left their jobs once they started their own family.

Another interesting aspect is how long it takes for women to come back to the labour market after a first birth, conditional on their returning. Table 4.9 represents the monthly average of the gap between birth and first job for different groups among those women who returned within five years. Those women who did not break their job history and worked continuously after birth are considered to have a nil gap. Data show that the mean time in returning to work for those women who were working one year before birth is 0.5 months. Additionally, women who did not work before but did it after the confinement have an average gap of 19.7 months. This number is calculated for those women who came back to work during the period of five years, which means that some women might start working later and, consequently, they are not accounted for in the analysis. This censoring causes an underestimation of the average gap. Despite this fact, Table 4.9 shows unequivocally that women at higher positions return to work faster on average. Female previously at *High* job category have a zero mean. Those females initially at a *Very Low* position, who came back to a job within five years, required an average of 1.2 months.

One might question how it is possible for such a low average gap if females have the right of maternity leave. Recall that we are conditioning on returning within five years and a woman can be under maternity leave while remaining employed. Being under maternity leave is not equivalent to not working. In fact, maternity leave is accounted as being

Table 4.9: Average Monthly Returning Gap to Working Status for those who Return in Five Years, FFS — Spanish Females

Occupational Status Before		*n*	*Average Monthly Return Gap*
Not Working		270	19.7
Working	*High*	55	0.0
	Moderate	228	0.2
	Low	283	0.4
	Very Low	188	1.2
	Total	754	0.5
TOTAL		1150	7.1

Table 4.10: Occupational Status After First Birth By Age at Motherhood (%), FFS — Spanish Females

Occupational Status 5 Years After Birth	*Age at 1st Birth*			
	-20	*20-24*	*25-29*	*30+*
Not Working	68.5	69.9	63.9	59.3
Working at Good Level	1.1	1.3	4.0	5.3
Working at Average Level	4.0	6.9	11.4	17.7
Working at Low Level	13.1	12.9	14.6	13.3
Working at Very Low Level	13.3	9.0	6.1	4.4
Total Number	276	982	624	113

employed in the Spanish Statistics. Table 4.9 shows that women employed before motherhood who work at any time within five years of childbearing did not experience hardly any non-employment gap. This is particularly true for pre-birth women in high-level occupations since they have a higher opportunity cost and a higher degree of job attachment compared to their counterparts with low-profile jobs. They are also more likely to have better working conditions and be able to pay for childcare.

Age of motherhood has been related to the concern of women returning to the labour market after a birth. It is appealing to investigate which is the range of age at first child with higher occupation category after childbearing.

The average age of motherhood in the group of women who had never held a paid job is 22.3, compared to 24.7 for those who had worked before birth.[31] Table 4.10 represents

[31]Note that this average is computed for those women who already had a child. This biases the number downwards. The purpose of these numbers is not to show the average age of motherhood, but to see the differences in age of motherhood coming from pre-birth employment status.

the job status 5 years after birth by age of motherhood.[32] Once more we face censoring among recent mothers at interview. Thus, in these tabulations we omit those women who had their first birth less than five years before the interview date. Table 4.10 shows that those women who enter motherhood before 25 years old are more likely to remain out of work after birth. Only those who became mothers after 25 are a significant proportion in occupations located in *High* or *Moderate* positions in the occupational ladder. Age of motherhood is strongly linked to the pre-birth working status. In our sample, 68% of women who had a first child before their 20s did not work one year before, compared to 48% among those women who gave birth after the age of 25. Thus, age at motherhood matters in the post-birth job status partly through its effect on pre-birth job status.[33]

Downward Occupational Mobility

As discussed above, *Downward Occupational Mobility* is another type of employment transition linked to childbearing. Descriptive statistics seem to predict that this type of career cost is less pronounced in the Spanish sample. For example, among women who were employed 3 months before and 12 months after the confinement, only 2.3% change occupation.[34] Similarly, 5.1% of women who are employed 3 months prior to the birth and 24 months later have modified their occupational status. This percentage increases to 16.4% among those women who held a paid job 3 months before and 10 years after. As expected, the proportion of changes rises through time. If we are able to show that most of the transitions are downwards, we might be able to relate *Downward Occupational Mobility* to childbearing. Obviously, transitions in occupation only enable us to pick up part of the job transitions (the one that implies changing from one occupation to another inferior, with 28 different ISCO choices). However, women may have experienced downward mobility within an occupation. Unfortunately, we are not able to distinguish in our data different positions within the same occupation, which may be the most important fraction of job transitions.

Table 4.11 should be interpreted as follows: the percentage of females who were in a particular job status before birth and are in any of the job status after the confinement. Note that this table follows individuals up to when they are censored.[35] That is, 'Not Working After' means that the individual did not have any job after motherhood up to

[32] Age of motherhood is classified into four groups: less than 20 years, between 20–24, 25–29 and 30 or more.

[33] Note that pre-birth status of working is shown to influence significantly the post-birth status in Table 4.11.

[34] At this point we do not specify if higher or lower on the occupational ladder.

[35] Both younger cohorts and later first child mothers are censored earlier because of the structure of our data.

the last month we observe her. Similarly, we compare pre and post-birth job position by looking at the first job after confinement.[36] For example, 52.5% employed women in the *Very Low* category are not currently working. 46.6% of women previously working in the *Very Low* level remained in the same category in their first job after birth. Finally, 0.9% of those *Very Low* women turned out to be working in a higher level after birth. The main information in this table is that the lower the job category before the confinement, the more likely you are to leave the labour market (note that women in *High* level have an abandonment rate of 8.8% compared to 52.5% for women in *Very Low* level). This table also provides evidence that the movement between categories among women who remain working is insignificant.[37] For instance, 0.7% women initially classified as *Low* moved down towards *Very Low*. 0.9% in the *Moderate* level also declined in position. Therefore, we find no evidence of *Downward Occupational Mobility* in our data. This differs from several studies for British samples (Newell and Joshi (1986), Dex (1987), McRae (1991) and Callender, Millward, Lissenburgh and Forth (1996)) that have related *Downward Occupational Mobility* to movements into part-time work after childbirth, despite the fact that many part-time job positions are offered at high levels in Britain.[38]

In our study, *Downward Occupational Mobility* is less of an issue and this may be due to the scarcity of part-time jobs in Spain (only 3% of women move from full-time pre-birth job to part-time post-birth job). Actually, we would probably face more downward occupational transitions if part-time jobs were more available. Under this scenario, we may observe fewer individuals with any type of *Career Break* and more with *Downward Occupational Mobility*. For example, Bernhardt (1988) found that Swedish mothers who before would have chosen to stay home are taking increasingly, over time, the combination family plus work option, which is part-time.

Following the same criterion as in the FFS, we rank occupations in the EPA to see if there are movements between categories after childbearing. The EPA data do not capture *Downward Occupational Mobility* either[39] and confirm the explanation that we

[36]This is different from Figure 4.1, where we follow up to 24 months. Despite the fact data show that late returners is not a typical pattern, we want to allow for the possibility to return after any number of months. This is why we take the occupation held at first job after birth as the level to compare with pre-birth job category.

[37]Although not reported, the same pattern is observed within the 28 ISCO levels.

[38]We have constructed employment tabulations by occupation level for childless and mothers aged 16–59. We have used the British GHS (General Household Survey) between 1974 and 1999. The proportion of employed childless women in part-time jobs are 18.7% for level 1, 25.1% for level 2, 49.8% for level 3 and 18.5% for level 4, level 1 being the highest category. The percentages for their mother counterparts are 52.0%, 62.4%, 77.1% and 49.3%. We observe that part-time jobs for mothers seem to be far greater than for childless at all levels, and not only for those in low positions.

[39]If we had had information about wages, we could have studied wage drop, which is a more accurate

Table 4.11: Change in Occupational Status Around First Birth (%), Cohort 1945–77, FFS — Spanish Females

1^{st} *Job After*[1]	*Occupational Status 12 months Before*				
	Not Working	*Working*			
		High	*Moderate*	*Low*	*Very Low*
Not Working	96.5	8.8	28.8	40.5	52.5
Good	0.3	91.2	0.0	0.0	0.0
Average	0.2	0.0	70.3	0.3	0.0
Low	1.8	0.0	0.5	58.5	0.9
Very Low	1.2	0.0	0.4	0.7	46.6
Total Number	999	57	229	304	236

[1]Not working at the interview. Note that these women might come back to work some time after the date of the interview, especially if they had recently entered into motherhood. This information is not known (censored) and we are only able to state that these individuals have not come back to the labour force yet. We observe some women longer than others with a maximum of 30 years after birth.

propose for the non-*Downward Occupational Mobility* in the FFS, which is based on the non-existence of transitions from full-time jobs to part-time jobs. At first quarter, the percentage of women at part-time jobs is 13% and six quarters afterwards this rate is 12%.

Table 4.11 shows that there is a mass movement among mothers who were previously working towards a non-working status. This phenomenon is decreasing in importance the higher the level of job category.[40] Women who work at the top of the occupational ladder are more likely to come back to the labour force compared to those in lower positions. This is due to the fact that these women are more attached to their job careers. It is important to be aware that some of recent mothers might have not come back to work yet. This would lead to an overestimation of the percentages of people who are moving towards a non-working status after birth. In order to check for the importance of this effect, we have constructed Table 4.26 in Appedix 4.9.1, where only individuals who had the first child potentially a long time ago (cohort 1945–60) are considered. The results in Table 4.26 are very similar to Table 4.11, which confirms the high proportion of drops in working status among mothers.[41]

measure of job downgrading after motherhood.

[40]This result is complemented by EPA where tabulations show that 80% of women employed at *HIGH* profile jobs at quarter 1 are at work at quarter 6, whereas 52% of those who were at *LOW* are employed afterwards.

[41]Note, however, that these women are the oldest of the whole sample 1945–77 and thus, the more 'traditional' oriented. We may have a smaller dropping out of the labour market among younger cohorts,

To summarise, there is a significant fall in the proportion of women with paid work after a first birth. Moreover, this drop appears to be persistent since the employment rates do not recover after birth. This result is at odds with the results in Dex et al. (1998) using British data. They find that transitions into paid work increase with time after birth. That is, they observe that post-birth, the employment of British women declines but then recovers as time goes on. In our Spanish sample, this recovery seems to be non-existent. Rather than a temporary exit from paid work, it looks closer to a permanent one. Data confirm the expected result that those women who were previously working in high positions have a greater chance of working after. We also find that movements across levels in the occupational ladder are insignificant. Finally, there is evidence that age of motherhood is an important factor determining the chances of returning to paid work. Age at first birth is strongly linked to the fact of having worked before the confinement, which may explain why teenage mothers are less likely to work after birth.

4.5.4 Econometric Results

In this section we explain the main findings from the estimation of the probability of staying-on at work in Spain, following the empirical specification described in Section 4.4. We first report the results from the FFS survey and then those from the EPA survey. Recall that the FFS covers an extended time horizon and allows us to analyse changes in market conditions and policies (Table 4.12 summarises some policies partly described in Section 4.3). By contrast, the EPA enables us to study the effect of pre-birth in-job characteristics on the likelihood of remaining employed.

Table 4.12: Labour Market[1] and Maternity Leave[2] Evolution in Spain: 1975–1997

	1975	*1980*	*1985*	*1990*	*1995*
Female Unemp. Rates	4.8	10.2	25.7	24.2	30.9
% Fixed-Term Contracts	0	0	7.1	34.2	38.2
Duration[3] Maternity Leave	12	14	16	16	16
Cash Benefit[4] Maternity Leave	75	75	75	100	100

[1]Source for Spain: INEBase.

[2]Source: Gauthier (2000) and Moss and Deven (1990).

[3]Duration of the leave in weeks.

[4]Cash benefits as a percentage of regular wages.

if we would be able to observe them further in their history.

Probit Estimation with FFS

In Table 4.13 we present the marginal effects for the probit estimation of employment after first child. Since we are also interested in analysing the evolution through time of the impact of skills on the staying-on rates after childbearing, we include into the model interactions between *OcHIGH*[42] and the post-birth monthly duration dummies. We also interact *E3GrPo*[43] with these duration dummies.[44] We focus on cohorts 1945–69.

Results show that uncertainty (i.e. temporary contracts) in the labour market decreases the likelihood that women will stay-on employed after motherhood. Table 4.13 indicates that previous job career experience matters for post-confinement employment status. Pre-birth occupation level positively affects the probability of staying-on at work at any time after birth, although it is not significant. Female education is a key factor since higher levels substantially increase the probability of remaining employed after motherhood.[45] Partner's education does not seem to play a major role. Although the coefficients of the partner's education dummies are not significant, signs reveal that those females whose partner has medium education have a smaller probability of being employed than those whose partner has a primary qualification. The reason could be that for low levels of partner's education (i.e. primary qualification), males are more likely to be unemployed or have lower earnings, which makes females employment more necessary. This is corroborated by Adam (1996b) who finds that those women whose partners are unemployed have a greater probability of re-entry after confinement.

Social characteristics also have an impact on women's withdrawal from the labour force. Religion affects negatively, although insignificantly, the probability of returning to work after confinement. This might be due to more traditional-oriented preferences amongst religious people. Estimations have also been undertaken with a dummy for marital status. We find that those who were married are slightly less likely to remain at work (on the border of the 10% significant level). The interpretation from the rest of the variables does not change under either sample (only married women or all women). Because we lose partner's education for the non-married mothers and because most women are married at the date of birth in our sample (97.2%), we choose a specification with only married women.

[42]Dummy variable that takes value 1 if level occupation is *HIGH* one year before birth.

[43]Dummy variable that takes value 1 if mother's highest education level is university degree or above.

[44]Note that monthly duration dummies after birth (D_3, D_6, D_{12}, D_{24}, D_{48}, and D_{96}) and their interactions with education and occupation level are not reported in the table.

[45]The omitted category is E1, which is the lowest level.

Table 4.13: Probability of Employment After First Birth: following 96 Months, FFS — Spanish Females

Model	*Probit After 1st Birth: Marginal Effects* [1,2]	
Coefficient	*dF/dx*	*Std.Error*
Temporary[3]	-0.0035**	0.0018
Experience[4]	0.0047**	0.0011
OcHIGH[5]	0.037	0.043
AgeAt1C	0.024	0.039
AgeAt1C2	-0.0013*	0.0007
AgeAt1Job	0.046**	0.012
Religious	-0.032	0.042
E2[6]	0.048	0.040
E3Voc	0.17**	0.056
E3GrPo	0.21**	0.062
E2P[7]	-0.087	0.073
E3VocP	-0.035	0.116
E3GrPoP	0.058	0.089
NW[8]	0.0079	0.060
NE	-0.030	0.061
CMadrid	-0.121**	0.059
C	0.021	0.059
E	-0.0035	0.048
Canaries	-0.030	0.083
Cohort 1950–54[9]	-0.011	0.059
Cohort 1955–59	0.092	0.057
Cohort 1960–64	0.129*	0.069
Cohort 1965–69	0.099	0.084
Log likelihood	-4515.4	
N subjects	1941	
N observations	4878	

*Significant at 10% level.

**Significant at 5% level.

[1]Duration dummies and interactions are not reported.

[2]Standard errors adjusted for individual clustering.

[3]Proportion of female fixed-term contracts at national level.

[4]Accumulated number of months worked up to the birth.

[5]Dummy (1 if high level of occupation one year before birth.)

[6]Female Education: Omitted category is the lowest level (*E1*).

[7]Partner Education: Omitted category is the lowest level (*E1P*).

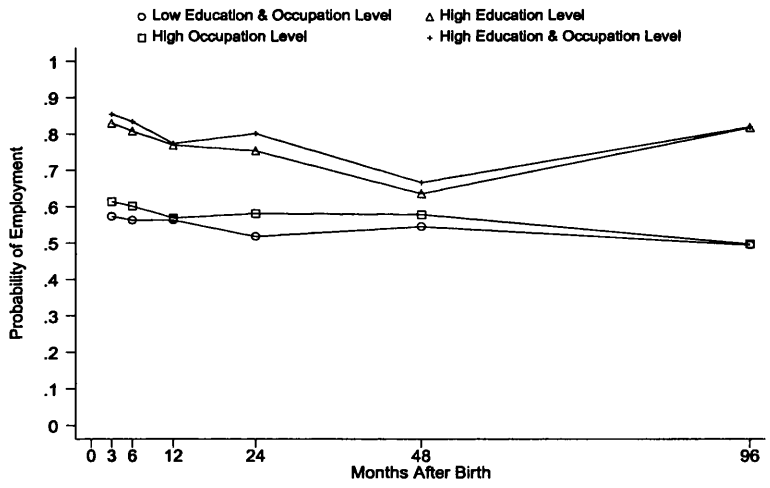
[8]Regions: Omitted category is South (*S*).

[9]Omitted Cohort is *1945–49*. Cohorts in sample from 1945 to 1969.

Our cohort dummies take the oldest cohort 1945–49 as reference category. Results indicate that younger generations are more likely to stay-on at work after confinement, although this is only significant for cohort 1960–64.[46]

It is useful for interpretation purposes to plot the predicted probability path of being at work (conditional on being employed before birth) for different representative individuals (called *RI*). The first sequence of figures take as benchmark a woman whose skills seem to direct her towards the lowest probability of staying-on employed at any month after birth. This implies a female who was employed in *LOW* occupation and with lower than a secondary qualification in education. Continuous variables are taken at the mean: experience at pre-birth job, age at first child and its square, age at first job and national temporary contracts (the latter is a time-varying variable). Other reference covariates are: born in the East, religious and from cohort 1950–54.[47] Departing from this benchmark, we represent the predicted probability of employment (conditional on being employed 12 months before birth) for the profile of different persons.

Figure 4.5: Probability of being Employed after First Birth Conditional on being Employed 12 Months Before, By Skill Profile — Spanish Females



For example, Figure 4.5 shows[48] that the occupation level held before birth affects the path of the probability of being employed (and hence, staying-on at work) after the con-

[46]We have re-estimated the model for two separate cohorts, those born between 1945–54 and those born between 1955–64. The aim is to investigate if there are significant differences in the way our variables impact on the likelihood of staying-on at work after childbearing in the two groups. We find that there are not and therefore, we only report the estimation for the pooled group 1945–69.

[47]The latter variables are not necessarily related to women more attached to the labour force as skills certainly are.

[48]*Low Education & Occupation Level* is the profile for the benchmark individual with characteristics as explained in the text and low pre-birth job skills.

finement. Those women who initially had a *HIGH* job position (*High Occupation Level* in the graph) have a greater probability of being employed, especially up to five years post-birth. Between around 12 and 48 post-birth months, the positive impact of *HIGH* on employment, ceteris paribus, is increasing. Thus, the *HIGH* group has a higher probability of being employed than the *LOW* one. However, its favorable effect, compared to their *LOW* counterparts, elapses almost completely after a longer period.

In Figure 4.5 we observe that many women with a graduate or post-graduate degree (*E3GrPo*, line *High Education Level* in the graph) stay-on at work after first birth. Up to four years, the advantage of being under category *E3GrPo* decreases slightly with time, maybe due to the fact that this group tend to compress first and second child[49] and some leave employment temporarily. However, after 48 months, the employment rates of these women increase and diverge again from their counterparts. We also plot the profile for someone who had both high education and pre-birth occupational level (*High Education & Occupation Level*). To have a graduate or post-graduate degree seems to be the main determinant on the likelihood of being employed after childbearing, although a pre-birth high occupation level plays a positive role too up to five years after birth, ceteris paribus. In Figure 4.12 in Appendix 4.10 we compare cohort 1960–64 with cohort 1945–49. We see that later cohorts have greater chances to stay-on at work after childbearing, keeping everything else constant.

Notice that if there are potential omitted covariates that vary across time and regions which are correlated with other explanatory variables, our estimation for these other variables could be biased. In order to check this effect, we undertake a new estimation where we control for the same explanatory variables as in Table 4.13 (except for *Temporary*), post-birth monthly duration dummies and include year-regional dummies. We create 120 year-regional dummies (30 years, from 1966 to 1995) and 4 regions[50] (*N*, *SCanaries*, *C* and *EMadrid*).

Once year-region dummies are incorporated the effect of cohorts is reversed. Later cohorts

High Education Level is the profile for an individual with all characteristics equal to the benchmark, except for the fact that she has graduate/post-graduate education instead of primary education.
High Occupation Level is the profile for an individual with the benchmark's characteristics, except that she was working at a high classified occupation before birth, instead of at a low level one.
High Education & Occupation Level is the profile for an individual with graduate/post-graduate education and high level of occupation in the employment before birth.

[49]There is some evidence that single-child-mothers with graduate or post-graduate degrees tend to have a second child relatively fast (see Section 3.4).

[50]These have been built by reclassifying our original 7 region dummies: *N* is *NE* and *NW*, *SCanaries* is *Canaries* and *S*, *C* is *C* and *EMadrid* is *E* and *CMadrid*.

become less likely to stat-on at work after confinement, although the coefficients are not significant. Thus, once we control for all those region characteristics that change across periods, cohort effects disappear. This suggests that the slightly positive effect of later cohorts on staying-on employed in Table 4.13 is picking up some changes across years that positively affect individuals and are captured by the cohorts dummies when they are not controlled for in the estimation.[51] The rest of explanatory variables remains unchanged.

Figures 4.13 and 4.14 in Appendix 4.10 show the predicted probability of employment after birth for the latter specification.[52] Figure 4.14 takes as a benchmark someone with low skills born between 1950 and 1954, and compares two different years: 1966 and 1995. We observe that if a mother in cohort 1950–54 had the child in 1995 instead of 1966, she would have had a greater probability of employment at all times after birth. This suggests that the later a woman gives birth, the more likely she is to stay at work. Interestingly, the positive impact of years on remaining employed is not a pure cohort effect but it is caused by other factors.[53] In fact, when we compare two individuals born in different cohorts in one particular year, younger cohorts appear to have, unexpectedly, a smaller probability of being employed. Figure 4.15 in Appendix 4.10 represents cohort 1945–49 versus cohort 1960–64 in 1966. In this graph we see that the younger cohort predicted probability of employment after confinement is smaller than the one for the older cohort.

Probit Estimation with EPA

The EPA survey helps us to study in more detail the impact of pre-birth job characteristics on post-birth labour force behaviour. For example, it allows us to analyse the effect of tenure, type of contract, sector, self-employment and full-time pre-birth job features on staying-on at work after childbearing. Furthermore, we are able to disentangle employment to unemployment from employment to inactivity transitions.

First, we focus on transitions employed *vs.* non-employed, without distinguishing between inactive and unemployed. We take a sample of women who were employed at quarter 1 (between six and nine months before they had a birth) and estimate the probability that they will be employed at quarter 6 (between six and nine months after confinement). We estimate staying-on rates in employment after first and second births. Since paid ma-

[51] We explore the reasons for variations across years in the staying-on rates in Section 4.6.

[52] Figure 4.13 shows practically the same profile as the one we obtained with the estimation without Year-Region Dummies in Figure 4.5.

[53] We think about changes in taxation and family policies that mean that recent mothers have more incentives to stay-on in employment in the last years. For example, going from a joint taxation to a separate one in 1989.

Table 4.14: Probability of Employment After First and Second Birth, EPA — Spanish Females

Model	*After 1st Birth*		*After 2nd Birth*	
Coefficient	*dF/dx*	*Std.Error*	*dF/dx*	*Std.Error*
Employer[1]	0.076	0.090	0.23**	0.040
Public[2]	0.14*	0.078	0.11	0.069
Permanent[3]	0.20**	0.075	0.34**	0.074
Fulltime[4]	0.17*	0.097	-0.075	0.066
Tenure[5]	0.0022**	0.005	0.0005	0.0005
OcHIGH[6]	0.080	0.075	0.0009	0.076
Age	-0.012	0.067	0.066	0.049
Age2	0.0004	0.001	-0.0009	0.0008
Nationality	-0.029	0.28	Dropped[7]	
Married	-0.21**	0.040	-0.15**	0.046
E2[8]	0.034	0.090	0.11	0.069
E3Voc	0.003	0.13	0.19*	0.041
E3GrPo	0.26**	0.092	0.19**	0.074
NW[9]	0.23**	0.037	0.21**	0.039
NE	-0.014	0.10	0.11*	0.054
CMadrid	0.16	0.076	0.17*	0.066
C	0.029	0.082	0.055	0.054
E	0.087	0.072	0.095*	0.049
Canaries	0.044	0.11	0.08	0.082
Year 1991-93[10]	-0.041	0.072	0.051	0.043
Year 1994-96	-0.038	0.075	0.057	0.044
Log likelihood	-149.4		-108.9	
N observations	304		275	

*Significant at 10% level.

**Significant at 5% level.

[1]Dummy (1 if employer at pre-birth job; 0 employee).

[2]Dummy (1 if public sector at pre-birth job).

[3]Dummy (1 if permanent contract at pre-birth job).

[4]Dummy (1 if worked more than 35 hours at pre-birth job).

[5]Months worked at specific pre-birth job.

[6]Dummy (1 if high level occupation at pre-birth job).

[7]Nationality=1 predicts success perfectly (dropped).

[8]Female Education: Omitted category is *E1*.

[9]Regions: Omitted category is *S*.

[10]Years: Omitted category is *Year 1988-90*.

ternity leave has expired at that time, we are sure that we do not classify as employed those women who will leave employment just after their rights finish. Second, we estimate transitions from employment to staying-on in the labour force, which implies that the dependent variable is one if the individual is either employed or unemployed and zero if inactive at quarter 6. Third, we select those individuals who were employed at quarter 1 and in the labour force at quarter 6 and we estimate the probability that they are either employed or unemployed.[54]

Our first aim is to show which job and educational characteristics contribute to the probability of staying-on employed at quarter 6. Some explanatory variables[55] refer to job features in the first quarter: *Employer*, *Public*, *Permanent*, *Fulltime*, *Tenure* and *OcHIGH*. Other variables correspond to values at quarter 6: *Age*, *Age2*, educational dummies (*E1*, *E2*, *E3Voc*, and *E3GrPo*), *Nationality*, *Married*, regional dummies (*NW*, *NE*, *C*, *E*, *Canaries* and *S*) and temporal dummies (*Year 1988–90*, *Year 1991–93* and *Year 1994–96*).

Table 4.14 summarises the marginal effects for the probit estimation of employment between six and nine months after first and second child. There is evidence that pre-birth job characteristics greatly influence the chances of returning to work after first birth. Any woman who was employed in the public sector before childbearing has a probability of returning to work after first birth 14 percentage points greater than her counterparts, ceteris paribus. Similar effect is related to the security of the contract since holding a pre-birth permanent position increases post-first-birth employment by 20 percentage points. Tenure is also positive and significant. The longer a mother had worked in that pre-birth job, the better the chances of being employed after. Previous full-time employment also has a positive impact on post-confinement employment. Those women who worked in high level jobs are more likely to stay-on employed. There is also evidence that pre-birth characteristics not only affect the chances of returning to work after the first child, but also after the second. In the latter case, being an employer and having a permanent contract plays a significant positive role.

Amongst the demographic characteristics, marital status appears to be the most relevant feature. Contrary to what we might expect, given the evidence for other countries,[56]

[54]We do not use a nested probit since we believe that the process is sequential. That is, first there is the choice of being or not in the labour market at quarter 6 and then, once you are in, there is the allocation into employment or unemployment.

[55]Description of the variables in Table 4.25 in Appendix 4.8.

[56]Self-constructed employment rates for single mothers and married mothers for the UK (using the GHS survey) show that employment rates for married mothers are significantly higher at all years from 1979 to 1999. For example, in 1990, 60% married mothers are employed whereas only 39% of their

being married reduces the chances of re-entering employment after first and second birth. Those women with a graduate or post-graduate degree are 26 percentage points more likely to re-enter employment after the first child compared to women with only a primary qualification. The rate is 19 percentage points for post-second-birth return.

We next analyse the factors that determine the probability of being in the labour force after motherhood, either employed or unemployed. In Table 4.15 we observe that the probability of being active after first birth depends positively and significantly on occupation level, tenure and on having a full-time contract. It depends negatively on marriage. When we look at second birth we find that those who were previously employers or who had permanent contracts were more likely to be in the labour force after birth, whereas marriage affects it negatively. Higher levels of education raises participation after both first and second birth.

Finally, we select post-birth active women and focus on the effect of pre-birth job characteristics on the probability of being employed rather than unemployed. As Table 4.16 shows, the main factors affecting employment are the pre-birth type of contract and tenure. Those women who had a permanent contract are more likely to be at work. Tenure also contributes positively. Looking at employment after second birth, those who were previously employers or had a permanent contract have greater chances of being employed after motherhood. Both marital status and occupational level are not significant for post-first-birth transitions. However, marriage contributes negatively to the likelihood of being employed after second birth.

These three analyses reveal that tenure and possession of a permanent contract influence post-first-birth employment mainly by increasing the chances of being employed among those women who are in the labour market after childbearing. This suggests that the increase of temporary contracts is likely to have caused a rise in transitions from employment to unemployment. On the other hand, marital status and occupational level affect the likelihood of choosing to be in the labour force, no matter if employed or unemployed. Being an employer plays a positive and significant role on staying-on employed after second child. Higher levels of education impact positively and significantly for both after first and second child employment, particularly by increasing the likelihood of participation.

single counterparts are. Also Ondrich et al. (1996) find that marriage does not affect return to work after childbirth in Germany. In the paper by Rönsen and Sunström (1996), marriage at first birth is insignificant for re-entry in Sweden but it reduces the hazard in Norway.

Table 4.15: Probability of Being at the Labour Force After First and Second Birth, EPA — Spanish Females

Model	*After 1st Birth*		*After 2nd Birth*	
Coefficient	*dF/dx*	*Std.Error*	*dF/dx*	*Std.Error*
Employer[1]	-0.007	0.083	0.13**	0.033
Public[2]	0.060	0.065	0.069	0.056
Permanent[3]	0.054	0.061	0.20*	0.065
Fulltime[4]	0.15**	0.087	-0.022	0.053
Tenure[5]	0.0012*	0.00061	0.0006	0.0004
OcHIGH[6]	0.098*	0.058	-0.0091	0.056
Age	-0.048	0.057	-0.013	0.036
Age2	0.0009	0.0009	0.0003	0.0006
Nationality	0.14	0.28	Dropped[7]	
Married	-0.16**	0.041	-0.12**	0.037
E2[8]	0.040	0.068	0.034	0.051
E3Voc	0.13*	0.057	0.11**	0.044
E3GrPo	0.19**	0.065	0.18**	0.045
NW[9]	0.17**	0.045	0.15**	0.031
NE	0.092	0.061	-0.024	0.083
CMadrid	0.099	0.083	0.093	0.062
C	0.040	0.069	0.047	0.056
E	0.060	0.064	0.047	0.055
Canaries	-0.0020	0.18	-0.0052	0.091
Year 1991-93[10]	0.038	0.055	0.0091	0.051
Year 1994-96	0.081	0.054	-0.0086	0.056
Log likelihood	-132.3		-101.9	
N observations	304		275	

*Significant at 10% level.

**Significant at 5% level.

[1]Dummy (1 if employer at pre-birth job; 0 employee).

[2]Dummy (1 if public sector at pre-birth job).

[3]Dummy (1 if permanent contract at pre-birth job).

[4]Dummy (1 if worked more than 35 hours at pre-birth job).

[5]Months worked at specific pre-birth job.

[6]Dummy (1 if high level occupation at pre-birth job).

[7]Nationality=1 predicts success perfectly (dropped).

[8]Female Education: Omitted category is *E1*.

[9]Regions: Omitted category is *S*.

[10]Years: Omitted category is *Year 1988-90*.

Table 4.16: Probability of Being Employed *vs.* Unemployed After First and Second Birth — Spanish Females

Model	*After 1st Birth*		*After 2nd Birth*	
Coefficient	*dF/dx*	*Std.Error*	*dF/dx*	*Std.Error*
Employer[1]	0.038	0.040	0.058**	0.025
Public[2]	0.065	0.038	0.028	0.031
Permanent[3]	0.12**	0.064	0.13**	0.060
Fulltime[4]	0.024	0.063	-0.032	0.021
Tenure[5]	0.0013**	0.00062	0.0006	0.00023
OcHIGH[6]	-0.00069	0.047	0.017	0.047
Age	0.0033	0.037	0.035	0.022
Age2	-0.00005	0.00061	-0.0005	.0003
Nationality[7]	Dropped		Dropped	
Married	-0.002	0.050	-0.051*	0.021
E2[8]	0.036	0.060	0.054	0.033
E3Voc	-0.014	0.0911	Dropped[9]	
E3GrPo	0.10	0.056	0.0084	0.055
NW[10]	0.040	0.042	0.045	0.022
NE	0.071	0.037	-0.016	0.059
CMadrid	0.035	0.067	Dropped[11]	
C	0.060	0.035	-0.015	0.045
E	0.042	0.044	0.008	0.036
Canaries	Dropped[12]		0.032	0.028
Year 1991-93[13]	0.063	0.037	-0.024	0.042
Year 1994-96	0.011	0.042	-0.042	0.046
Log likelihood	68.99		-43.1	
N observations	224		197	

*Significant at 10% level.

**Significant at 5% level.

[1]Dummy (1 if employer at pre-birth job; 0 employee).

[2]Dummy (1 if public sector at pre-birth job).

[3]Dummy (1 if permanent contract at pre-birth job).

[4]Dummy (1 if worked more than 35 hours at pre-birth job).

[5]Months worked at specific pre-birth job.

[6]Dummy (1 if high level occupation at pre-birth job).

[7]Nationality=1 predicts success perfectly (dropped).

[8]Female Education: Omitted category is *E1*.

[9]*E3Voc*=1 predicts success perfectly (dropped).

[10]Regions: Omitted category is *S*.

[11]*CMadrid*=0 predicts success perfectly (dropped).

[12]*Canaries*=0 predicts success perfectly (dropped).

[13]Years: Omitted category is *Year 1988-90*.

4.5.5 Summary and Conclusions

In Section 4.5 we focused on temporary or permanent *Career Break* and *Downward Occupational Mobility* after motherhood. We use two data sources (FFS and EPA) in order to develop a comprehensive analysis on the main factors that determine the staying-on rates in employment after motherhood.

We find no evidence for *Downward Occupational Mobility* since movements across levels in the occupational ladder are insignificant after a first birth. We suggest the lack of freely available part-time jobs, which have been linked to downward mobility for some countries (e.g. Newell and Joshi (1986), Dex (1987), McRae (1991) and Callender et al. (1996) for Britain), as an explanation.

Data show that there is a significant fall in the proportion of women with paid work after a first birth in Spain. Thus, permanent *Career Break* is found to be important for Spanish mothers. Employment rates drop from 47% one year before confinement to 32% when the baby is one year old. Moreover, there is hardly any recovery of employment for those women who leave work after motherhood since employment rates after 10 years are at about 35%. Therefore, Spanish drops are permanent rather than temporary. Around 60–63% of women who were employed one year before motherhood, were at work after one year. Among the exits, we learn that about one third became unemployed and two thirds became inactive. More transitions into non-employment are expected to be unemployment rather than inactivity for younger cohorts. Policies aimed at reducing youth unemployment in Spain would definitely help to increase staying-on rates in employment.

There is evidence of differences between cohorts. Whereas in young cohorts exit is exclusively linked to childbearing, in old cohorts the drop in employment is already initiated at marriage. This means that traditional society in Spain, together with its joint taxation system, discouraged married women from working, independently of motherhood.

From the estimation we learn that the rise of fixed-term contracts has had a significant negative impact on the likelihood of re-entry. This has policy implications since the government has the ability to modify the legislation and reduce this type of uncertainty. Results also suggest that labour market stability facilitates staying-on employed since both pre-birth permanent contracts and public sector raise the probability of returning to work.

Higher levels of education play a principal role in staying-on at work. These are the women with highest opportunity cost of leaving employment. They also earn more and

are able to pay for childcare. Since female investment in education has increased substantially, we expect that staying-on rates in employment will continue to rise.

Births in later years also raise post-first-birth employment, ceteris paribus. This could be caused by factors such as changes in taxation (from joint to separated in 1989) and social issues that make it more appealing for women who had births later in the period to remain employed.

Only 3% of recent mothers move from full-time to part-time jobs. We know that in other countries (e.g. Sweden and UK) these rates are much higher, which implies that the availability of part-time work in Spain is limited. If women are able to select the number of hours of employment, the choice becomes work full-time *vs.* part-time *vs.* non-employment, instead of full-time *vs.* non-employment. We claim that post-birth employment rates would be higher in Spain if mothers were offered broader flexibility to combine childcare and work through part-time. This has implications for welfare policy, both in terms of facilitating part-time jobs and increasing the supply of childcare, either publicly provided or through tax credits.

4.6 European Comparison

4.6.1 Introduction

In this section we investigate the transitions of women from employment to non-employment after first birth (temporary or permanent *Career Break*). We analyse the factors that increase or reduce employment after childbearing and, for fixed characteristics, how this depends on specific country elements. We also explore how and why the expected probability of employment after birth has evolved over time. We focus on Belgium, West-Germany, Italy, Spain and Sweden since they exhibit substantial differences in policies and social customs.

This issue has been addressed in these countries (especially in Germany and Sweden). Our contribution is to make a comprehensive comparison and harmonise research on the likelihood of employment after first birth. We use the same data (Family and Fertility Survey) for each country and select identical variables, cohorts and time horizon. We trace the post-birth employment probability for a representative recent mother. That is, we determine the chances of employment after childbearing for a woman with certain characteristics and in a given country. Differences in predictions for employment across

countries are caused by distinct policies and/or unobserved heterogeneity that we do not capture with our controls. Our aim is also to identify the effect of changes in policies on employment after birth.

The countries under examination differ in the rigidity of their labour markets (particularly the availability of part-time jobs), flexi-time, family taxation and subsidised childcare.[57] These factors have been shown to affect simultaneously fertility and female labour supply. For example, Del Boca (2002) uses panel data from the Bank of Italy to analyse how imperfections in the labour market and characteristics of the publicly-funded childcare system discourage both family formation and female labour participation in Italy. Apps and Rees (2001) find evidence that countries with individual rather than joint taxation are likely to have at once high fertility and female labour supply. They also show that family support through improved availability of alternatives for domestic childcare is more effective for female participation than direct child payments.

4.6.2 Data and Constructed Variables

In order to have a comparable sample across countries, we use those cohorts and observable years that are common among them. These are cohorts of people born between 1951 and 1970,[58] and observable calendar years up to 1993.[59] In Sweden, we have women for five specific cohorts: 1949, 1954, 1959, 1964 and 1969. This means that we have not been able to completely homogenise cohorts. Nevertheless, we believe that our results are fairly comparable. Country-specific data collection has been explained in Subsection 3.5.2 in Chapter 3.

We select those explanatory variables[60] that are comparable across our countries.[61] These are the following: size of the city of origin (*City*), being religious (*Religious*), education, cohort, married at first birth (*Married1C*), monthly working experience from 15 years old to the pre-birth job (*Experience*), age at first birth and its square (*AgeAt1C* and *AgeAt1C2*), age of first job (*AgeAt1Job*). All explanatory variables are measured one

[57] They have also differences in cultural-family rules. In Southern Europe, grandparents are more likely to live in the same household, providing indirect childcare. However, their effect on childcare could go either way if they require health assistance.

[58] 1949–69 for Sweden and 1952–70 for West-Germany.

[59] Notice that FFS's interviews are done between 1995–96 in Spain and Italy, which means that we observe individuals from equal cohort longer in these two countries. We artificially constrain their history up to 1993.

[60] Full description of the variables in Table 4.24 in Appendix 4.8.

[61] Further description of the variables also in Subsection 3.5.2 in Chapter 3.

year pre-birth, except for education.[62] Different levels of education are captured in four dummy variables: *E1*, *E2*, *E3Voc* and *E3GrPo*. Our reference category is the lowest level *E1*. Notice that category *E3Voc* does not exist neither in Italy nor in Sweden. We also control in every country regression for post-confinement duration dummies and calendar year dummies. Duration dummies capture the path of the staying-on rates in employment after a birth. The calendar year dummies explain the growth in a particular country of the forecasted probability, given the path described by the duration dummies. For example, if the year dummy for 1990 is positive in the regression for country x, this means that an individual in country x is predicted to have a higher probability of staying-on employed after birth in 1993 than an individual with equal characteristics in 1972 (the reference year) at any month after birth.

For the estimation, we select those women who gave birth at least once. We have 1969 observations in Belgium, 1350 in West-Germany, 2856 in Italy, 2470 in Spain and 2291 in Sweden.

4.6.3 Descriptive Statistics

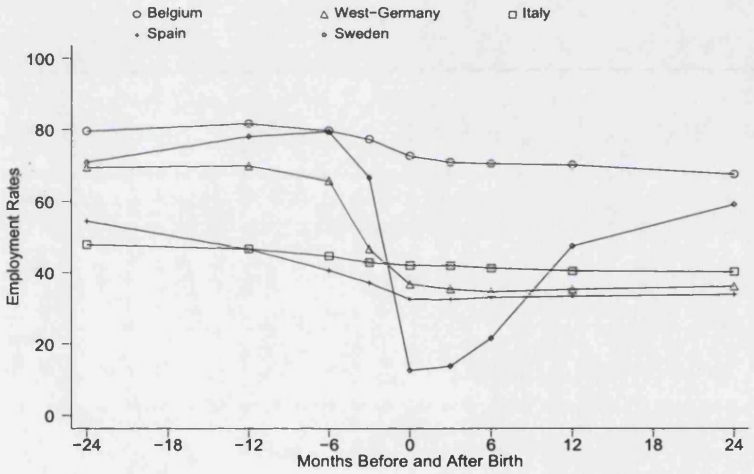
In the previous section, we found that Spanish women's employment rates diminish substantially around childbearing and that they do not recover. We now investigate transitions in countries with different policy regimes. In our basic analysis, we look at employment patterns after the first birth without controlling for subsequent fertility. In other words, the observed patterns may arise, at least in part, because of different future fertility patterns. Furthermore, the impact of exogenous variables on these employment patterns may operate either directly or via subsequent fertility.

[62] Education level is taken at the date an individual completes school, which could occur after birth. We were obliged to take this measure since schooling calendar is missing in Belgium, West-Germany and Italy. In the latter countries, only the highest level of education at completion date is reported. Despite this, we believe that this variable is adequate at capturing individual's human capital at birth. First, most women are likely to exit schooling before childbearing. Second, for those who finish later, the final level achieved is a measure of their expectations in the labour market.

The Withdrawal of Women from Work

In Figure 4.6[63] we present female employment rates[64] around motherhood from Belgium, West-Germany, Italy, Spain and Sweden. We can notice immediately how dissimilar they are, not only in their starting point (24 months before birth) but also in their evolution. Future employment rates in Belgium[65] for first-child mothers are about 80% two years before confinement and experience a slight decline around birth. Belgian employment rates stay at about 68% two years after motherhood. In ten years time, when the procreation process is likely to be over, they still have an employment rate of 65%. Thus, the exit rate from the labour market appears to be small.

Figure 4.6: Employment Rates Around First Birth — Country Comparison



Swedish women experience a huge drop in employment around birth. This is due to the fact that Swedish women are responding as non-employed when they are on maternity leave. The same may partly happen in West-Germany. This is not the case in the other countries, where women on leave are accounted as employed. The picture shows the impact of parental leave on labour force and how Swedish mothers recover their pre-birth

[63]We summarise labour market characteristics for women with and without children in 1998 in Table 4.28 in Appendix 4.9. We also tabulate activity rates by marital status in 1991 and 1995 (Table 4.29). The purpose is to see if our results are in line with national statistics. However, note that this data do not coincide with our time horizon (approximately 1965–95).

[64]As in Figure 4.1 in the previous section, employment rates are computed taking into account censoring. For example, there are some women not observed two years after birth. Thus, they have been subtracted from the total number of mothers in order to compute the rates.

[65]Belgian data was only collected in the Flemish and Brussels regions. Thus, it does not take into account the Walloon area. We would expect employment rates to be lower if this region was also included in the survey since unemployment rates are higher.

levels. Actually, data show that ten years after the first child is born, 74% women in Sweden are at work. Thus, once the procreation process is finished, most of them are back in the labour market. German employment rates around childbearing fall considerably from 70% to 36%. Spanish and German mothers are the groups who experience the greatest drop in post-birth employment rates. Ten years afterwards,[66] their rates are 34% and 40% respectively. We have to point out that German mothers are entitled to long and partly paid childcare leave, which is optional after full paid maternity leave. This could explain their low employment rates after motherhood.

We would like to know whether the Spanish pattern is typical of other South-European countries that have similar labour markets and social life. Figure 4.6 confirms that Spain is indeed closer to Italy than to Belgium or Sweden. Italian mothers' employment rates decrease from around 51% to 40% and they remain at 42% after ten years. However, the decline in Spain is more significant since it starts at higher employment rates and ends at lower levels.

Figure 4.16 in Appendix 4.10 represents employment rates around birth by country and cohort.[67] The largest cohort difference appears to be in Spain, whose rate of exit from employment around childbearing has significantly diminished. Curiously, in both West-Germany and Belgium, the profile of the two cohorts is very similar with actually slightly higher employment rates for older generations. This is probably due to the increase of unemployment in the 80s, when cohorts 1958–64[68] where at the age of motherhood. Note that this increase in unemployment happens in Italy and Spain as well. However, their young cohorts experience greater employment rates after childbearing compared to their older counterparts. This suggests that the change in social patterns or policies towards higher participation offsets the negative impact of unemployment both in Spain and in Italy.

We compare transitions in the labour market after motherhood by examining women's labour force status 12 months before birth and 24 months after.[69] Those individuals not observed in the two periods are censored. We define four types of people: *e-e* means employed at both times, *e-ne* defines those employed before but not after confinement, *ne-e* for movements from non-employment to employment and *ne-ne* for those non-employed

[66]Note that in this period of time, further births are possible.

[67]We do not plot Sweden since in this country the sample is constructed with cohorts 49, 54, 59, 64 and 69, and not with all cohorts from 1950 to 1970, as in the other countries.

[68]'Young Cohort' for the comparison in Belgium and West-Germany.

[69]We look at 24 months after birth since we want to ensure that we do not capture job protection policies in between.

either before nor after birth. Note that non-employment includes both house work and unemployment. This is important for interpreting the meaning of the transitions. That is, in countries and cohorts with high female unemployment rates, a significant proportion of the transitions to non-employment are related not only to home oriented women but also to unemployed mothers. For example, we would expect that shifts *e-ne* are due to higher unemployment for later cohorts in Spain.[70]

Table 4.17: Female Unemployment rates: 1975–95 — Country Comparison[1]

	Female Unemployment Rates				
Countries	1975	1980	1985	1990	1995
Belgium	7.5	13.8	18.9	12.5	14.0
Germany	5.4	5.2	10.4	8.4	9.2
Italy	6.3	10.8	17.7	15.0	15.2
Spain[2]	4.8[3]	10.2	25.7	24.2	30.9
Sweden[4]	2.0	2.3	2.9	1.6	6.9

[1]Source: Eurostat *Employment and Unemployment.*
[2]Source for Spain: INEBase.
[3]Data from 1976 in Spain.
[4]Source for Sweden: Statistiska Centralbyrån (Sweden).

Table 4.17 shows that Spanish women indeed have the greatest unemployment rates from the 80s and, therefore, they are a priori more likely to have transitions to non-employment linked to unemployment rather than home activities, compared to the other countries.

In Table 4.18 we observe transitions in and out the labour market around childbearing. In Belgium, 62.7% of first-birth mothers are employed pre and post-birth, which is the highest rate. As foreseen, Spain has the lowest rate, with only 27.6% women at work at both times. 51.1% of Swedish women do not leave employment, which is consistent with the result of 46.7% found by Wetzels (1999).[71] West-Germany and Italy have rates of being at work in the two periods of 31.5% and 35.6% respectively. Transitions from employment to non-employment are greater in Sweden, where 26.8% mothers moved in this way, and in West-Germany, with 37.2%. These results are similar to those found by Wetzels (1999). She estimates (using other data sources) transitions of 29.3% for Sweden

[70]The proportion of women employed, unemployed and inactive has changed substantially since 1970 in Spain. For example, 22% married women aged 20–30 were employed in 1977, 1% were unemployed and 77% were inactive. In 1987, the rates were 30%, 13% and 57%, respectively. In 1997, the proportions were 40%, 20% and 40%.

[71]She looks at shifts between 3 months pre-birth and 24 months after birth.

Table 4.18: Transitions Employment *vs.* Non-Employment around First Birth (from 1 year pre-birth to 2 years post-birth) — Country Comparison[1,2]

Country	*n*	*e-e*	*e-ne*	*ne-e*	*ne-ne*
Belgium	1756	62.7%	18.1%	4.8%	14.4%
West-Germany	1222	31.5%	37.2%	4.7%	26.6%
Italy	2658	35.5%	12.1%	5.5%	47.9%
Spain	2297	27.6%	19.3%	5.4%	47.8%
Sweden	2063	51.1%	26.8%	8.2%	13.9%

[1]Excluding censoring.
[2]*e* means Employment and *ne* means Non-Employment.

Table 4.19: Transitions Employment *vs.* Non-Employment around First Birth (from 1 year pre-birth to 5 years post-birth) — Country Comparison[1,2]

Country	*n*	*e-e*	*e-ne*	*ne-e*	*ne-ne*
Belgium	1411	58.2%	21.2%	7.4%	13.2%
West-Germany	957	31.6%	35.8%	7.2%	25.4%
Italy	2337	32.7%	14.2%	9.5%	43.6%
Spain	1987	25.4%	20.2%	7.4%	47.0%
Sweden	1710	53.3%	24.0%	10.1%	12.6%

[1]Excluding censoring.
[2]*e* means Employment and *ne* means Non-Employment.

and 41.9% for West-Germany (GSOEP 1983–92). Many of these women are on maternity leave and are accounted in Sweden as non-employed. The same might be partly the case for childcare leave in Germany. Regarding the other countries, Spain has 19.3% women experiencing transitions to non-employment, Belgium 18.1% and Italy 12.1%. Table 4.18 suggests that around half of mothers are out of work not only 12 months before birth but also 24 months after birth in Italy and Spain. In Belgium and Sweden, women reach the highest employment rates 12 months before maternity. Although there are significant shifts to non-employment from previous employed women in these two countries, the percentage of mothers out of work in both pre and post-birth is only about 13%. Germany is somewhere in between since 26.6% women do not work either before birth nor after it.

We calculate the proportion of women staying-on at work. We find that 78% of Belgian mothers who worked 12 months before confinement are also employed 24 months after. The percentages are 46% in West-Germany, 75% in Italy, 59% in Spain and 66%

in Sweden. The work by Saurel-Cubizolles et al. (1999), which focuses on data from the mid-nineties, finds that 78% of recent mothers have come back to work in Italy when the baby is one year old. For West-Germany and Sweden, Wetzels (1999) obtains a return rate of 44% and 61% respectively. Although she selects women who were employed three months before confinement (we take a criterion of one year), her results are in line with ours.

Since there is the possibility of childcare leave (especially in Sweden and West-Germany), we look also at transitions from one year pre-birth to five years post-birth in Table 4.19. However, this includes women with more children, which makes it more difficult to interpret. We calculate the staying-on at work rates over this period as 73% in Belgium, 47% in West-Germany, 70% in Italy, 56% in Spain and 69% in Sweden. Note that the returning rates to work after first birth have slightly risen in Sweden, compared to the transitions we had with our previous three years horizon. This confirms that Swedish women make use of their leave but come back to work afterwards. Furthermore, more children have little impact on subsequent employment in Sweden. The percentages for Belgium, Italy and Spain diminish around three percentage points. West-Germany staying-on rates remain fairly constant.

Table 4.20: Transitions Full-time Employment *vs.* Part-time Employment around First Birth (from 1 year pre-birth to 2 years post-birth) — Country Comparison[1,2,3]

Country	*n*	*ef-ef*	*ef-ep*	*ep-ef*	*ep-ep*
Belgium	992	78.9%	12.5%	1.8%	6.8%
West-Germany	211	73.5%	5.7%	20.8%	0.0%
Italy	752	83.0%	2.0%	0.3%	14.7%
Spain	564	83.0%	3.2%	1.4%	12.4%
Sweden	1032	38.5%	49.2%	1.9%	10.4%

[1]West-Germany has high rate of missing information.
[2]Part-time if work less than 35 hours per week.
[3]*ef* means Full-time Employment and *ep* means Part-time.

We would like to know whether recent mothers choose part-time work. Table 4.20 shows the movements between full and part-time work among those women who remained employed. Swedes' preference for part-time work after birth is evident since about half of Swedish mothers moved from full-time to part-time job status. These shifts hardly exist in Spain and Italy, where only about 2–3% move. 12.5% of Belgian mothers became new

part-time workers. Therefore, in Belgium and especially in Sweden, it is common to move to part-time positions after motherhood. This means two things: either the preferences of women are quite different across countries or flexibility and opportunity to transfer into part-time jobs is different. We think that the latter is more likely to be driving the result. Part-time work does not seem to be related to motherhood in Spain and in Italy, whereas it definitely is in Belgium and Sweden. We believe that some Spanish or Italian women might opt for participation around childbearing if part-time jobs were commonly available. Legislation in these two countries prevents employers from perceiving part-time work as advantageous, in terms of both costs and flexibility (see Ruivo, González and Varejão (1998) and Tindara (1997)).

Is the Withdrawal from Work Due to Marriage or to Motherhood?

We have seen that their employment rates indicate that Spanish mothers initiate their exit from employment far before birth. We find similar results for Italy. We would like to see if the fall in employment rates around childbearing is caused only by the birth itself or if, by contrast, marriage plays an important role. In order to do so, we take mothers without children as a control group and we analyse their employment rates around the marriage date.

In Figure 4.7, we compare Belgium, West-Germany, Italy and Spain. We observe that recently married women in Spain experience a decline in their employment rates. Italian employment rates also drop, although they recover to some extent. Therefore, part of the decline in employment around childbearing may be explained by marriage, which suggests that these countries are more traditional.[72] Belgian and German employment rates are not affected by marriage. Thus, their drop in employment rates around motherhood is due to the birth itself. In fact, employment rates in Belgium and West-Germany even rise before marriage, which means that women complete education, they find a job and then they marry.

The purpose of Table 4.21 is to display transitions between employment and non-employment around marriage for those women who do not have any child. Clearly, Spain (followed by Italy) is the country with the highest number of cases classified as employed 12 months before the marriage and non-employed 24 months after. Among those Spanish women who were employed before marriage, 71% are at work after. These rates are 94% in Belgium, 90% in West-Germany and 71% in Italy.

[72] Recall that we are pooling all cohorts. We would expect this effect to be lower in younger generations, for the same levels of unemployment (See Figure 4.17 in Appendix 4.10).

Figure 4.7: Employment Rates Around Marriage for Women Without Children — Country comparison

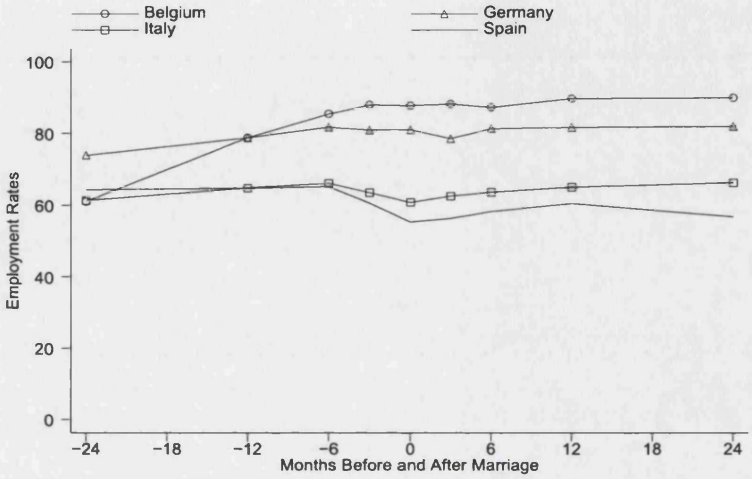


Table 4.21: Transitions Employment *vs.* Non-Employment around Marriage (from 1 year pre-marriage to 2 years post-marriage)[1,2] — Country Comparison

Country	*n*	*e-e*	*e-ne*	*ne-e*	*ne-ne*
Belgium	285	70.9%	4.2%	18.9%	6.0%
West-Germany	198	68.7%	7.6%	19.9%	10.1%
Italy	266	55.3%	12.4%	10.9%	21.4%
Spain	164	47.0%	18.9%	9.8%	24.3%

[1] Excluding censoring.
[2] *e* means Employment and *ne* means Non-Employment.

We test whether there have been cohort changes in employment rates around childbearing and marriage. Figure 4.17 in Appendix 4.10 represents employment rates around marriage by country and by cohort. We actually find that there are some cohort variations but these are only noteworthy in Spain. Despite the sample being rather small, there is evidence that the employment rates of Spanish married childless women from cohort 1945–54 experience a significant decline close to marriage. The proportion of employed women six months before marriage is 66.7%, whereas the percentage is 37% afterwards. The respective rates are 65.2% and 62.3% for cohort 1955–64. Thus, one would expect to have a smaller effect of marriage itself on the drop of employment around childbearing in younger generations. This generational evolution in employment rates around marriage is not so important in

the other countries.[73]

4.6.4 Econometric Results

Table 4.22 shows the marginal effects of the probability of employment after childbearing.[74] The model has been set out in Section 4.4 and it has been estimated separately for each country.

We observe that the higher the level of education[75] achieved pre-confinement, the more likely are mothers to remain employed after childbearing. Interestingly, the coefficient for education is significant in all countries except for Sweden, which means that Swedish mothers' employment after first birth is less affected by their differences in education. This result is in line with the work by Gustafsson et al. (1996). They show that human capital is not a main determinant for re-entry in Sweden, whereas it is in Germany and Great Britain. Sweden is characterised by its generous public childcare provision, which means that many women do not face the burden of childcare costs. By contrast, mothers in the other countries who decide to remain employed must pay for private nursery. Without free public childcare, only those women with high earnings (or education here) will be able to afford childcare in order to stay-on employed. Consequently, high education is a key determinant for post-birth employment in countries with poor governmental childcare provision. Accumulated experience (i.e. number of months worked up the birth) increases considerably the chances of returning to work. Simultaneously, those mothers who initiated their first job later have a greater probability of post-birth employment.

Our sociological factors report that religious women are less likely to stay-on at work,

[73]We are surprised about the rather small cohort variation in Italy. We would have expected a closer pattern with respect to Spain.

[74]The coefficients for the duration dummies and the year calendar dummies are reported in Table 4.31 in Appendix 4.9. Since the model is estimated independently for each country, the year calendar dummies describe in each country the trend of the staying-on rates after childbearing. This table shows small size coefficients for the year calendar dummies (the omitted year is 1972) in Belgium (negative) and in Italy (positive), rather large and negative coefficients in Sweden, and large coefficients in West-Germany (negative) and in Spain (positive). This suggests that, for example, a Spanish woman in 1993 is more likely to stay-on employed after birth than a Spanish woman in 1972, ceteris paribus. The opposite happens in West-Germany.

[75]It would be interesting to control for partner's education as a proxy for the effect of external income on female labour supply. However, partner's education is only available at the interview's date (not retrospectively). Although this could be a good proxy for Spain or Italy (where most women are married when childbearing and there are few divorces), it is not for Sweden or West-Germany. In Section 4.5, we control for partner's education and find that it is not significant. Signs of the coefficients show that Spanish women whose partner have medium education are less likely to work after childbearing, ceteris paribus, compared to those whose partners have no qualifications. However, mothers with graduate husband's are more likely to be employed.

Table 4.22: Probability of Employment After First Birth: following 96 Months — Country Comparison

Variables	*Probit After 1st Birth: Marginal Effects*[1,2]				
	Belgium	*W-Germany*	*Italy*	*Spain*	*Sweden*
City[3]	-0.082** (0.036)	-0.011 (0.021)	0.023 (0.024)	0.030 (0.043)	-0.009 (0.024)
Religious	-0.084** (0.030)	-0.023 (0.022)	-0.069* (0.039)	-0.044 (0.062)	0.004 (0.019)
Married1C	0.043 (0.058)	-0.082** (0.030)	-0.014 (0.042)	-0.047 (0.055)	-0.036* (0.020)
Experience[4]	0.007** (0.002)	0.012** (0.002)	0.003** (0.0005)	0.001* (0.0007)	0.002** (0.0006)
AgeAt1Job	0.069** (0.018)	0.129** (0.019)	0.031** (0.006)	0.004 (0.006)	0.027** (0.008)
AgeAt1C	-0.018 (0.049)	-0.045 (0.038)	-0.057 (0.027)	-0.003 (0.048)	0.064 (0.040)
AgeAt1C2	-0.0009 (0.0009)	-0.001** (0.006)	-0.001 (0.0005)	-0.0001 (0.0009)	-0.002** (0.0006)
Education[5]					
E2	0.036 (0.034)	0.117** (0.046)	0.079** (0.027)	0.108** (0.051)	0.009 (0.071)
E3Voc	0.131** (0.040)	0.207* (0.112)		0.248** (0.101)	
E3GrPo	0.193** (0.041)	0.225** (0.111)	0.074 (0.050)	0.256** (0.111)	0.028 (0.070)
Cohorts[6]					
1954[7]					-0.0003 (0.081)
1956–60[8]	0.008 (0.037)	0.015 (0.040)	-0.004 (0.030)	-0.014(0.057)	-0.004 (0.157)
1961–65[9]	0.023 (0.063)	0.072 (0.074)	-0.006 (0.046)	-0.053 (0.104)	-0.041 (0.229)
1966–70[10]	-0.021 (0.108)	-0.003 (0.104)	-0.076 (0.062)	-0.248* (0.159)	-0.103 (0.294)
Log likel.	-8191.7	-6977.5	-9257.2	-9357.5	-10976.0
N subjects	1969	1350	2856	2470	2291
N obs.	10153	6883	10643	9808	12063

*Significant at 10% level.

**Significant at 5% level.

[1]Standard errors in brackets. Standard errors adjusted for individual clustering.

[2]Duration dummies, year dummies and interactions not reported.

[3]Dummy (1 if individual's locality up to 15 had >=100.000 inhabitants).

[4]Accumulated number of months worked up to the birth.

[5]Omitted category is the lowest level (*E1*).

[6]Omitted category is *Cohort 1951–55* (*Cohort 1952–55* for West-Germany and *Cohort 1949* for Sweden).

[7]*Cohort 1954 for Sweden only.*

[8]*Cohort 1959 for Sweden.*

[9]*Cohort 1964 for Sweden.*

[10]*Cohort 1969 for Sweden.*

ceteris paribus, in all countries, particularly in Belgium and Italy. The size of the city where the individual grew up has hardly any effect, except for Belgium, where it reduces the probability of staying-on employed.

Until now we have made no attempt to separate out the effect of subsequent fertility patterns on post-birth employment from other more direct effects. Thus, variables influencing post-first birth employment can operate either directly or via their impact on subsequent fertility. To give some idea of the implications, we estimate the probability of employment after first birth only for those women who remain with one child. Of course, this means we are selecting a sub-sample based on a variable which may be endogenous to employment. Nevertheless, the subsequent results will still be informative. Table 4.32 in Appendix 4.9 shows the results for this sub-sample. With this new estimation, we observe that religion loses generally the negative impact that it had in the estimation with the whole sample. This suggests that the religion effect is operating via its impact on subsequent fertility. The coefficients on the remaining characteristics change little but both estimations differ substantially in the duration and calendar year dummies. We examine these differences in the next subsection.

4.6.5 Simulation

In this section we focus on two issues. First, we are interested in whether the probability of post-birth employment has experienced variations over time within each country. For instance, do mothers in 1990 have a greater probability of post-birth employment than their counterparts in 1973? Second, we would like to take a representative individual and observe her probability of post-birth employment, given that she is mother in either of these countries.[76]

For the first exercise, we take an average individual and we compare the predicted prob-

[76]We are aware that the coefficients of each variable for a specific country might reflect not only the country-specific impact of that variable on the staying-on rates but also other country-specific effects not controlled for in the model. Then, we could interpret that a particular variable affects differently post-birth employment in two countries but this is partly due to the coefficients being misleading. That is, if there are characteristics not included in the model that are correlated to an included variable, the coefficients of the included one will be bias. This will be captured in the error term and will produce endogeneity. To decrease the magnitude of this potential problem, we control for year calendar dummies. They account for all the common effects to all individuals in the country and hopefully eliminate the size of error and its link to other included variables. Then, the bias is eliminated and country comparison is more reliable. Notice, however, that this still does not control for certain specific effects that are related to some particular individuals. Ideally, we should incorporate interactions between the year calendar dummies and the other characteristics. We decide not to do this because it would require many variables for the number of observations we have.

abilities of employment in three years: 1973, 1983 and 1993. In Figure 4.8, mothers have a secondary qualification, whereas in Figure 4.9 they have a graduate or post-graduate degree. The rest of the women's characteristics are the same. Figure 4.8 reveals that the likelihood of being employed has changed differently across time in these countries. Belgian mothers whose attainment level was a secondary qualification experience a rise between 1983 and 1993. Interestingly, Spanish women's predicted employment increased significantly between 1973 and 1983. By contrast, the probability of post-birth employment has declined over time in West-Germany and has remained fairly constant in Italy and Sweden.

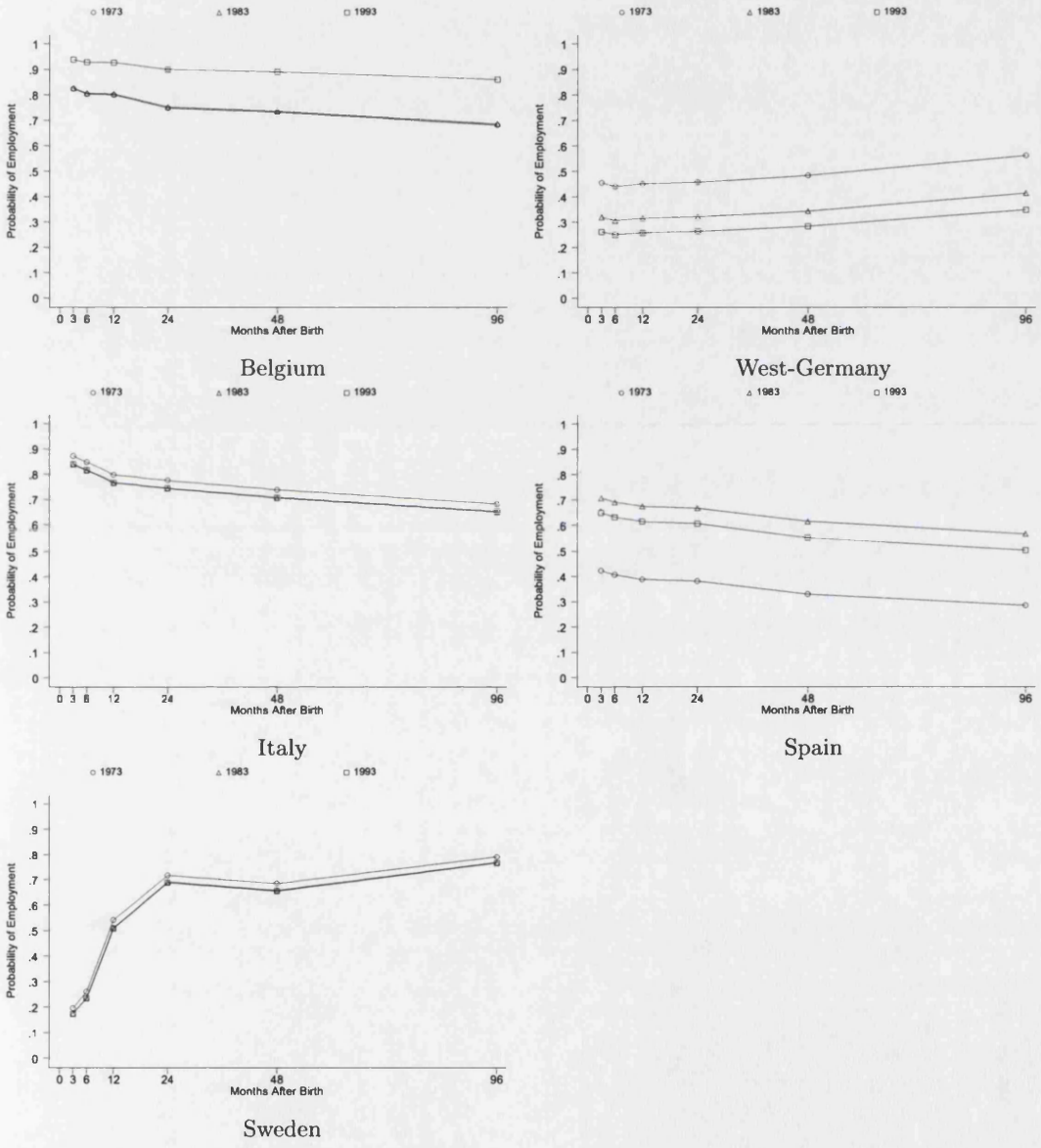
We observe in Figure 4.9 that the chances of being employed after childbearing among Belgian, Italian and Swedish graduates and post-graduates women hardly increased over time. These graphs show that the shift in predicted individual employment after childbearing in Belgium has been greater for the group of women with a secondary qualification. Although mothers with a complete university degree are still much more likely to stay-on at work, mothers with a lower education qualification increased their probabilities with higher speed. In Spain, mothers with a university degree augmented their chances of coming back in a similar proportion to those with a secondary qualification. The pattern is different in West-Germany, where the shifts over time in post-birth predicted employment are similar between graduate and secondary school levels and occurred in the opposite direction (downwards). In West-Germany, graduate women are more likely to be at work after childbearing but the variation over time has been equal for these two educational groups, which experienced a decline in post-birth employment.

As shown in Table 4.22, graphs reveal that graduate Swedes have greater probability of post-birth employment but this is not significantly different from mothers with secondary qualification. Italian mothers who were at work before birth with at least a graduate degree have a predicted post-birth employment rate of 90–100%.[77] We observe that there has been important changes in the estimated probability of employment after childbearing across years and countries. We will further explore this variation in Subsection 4.6.6.

For our second exercise, Figure 4.10 compares the predicted post-birth employment rates across countries for women with a secondary qualification in 1973 and 1993. Notice that

[77]We have also calculated the probability of being employed after childbearing without conditioning the sample to those mothers who were at work before birth in the selection equation. This predicted post-birth employment rate for Italy is much lower. This implies that in Italy is crucial to be employed before birth in order to be employed after. It is the country where we observe that this effect is the largest.

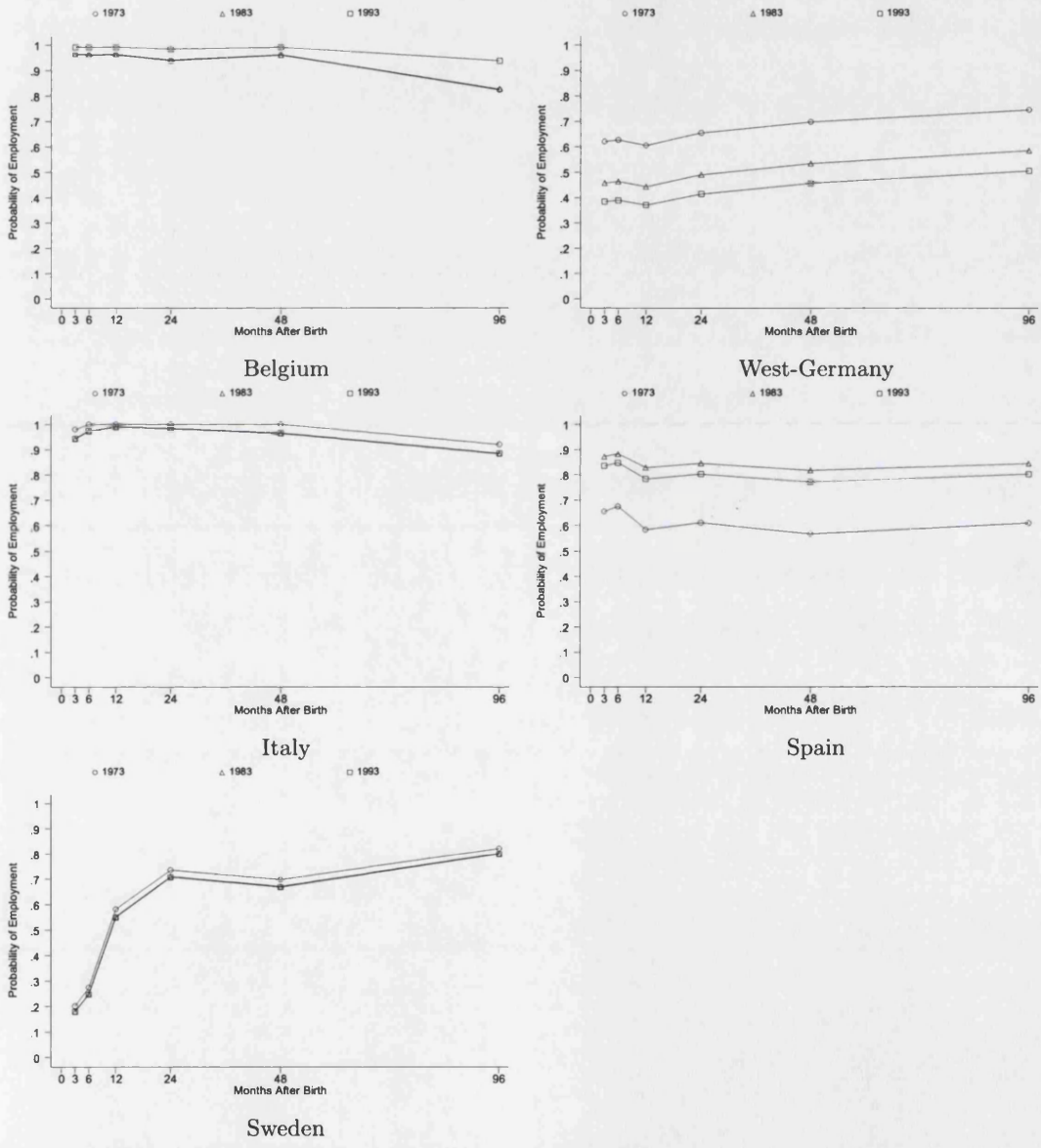
Figure 4.8: Monthly Probability of being Employed after First Birth Conditional on Being Employed 12 Months Before, Mothers with Secondary Qualifications — Years and Country Comparison[1]



[1] Swedish mothers are reporting to be non-employed when they are on maternity leave. This explains the huge drop of employment after childbearing.

Spain is the only country to experience a large shift upwards. Thus, Spain has had a clear change in behaviour within 1973–93. It is surprising the low predicted levels of employment after childbearing in West-Germany and their decline in latter periods. However, as

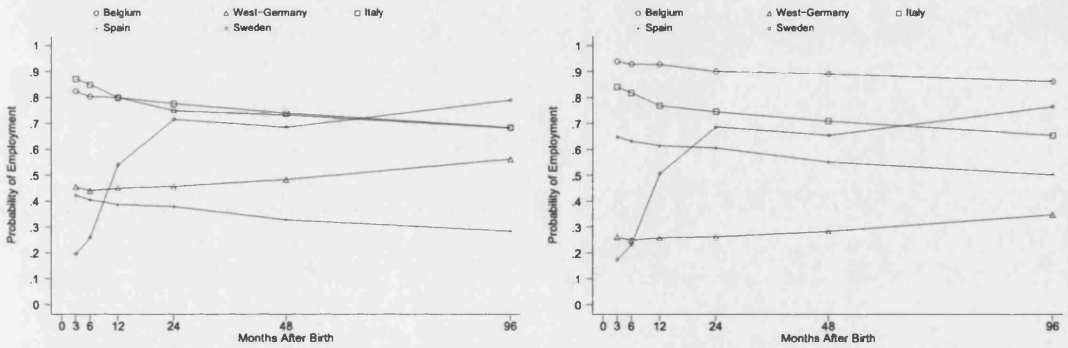
Figure 4.9: Monthly Probability of being Employed after First Birth Conditional on Being Employed 12 Months Before, Mothers with Graduate or Post-graduate Degree — Years and Country Comparison[1]



[1] Swedish mothers are reporting to be non-employed when they are on maternity leave. This explains the huge drop of employment after childbearing.

reported by Ondrich et al. (1996), "since 1979 German federal maternity leave and benefit policy has given women incentives to stay at home and take care of their newborn and youngest children. In 1986 this leave and benefit policy was changed in several ways, turn-

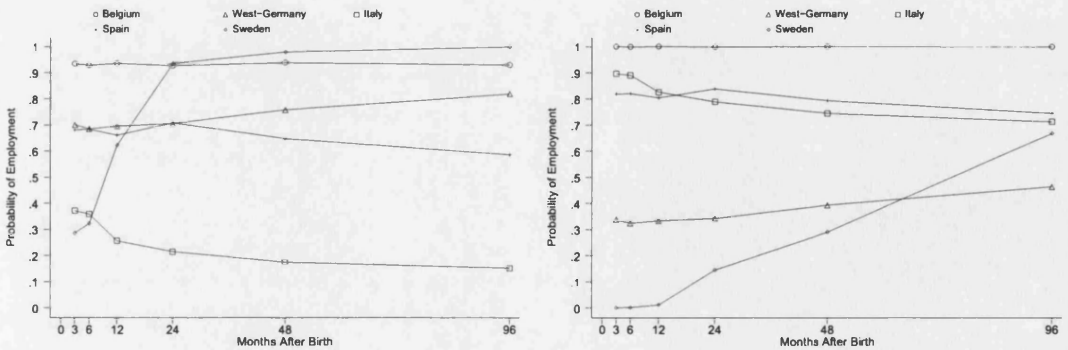
Figure 4.10: Monthly Probability of being Employed after First Birth Conditional on Being Employed 12 Months Before, Mothers with Secondary Qualifications — Country Comparison[1]



1973 1993

[1] Swedish mothers are reporting to be non-employed when they are on maternity leave. This explains the huge drop of employment after childbearing.

Figure 4.11: Monthly Probability of being Employed after First Birth Conditional on Being Employed 12 Months Before, Mothers with Secondary Qualifications who Only Had One Child Ever — Country Comparison[1]



1973 1993

[1] Swedish mothers are reporting to be non-employed when they are on maternity leave. This explains the huge drop of employment after childbearing. Year 1988 for Sweden.

ing it into a powerful instrument for delaying mother's return to work after childbirth". In their paper, they show that the rise in the generosity of maternity leave has had the effect that mothers interrupt their careers for longer periods. This could also explain our results.

Another point is how the predicted probability of being employed after childbearing evolves in the subsequent months. We observe a decrease with post-birth time in Belgium, Italy and Spain. This may be due to the enlargement of families, which impacts negatively on female participation. By contrast, both German and Swedish women's employment is predicted to raise with post-birth time.

Figure 4.11 replicates Figure 4.10 for those women who had only one child.[78] We observe that, in Belgium, the declining trend in the predicted probability of employment after first birth partly disappears when we base our analysis on single child women. This makes sense since drops in employment after first birth are likely to be caused by more births. In Belgium, however, there seems not to be much difference between those mothers who only had ever one child and the whole sample of mothers, especially in 1993. In West-Germany, the post-birth time profile does not vary but, both in 1973 and in 1993, the probabilities increase by about 20% and 10% respectively for all post-birth periods in the sample of single child mothers. Italian mothers with only one child ever have a slight increase on post-birth employment in 1993,[79] compared to the whole group. This suggests that extra children in 1993 do not have a big negative impact on post-birth employment in Italy. Sweden experiences a parallel upwards shift in 1973 for the restricted sample of mothers with only one child, although this disappears in 1993. Spanish single child mothers have a post-birth employment rate around 30% greater than the whole group of mothers in 1973. The gap is 15% in 1993. This suggests that in Spain in 1973 there are two groups: one, who have only one child and are more committed to the job market. The other group have more than one child and are substantially less committed. This effect is reduced in 1993. Note that the distinction between single child mothers and all mothers is more muted in the other countries.

4.6.6 Policy Evaluation

We would like to explain the impact of family-friendly policies and female unemployment rates on the observed changes in post-birth employment across countries and years. We take the year calendar dummy coefficients obtained in the probit estimation of employ-

[78]Notice that the sample restricted to single-child-ever mothers is likely to have a higher proportion of young cohorts compared to the whole sample since they are more likely to have only one child so far.

[79]We are not able to interpret the result for Italy in 1973.

ment after childbearing for each country[80] and regress them on some potential explanatory variables. These are: the proportion of women who completed tertiary education (*FHE*),[81] a constructed maternity leave indicator (*Leave*),[82] a dummy accounting for the taxation system (*Tax*),[83] female unemployment rates (*Unemrf*), the proportion of female part-time work over all employed women (*FvsP*), country dummies and a linear trend.[84] We focus on the period 1982–93.

The proportion of women with completed tertiary education (*FHE*) is aimed to capture the evolution in the society. Those countries with larger numbers of women with a university degree are more likely to have more females in paid work since this is well-established in their culture. That is, with this variable we want to make possible that not only changes in policies have a role in the rise in post-birth employment but also changes in the way of living.

One particular problem arises with this investigation. Swedish women are reporting to be non-working when they are on leave. This is not a problem as long as the pattern of leave remains unchanged, for then this distortion would be picked up by the duration dummies, leaving the year time dummies unaffected. Hence, if maternity leave laws (these are shown straightaway by the employment rates around birth in the Swedish case) did not change much during this period, then the duration dummies would capture the maternity leave factor and the year dummies would capture other economic aspects that matter. However, if maternity leave rights changed dramatically over this period, then the year time dummies might be distorted by this and, consequently, the analysis of this section would be corrupted when we investigate the main factors that had an impact on the year time dummies. In order to confirm that the Swedish year time dummies are appropriate, we calculate the employment rates around birth for Swedish women who had a birth in 1980, 1985 and 1990 (see Figure 4.18 in Appendix 4.10). Since they are very close, maternity leave appears to have similar effects over the period. Thus, we are confident that the Swedish time year dummies account for the relevant economic factors and the duration dummies capture the maternity leave pattern.

[80]The year calendar dummies are reported in Table 4.31 in Appendix 4.9. They show the within country growth in the prediction of staying-on rates for two individuals with equal characteristics but different years.

[81]We use the Barro-Lee data set.

[82]This variable is calculated as follows: (number of weeks in maternity leave*replacement rates) + (number of weeks in childcare leave*replacement rates).

[83]The dichotomous is one if the country has a separate taxation system in a particular year and zero if it has a joint one.

[84]Year dummies have been used instead of a linear trend and the main results were not significantly affected.

Table 4.23: OLS Regression of Probit's Year-Country Dummies Estimates on Policies, Labour Market, Country dummies and Linear Trend — Country Comparison

Model	*OLS*			
	All Sample			
	Country Dummies		*Country Dummies & Policies*	
	Coefficient	*Std.Error*	*Coefficient*	*Std.Error*
FHE[1]			23.838**	6.086
Leave[2]			-0.042	0.027
Tax[3]			0.108**	0.050
Unemrf[4]			0.889	0.709
FvsP[5]			1.878**	0.674
West-Germany[6]	-0.670**	0.045	0.931**	0.372
Italy	0.116**	0.045	1.258**	0.299
Spain	0.971**	0.045	2.030**	0.251
Sweden	-0.239**	0.045	0.899	0.972
Linear Trend			-0.041**	0.010
Cte	-0.020	0.032	1.795**	0.510
R-squared	0.9662		0.9800	
N observations	55			

*Significant at 10% level.

**Significant at 5% level.

[1]Proportion of female with completed tertiary education.

[2]Constructed maternity leave indicator.

[3]Dummy: 1 if separate taxation system; 0 if joint.

[4]Proportion of female unemployment.

[5]Proportion of female in part-time positions.

[6]Country omitted category is *Belgium*.

Table 4.23 (model with policies) shows that the education levels, the proportion of female part-time and the taxation system are the main factors that explain the variation in time of post-birth employment.[85] A positive coefficient in country x means that, after controlling for other relevant factors (policies), country x would have experienced an increase in the predicted probability of staying-on employed, compared to the comparison country (*Belgium*).

[85]We estimated the same equation with a broader interval of time 1973–93. The proportion of female with tertiary education and separate taxation had also a positive impact on the increase in re-entry in employment after childbearing. Unemployment rates were negative and significant, which we believe that it is due to its flatness pre-1982. Since education and taxation have a strong effect no matter how broad the period is considered, we are confident that these are the main explanatory factors to the variability of post-birth employment across time.

We observed in Section 4.6.5 that Spanish women experienced a rise in post-birth predicted employment. Table 4.23 suggests that this could be due to the increase in the proportion of women with tertiary education. This country has also moved into a separate taxation system in 1989. By contrast, West-Germany remains under a joint taxation system, which reduces the incentive for married mothers to work. There is evidence that separate taxation has a positive impact on post-birth employment. Finally, there is also some evidence that the proportion of part-time work has had a positive impact.

In Table 4.23 we observe that the inclusion of education, labour market factors and policies contributes substantially (by 41%) in improving the unexplained part of the regression. Notice also that in the regression with only country dummies, the calendar year dummies are just explained by country variation. Thus, in the regression without policies, a positive coefficient in country x means that country x experienced larger growth over time in the forecasted probabilities, compared to the benchmark (*Belgium*). This does not mean that country x has greater staying-on rates after birth compared to *Belgium* but that country x has had a greater increase.

It is interesting to observe that West-Germany has a negative and significant coefficient in this regression, whereas it becomes positive and equally significant in the model with policies. This suggests that over this period of time, our variables explain the negative trends in post-birth employment in West-Germany compared to the trends of the omitted category (Belgium). Furthermore, these country dummies show that Italy and especially Spain had larger gains in post-birth employment compared to the benchmark.

We also observe that the inclusion of the whole set of policy variables remove the significant difference between Belgium and Sweden and made these two countries converge. If we add sequentially to the regression each policy to disentangle what contributes to the convergence of Sweden and Belgium, we observe that the constructed maternity leave indicator (*Leave* is the responsible for the switch of the sign from negative and significant to positive. This means that the increase in the generosity in the Swedish maternity leave may have had a negative impact on the Swedish year calendar dummies.

Finally, we examine an alternative approach for assessing the impact of the Swedish data on the final policy results. This consists of re-estimating the probability of staying-on employed in Sweden with interactions between the calendar year dummies and the duration dummies. We then use these new calendar year estimates for Sweden in the regression on policies. First, note that we find that the added interactions are not significant, which

is in line with the previously discussed view that the year calendar dummies are actually picking up the right effect for Sweden. Second, the new regression on policies (see Table 4.33 in Appendix 4.9) arises similar conclusions as Table 4.23, except that the variable for *Separate* taxation has a smaller coefficient.[86]

4.6.7 Summary and Concluding Remarks

In this section we focused on the transitions from employment to non-employment after motherhood in five countries: Belgium, West-Germany, Italy, Spain and Sweden. Our main purpose was to understand the factors that determine the differences in their probabilities of staying-on in employment and how these probabilities have evolved over time. We observe cohorts born between 1951 and 1970 and use the same data source for each country in order to develop a comprehensive analysis.

From our comparison, we find that Spain and West-Germany are the countries with by far the highest long-term decline in employment rates after first child. We find that of those German mothers who were employed one year before first birth, only 46% are at work two years afterwards. The proportions are 78% in Belgium, 75% in Italy, 66% in Sweden and 59% in Spain. Although the staying-on rates on a two-year horizon are not much apart in Spain and Sweden, they differ in two main aspects. First, Swedish mothers have higher pre-birth employment rates. Second, Spanish drops are permanent rather than temporary. This means that once the procreation process is finished, more Swedish mothers are at work.

From those women who are employed both before and after confinement, we observe that there are noticeable differences across countries in transitions full-time *vs.* part-time. In Belgium, 13% women move from full-time to part-time after birth of a first child. The rate is 49% in Sweden. Only about 3% do so in Italy and Spain, and 5% in West-Germany. We believe that this reflects disparity in the free choice of the number of working hours, rather than these countries being apart in female preferences. The lesson is that post-birth employment rates would be higher in West-Germany, Italy and Spain if mothers were offered broader flexibility to combine childcare and work part-time. In that case, we might have more mothers moving into part-time employment instead of into inactivity.

In our probit estimation, we observe that women with graduate degrees are more likely to

[86]Year calendar dummy coefficients for the new Swedish estimation are on average more negative. Since Sweden has a *Separate* taxation throughout this period, we expect that the positive effect of this variable on the regression will be smaller in this new estimation.

be at work after childbearing in all countries, except for Sweden. In the latter, education does not significantly raise the chances of post-birth employment. This is due to the fact that Swedish women are eligible for public childcare. This means that mothers with low education find it worthwhile being at work since they do not need to pay childcare by themselves. We also find that the number of months worked up to motherhood increase the probability of being employed after first birth. Thus, longer accumulation of human capital increases the probability of post-birth employment.

A representative mother who was at work before birth has a different predicted post-birth probability of employment depending upon the country where she lives. There are also relevant changes over time. Belgian and especially Spanish mothers increased their probability of post-birth employment, ceteris paribus. The opposite movement occurred in West-Germany. Italy and Sweden remained fairly invariable over time.

This section attempts to separate out the effect of subsequent fertility patterns on post-birth employment from other more direct effects. We do this by estimating the probability of employment after first birth for those women who remain with one child. This reveals that in Spain (especially for earlier cohorts) there are two different groups of mothers. One that have only one child and are committed to the job market. The other have more than one child and are less attached to it. This distinction is more muted in the other countries.

We observe that the predicted probability of being at work varies substantially across countries and years. We then explore the factors that could explain this. We find that the increase in completed female tertiary education, the separate taxation system and the proportion of part-time contracts consistently explain the observed changes. This has important policy implications. For instance, West-Germany might experience an increase in post-birth employment if it moved into a separate taxation regime. Results also show that maternity leave does not significantly impact on post-birth employment. Note that all these countries have the right of reinstatement in the period 1973–93 but they differ in its generosity and length. We believe that a too long period of leave is counterproductive since it postpones return, which reduces female skills and might be a further disincentive to re-entry. The availability of long maternity leave should be accompanied by public offered childcare (as in Sweden) or childcare tax relief (as in Belgium) so that women have the simultaneous choice of being at work and/or on leave. Besides, childcare should be flexible and accommodate mothers' needs in their working time.

4.7 Summary of Main Findings

This chapter analysed the employment transitions after childbearing. We investigated empirically the factors that affect the likelihood of staying in employment. We have also investigated differences across countries and periods. In particular, we have discussed the policies that cause the dissimilarities in the evolution of post-birth employment patterns.

We next summarise the main results for the Spanish analysis:

- There is no evidence that women move towards a less rewarding job after childbearing (*Downward Occupational Mobility*) because of the lack of voluntary part-time jobs.
- Instead, 40% of mothers experience transitions to non-employment (mostly permanent *Career Break*) and one third of those movements go to unemployment.
- Labour market stability (i.e. permanent or public sector contracts) raises the staying-on rates. Policies that reduce the number of fixed-term contracts are likely to increase female post-birth employment.

The country comparison reveals the following:

- Post-birth employment rates would be expected to be higher in West-Germany, Italy and Spain if mothers were offered the free choice of part-time work.
- In countries with limited public childcare, staying-on employed is far more likely for high educated women since they can afford to pay private childcare. It is interesting to find that Sweden is the only country where post-birth employment is not related to the level of education. Recall that Sweden is also the most generous country in terms of its availability of public childcare.
- Belgian and especially Spanish women have increased their probability of staying-on employed after a birth over time. The opposite has occurred in West-Germany, whereas Sweden and Italy have stayed fairly constant.
- The increase in female education levels, the change from a *joint* to an *individual* taxation system and the rise in part-time jobs have had a positive impact on the staying-on rates. By contrast, extending the period of childcare leave (as in West-Germany) has had a rather negative effect on the probability of remaining at work after motherhood.

4.8 Appendix A: Labels for the Variables

Table 4.24: Variable Labels, FFS

*Temporary**	Proportion of female fixed-term contracts at national level
Experience	Accumulated number of months worked up to the birth
Unemrf	Female regional unemployment rates
*OcHIGH**	Dummy (1 if high level occupation 1 year before birth)
AgeAt1C	Age at first child in years
AgeAt1C2	Square of age at first child
AgeAt1Job	Age at first job
Married1C	Dummy (1 if married at first birth)
E1	Dummy (1 if highest education is primary degree; omitted category)
E2	Dummy (1 if highest education is secondary degree)
E3Voc	Dummy (1 if highest education is vocational tertiary degree)
E3GrPo	Dummy (1 if highest education is university degree)
*E1P**	Dummy (1 if husband's highest education is primary degree; omitted)
*E2P**	Dummy (1 if husband's highest education is secondary degree)
*E3VocP**	Dummy variable (1 if husband's highest education is vocational degree)
*E3GrPoP**	Dummy (1 if husband's highest education is university degree)
Religious	Dummy (1 if individual's is religious)
*NW**	North-West region
*NE**	North-East region
*CMadrid**	Madrid region
*C**	Centre region
*E**	East region
*Canaries**	Canaries Islands region
*S**	South region (Omitted category)
*City***	Dummy (1 if individual's locality up to 15 had >=100.000 inhabitants)
*FHE***	Proportion of female with completed tertiary education at country level
*Leave***	Weeks maternity*replacement rates + weeks childcare*replacement rates
*Tax***	Dummy (1 if separate taxation system)
*FvsP***	Proportion of female part-time labour
Cohort X–Y	Individual is born between year X and Y

*Variable only for the Spanish analysis.

**Variable only for the European comparison analysis.

Table 4.25: Variable Labels, EPA[1]

Employer	Dummy (1 if employer; 0 employee)
Public	Dummy (1 if she works at the public sector)
Permanent	Dummy (1 if permanent contract)
Fulltime	Dummy (1 if she worked more than 35 hours per week)
Tenure	Months worked in particular pre-birth job
OcHIGH	Dummy (1 if high level occupation 1 year before birth)
Age	Age in years
Age2	Square of age
E1	Dummy (1 if highest education is primary degree; omitted category)
E2	Dummy (1 if highest education is secondary degree)
E3Voc	Dummy (1 if highest education is vocational tertiary degree)
E3GrPo	Dummy (1 if highest education is university degree)
Nationality	Dummy (1 if individual's is Spanish)
Married	Dummy (1 if married)
NW	North-West region
NE	North-East region
CMadrid	Madrid region
C	Centre region
E	East region
Canaries	Canaries Islands region
S	South region (Omitted category)
Year 1988–90	Interview done between 1988–90 (Omitted category)
Year 1991–93	Interview done between 1991–93
Year 1994–96	Interview done between 1994–96

[1]Survey only for the Spanish analysis.

4.9 Appendix B: Tables

4.9.1 The Spanish Case

Table 4.26: Change in Occupational Status Around First Birth (%), Cohort 1945–60, FFS — Spanish Females

1st Job After[1]	*Occupational Status 12 months Before*				
	Not Working	*Working*			
		High	*Moderate*	*Low*	*Very Low*
Not Working	97.1	6.4	22.0	40.1	50.8
Good	0.2	93.6	0.0	0.0	0.0
Average	0.0	0.0	77.1	0.6	0.0
Low	1.4	0.0	0.2	58.7	0.8
Very Low	1.3	0.0	0.7	0.6	48.4
Total Number	555	31	132	167	120

[1] *1st* job hold in observed period. Individuals might be censored before return.

4.9.2 European Comparison

Table 4.27: Standard Taxing Reliefs in 1990 — Country Comparison[1]

Countries	*Married's Relief*	*Children's Relief*	*Childminder's Relief*
Belgium	√	√	√
Germany	√	√	√
Italy	√[2]	√	×
Spain	√	√	×
Sweden	√[3]	×[4]	×

[1] Source: OECD (1993).

[2] Husband's spouse credit is not given if wife's income exceeds fixed limit.

[3] Husband's tax credit tapers off to zero as spouse's income increases.

[4] Cash transfers.

Table 4.28: Labour Force Status of Female Aged 20–49 Years Old, By Number of Children in 1998 — Country Comparison[1]

	LFS	*Belgium*	*Germany*	*Italy*	*Spain*	*Sweden*[2]
0 Child	*Employed*	73.0%	81.2%	66.9%	65.8%	74.1%
	Unemployed	8.8%	6.1%	7.9%	15.2%	6.3%
	Inactive	18.1%	12.7%	25.2%	18.9%	18.0%
1 Child 0-2	*Employed*	65.5%	47.6%	45.5%	40.2%	34.9%
	Unemployed	9.6%	3.0%	7.7%	12.8%	6.5%
	Inactive	24.9%	49.2%	46.8%	47.0%	57.1%
2 Children youngest 0-2	*Employed*	68.0%	43.8%	41.1%	36.5%	38.5%
	Unemployed	8.1%	9.4%	7.0%	12.3%	6.8%
	Inactive	23.9%	44.4%	51.8%	51.3%	53.2%
3+ Children youngest 0-2	*Employed*	45.6%	29.9%	29.9%	23.4%	39.3%
	Unemployed	8.6%	2.3%	6.4%	11.7%	4.3%
	Inactive	45.8%	67.8%	63.7%	64.9%	54.7%

[1]Source: Eurostat. Labour Force Survey. Results 1998. Theme 3. Table 11.
[2]Self-constructed with 1992–92 FFS survey.

Table 4.29: Activity Rates of Women Aged 25–49 Years Old, By Marital Status — Country Comparison[1,2]

Year	*Marital Status*	*Belgium*	*Germany*	*Italy*	*Spain*	*Sweden*[3]
1991	*Single*	84.0%	86.2%	78.6%	82.7%	79.9%
	Married	65.1%	61.7%	51.7%	42.7%	80.7%
1995	*Single*	84.2%	86.1%	70.3%	82.7%	
	Married	69.4%	69.7%	52.0%	51.0%	

[1]Source 1991: Eurostat. Labour Force Survey. Results 1991. 3C. Table 04.
[2]Source 1995: Eurostat. Labour Force Survey. Results 1995. 3C. Table 04.
[3]Source for Sweden: Self-constructed with 1992–92 FFS survey.

Table 4.30: Probability of Employment After First Birth: following 96 Months (Women whose Retrospective History Covers the Entire 96 Months) — Country Comparison

Variables	*Probit After 1st Birth: Marginal Effects*[1,2]				
	Belgium	*W-Germany*	*Italy*	*Spain*	*Sweden*
City[3]	-0.058 (0.042)	-0.025 (0.035)	0.012 (0.028)	0.059** (0.023)	0.046 (0.029)
Religious	-0.082** (0.036)	-0.029 (0.036)	-0.064 (0.046)	-0.138** (0.036)	0.006 (0.022)
Married1C	-0.182** (0.043)	0.008 (0.078)	0.028 (0.049)	-0.029 (0.051)	-0.031 (0.024)
Experience[4]	0.011** (0.002)	0.020** (0.002)	0.003** (0.0006)	0.0006* (0.0003)	0.0010 (0.008)
AgeAt1Job	0.113** (0.023)	0.224** (0.034)	0.031** (0.007)	0.0007 (0.001)	0.021** (0.010)
AgeAt1C	-0.239** (0.072)	-0.258** (0.086)	0.039 (0.039)	-0.002 (0.040)	0.074 (0.050)
AgeAt1C2	0.003* (0.002)	0.0008 (0.001)	-0.0008 (0.0008)	0.002 (0.0008)	-0.002* (0.0009)
Education[5]					
E2	-0.0017 (0.034)	0.177* (0.092)	0.059** (0.027)	0.079** (0.025)	-0.0001 (0.071)
E3Voc	0.116** (0.038)	0.249* (0.149)		0.153** (0.064)	
E3GrPo	0.136** (0.054)	0.422** (0.120)	-0.0007 (0.058)	0.171** (0.085)	-0.066 (0.078)
Cohorts[6]					
1954[7]					-0.028 (0.095)
1956–60[8]	0.041 (0.037)	0.061 (0.067)	-0.018 (0.036)	-0.012(0.064)	-0.063 (0.184)
1961–65[9]	0.110** (0.050)	0.208* (0.125)	-0.025 (0.060)	-0.105 (0.126)	-0.114 (0.262)
1966–70[10]	dropped	0.040 (0.203)	-0.108 (0.095)	-0.275 (0.187)	dropped
Log likel.	-5312.7	-6068.6	-7301.0	-7034.5	-7563.6
N subjects	1062	688	2056	1684	1410
N obs.	6372	5983	8412	7548	8460

*Significant at 10% level.

**Significant at 5% level.

[1]Standard errors in brackets. Standard errors adjusted for individual clustering.

[2]Duration dummies, year dummies and interactions not reported.

[3]Dummy (1 if individual's locality up to 15 had >=100.000 inhabitants).

[4]Accumulated number of months worked up to the birth.

[5]Omitted category is the lowest level (*E1*).

[6]Omitted category is *Cohort 1951–55* (*Cohort 1952–55* for West-Germany and *Cohort 1949* for Sweden).

[7]*Cohort 1954 for Sweden only.*

[8]*Cohort 1959 for Sweden.*

[9]*Cohort 1964 for Sweden.*

[10]*Cohort 1969 for Sweden.*

Table 4.31: Duration Dummies and Year Calendar Dummies in the Model of Table 4.22 — Country Comparison

Variables	*Probit After 1st Birth: Coefficients*[1]				
	Belgium	*W-Germany*	*Italy*	*Spain*	*Sweden*
D6[2]	-0.074 (0.024)	-0.031 (0.015)	-0.031 (0.010)	-0.043 (0.022)	0.212 (0.031)
D12	-0.082 (0.035)	-0.009 (0.027)	-0.101 (0.016)	-0.089 (0.039)	0.955 (0.056)
D24	-0.256 (0.054)	0.004 (0.048)	-0.133 (0.025)	-0.109 (0.062)	1.424 (0.089)
D48	-0.308 (0.093)	0.059 (0.095)	-0.187 (0.044)	-0.248 (0.113)	1.332 (0.157)
D96	-0.452 (0.174)	0.221 (0.190)	-0.268 (0.086)	-0.369 (0.217)	1.656 (0.308)
Year73[3]	-0.113 (0.240)	-0.321 (0.195)	0.145 (0.125)	0.220 (0.363)	-0.217 (0.231)
Year74	-0.098 (0.239)	-0.071 (0.218)	0.024 (0.135)	0.481 (0.403)	-0.233 (0.263)
Year75	-0.057 (0.243)	-0.179 (0.219)	-0.038 (0.143)	0.675 (0.388)	-0.231 (0.292)
Year76	0.003 (0.247)	-0.156 (0.228)	0.077 (0.129)	0.395 (0.386)	-0.413 (0.319)
Year77	-0.077 (0.252)	-0.159 (0.248)	0.166 (0.130)	0.489 (0.384)	-0.377 (0.354)
Year78	-0.113 (0.258)	-0.322 (0.259)	0.144 (0.133)	0.492 (0.376)	-0.177 (0.391)
Year79	-0.066 (0.268)	-0.223 (0.260)	0.117 (0.138)	0.598 (0.384)	-0.274 (0.428)
Year80	-0.217 (0.279)	-0.416 (0.285)	0.107 (0.145)	0.837 (0.402)	-0.336 (0.465)
Year81	-0.157 (0.295)	-0.383 (0.304)	0.079 (0.151)	1.112 (0.416)	-0.357 (0.500)
Year82	-0.115 (0.310)	-0.498 (0.321)	0.093 (0.155)	0.937 (0.425)	-0.293 (0.542)
Year83	-0.157 (0.295)	-0.628 (0.339)	0.099 (0.164)	0.950 (0.443)	-0.291 (0.577)
Year84	-0.142 (0.335)	-0.623 (0.359)	0.164 (0.171)	1.019 (0.462)	-0.192 (0.612)
Year85	-0.081 (0.351)	-0.697 (0.376)	0.054 (0.177)	0.977 (0.484)	-0.271 (0.653)
Year86	-0.186 (0.369)	-0.676 (0.394)	0.072 (0.187)	1.081 (0.499)	-0.304 (0.691)
Year87	0.037 (0.385)	-0.693 (0.417)	0.085 (0.194)	0.967 (0.517)	-0.209 (0.725)
Year88	-0.036 (0.401)	-0.647 (0.433)	0.134 (0.203)	0.885 (0.537)	-0.076 (0.763)
Year89	-0.012 (0.421)	-0.812 (0.460)	0.085 (0.211)	0.931 (0.554)	-0.260 (0.801)
Year90	-0.123 (0.434)	-0.754 (0.479)	0.088 (0.217)	0.989 (0.578)	-0.240 (0.841)
Year91	0.042 (0.456)	-0.779 (0.500)	0.085 (0.224)	0.942 (0.597)	-0.408 (0.876)
Year92-93[4]	0.496 (0.697)	-0.778 (0.518)	0.101 (0.234)	0.789 (0.625)	-0.300 (0.912)

*Significant at 10% level.

**Significant at 5% level.

[1]Standard errors in brackets. Standard errors adjusted for individual clustering.

[2]Duration dummies. Omitted variable: *D3*

[3]Year Calendar Dummies. Omitted variable: *Year72*.

[4]We take year 1992 and 1993 together to increase the number of observations in this cell.

Table 4.32: Probability of Employment After First Birth: following 96 Months (Women who Only Had One Child Ever) — Country Comparison

Variables	*Probit After 1st Birth: Marginal Effects*[1,2]				
	Belgium[3]	*W-Germany*	*Italy*	*Spain*	*Sweden*
City[4]	-0.125	-0.003 (0.037)	0.035 (0.034)	0.023 (0.064)	-0.094** (0.042)
Religious	0.026	0.012 (0.035)	-0.038 (0.040)	-0.059 (0.072)	0.011 (0.040)
Married1C	0.015	-0.129** (0.050)	-0.003 (0.054)	0.106 (0.103)	-0.031 (0.041)
Experience[5]	0.002	0.010** (0.003)	0.002* (0.001)	0.002* (0.0010)	0.004** (0.001)
AgeAt1Job	0.011	0.103** (0.029)	0.025** (0.012)	0.006 (0.005)	0.041** (0.014)
AgeAt1C	0.210	-0.018 (0.059)	-0.017 (0.041)	0.016 (0.078)	0.059 (0.056)
AgeAt1C2	-0.004	-0.002** (0.001)	-0.0001 (0.0007)	-0.0009 (0.001)	-0.0007 (0.0009)
Education[6]					
E2	0.133	0.186** (0.085)	-0.012 (0.045)	0.109 (0.074)	-0.038 (0.111)
E3Voc	0.228	0.300 (0.219)		0.348** (0.103)	
E3GrPo	0.298**	0.406** (0.206)	0.025 (0.084)	0.310** (0.132)	0.045 (0.108)
Cohorts[7]					
1954[7]					0.327* (0.171)
1956–60[8]	-0.107	-0.004 (0.069)	0.030 (0.050)	-0.185 (0.128)	0.542** (0.249)
1961–65[9]	-0.094	0.003 (0.125)	0.035 (0.087)	-0.204 (0.198)	0.748** (0.175)
1966–70[10]	-0.145	-0.042 (0.172)	-0.028 (0.151)	-0.491** (0.211)	0.720 (0.125)
Log likel.	-2070.7	-2601.7	-2623.8	-2022.1	-2172.6
N subjects	663	574	965	711	600
N obs.	2938	2640	2901	2138	2530

*Significant at 10% level.

**Significant at 5% level.

[1]Standard errors in brackets. Standard errors adjusted for individual clustering.

[2]Duration dummies, year dummies and interactions not reported.

[3]Fail in calculating second derivative, no standard deviation reported.

[4]Dummy (1 if individual's locality up to 15 had >=100.000 inhabitants).

[5]Accumulated number of months worked up to the birth.

[6]Omitted category is the lowest level (*E1*).

[7]Omitted category is *Cohort 1951–55* (*Cohort 1952–55* for West-Germany and *Cohort 1949* for Sweden).

[8]*Cohort 1954 for Sweden only.*

[9]*Cohort 1959 for Sweden.*

[10]*Cohort 1964 for Sweden.*

[11]*Cohort 1969 for Sweden.*

Table 4.33: OLS Regression of Probit's Year-Country Dummies Estimates on Policies, Labour Market, Country dummies and Linear Trend — Country Comparison

Model	*OLS*			
	All Sample			
	Country Dummies		*Country Dummies & Policies*	
	Coefficient	*Std.Error*	*Coefficient*	*Std.Error*
FHE[1]			33.089**	7.138
Leave[2]			-0.016	0.032
Tax[3]			0.063	0.059
Unemrf[4]			1.357	0.831
FvsP[5]			1.729**	0.790
West-Germany[6]	-0.670**	0.053	1.118**	0.437
Italy	0.116**	0.053	1.429**	0.351
Spain	0.971**	0.053	2.316**	0.294
Sweden[7]	-0.209**	0.053	-0.002	1.140
Linear Trend			-0.043**	0.012
Cte	-0.020	0.037	1.120**	0.598
R-squared	0.9541		0.9727	
N observations	55			

*Significant at 10% level.

**Significant at 5% level.

[1]Proportion of female with completed tertiary education.

[2]Constructed maternity leave indicator.

[3]Dummy: 1 if separate taxation system; 0 if joint.

[4]Proportion of female unemployment.

[5]Proportion of female in part-time positions.

[6]Country omitted category is *Belgium*.

[7]The year calendar dummies for Sweden have been estimated with a probit model with interactions between the year calendar dummies and the duration dummies.

4.10 Appendix C: Graphs

4.10.1 The Spanish Case

Figure 4.12: Monthly Probability of being Employed after First Birth Conditional on being Employed 12 Months Before, By Cohort — Spanish Females

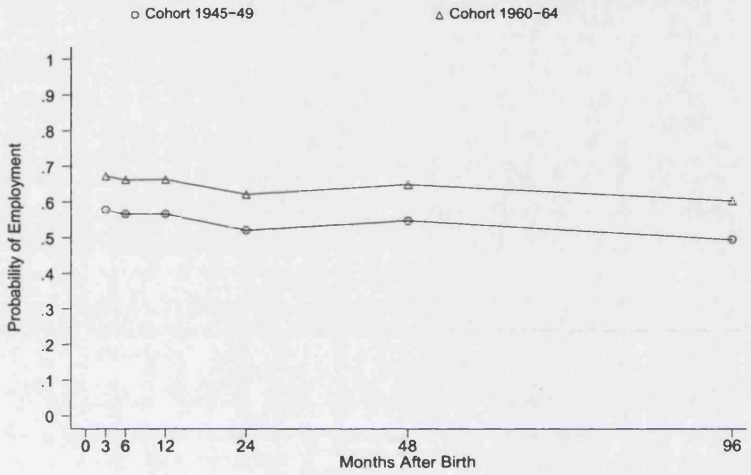


Figure 4.13: Monthly Probability of being Employed After First Birth Conditional on being Employed 12 Months Before, Year-Regional Dummies, By Skill Profile — Spanish Females

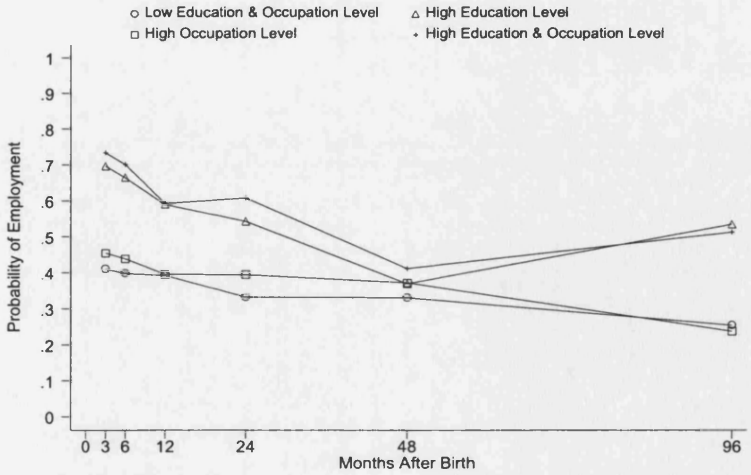


Figure 4.14: Monthly Probability of being Employed After First Birth Conditional on being Employed 12 Months Before, Year-Regional Dummies, By Year — Spanish Females

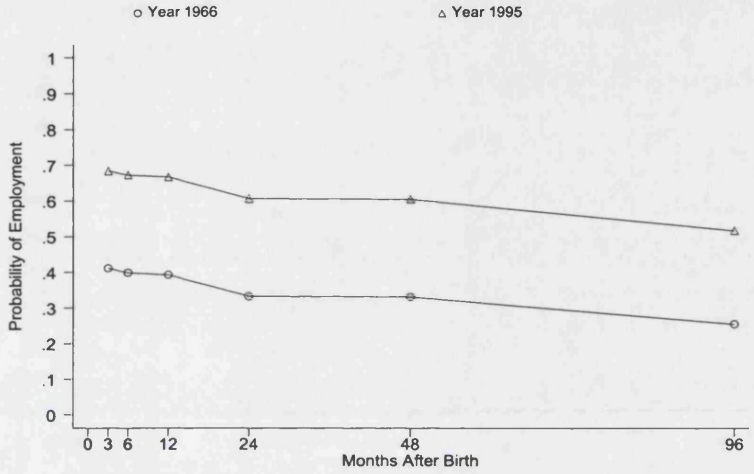
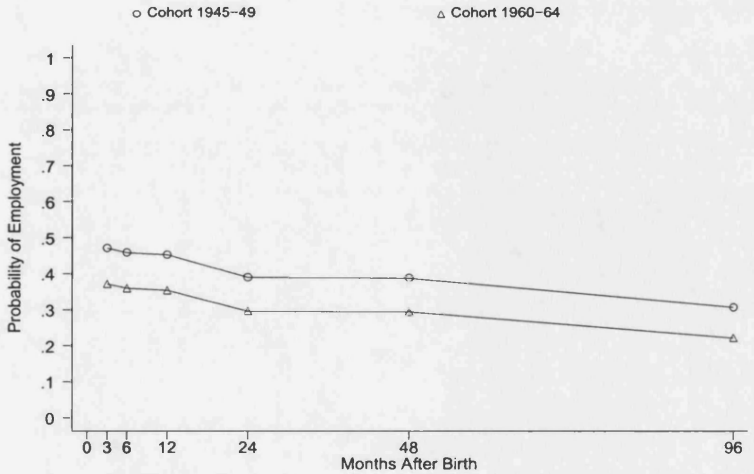


Figure 4.15: Monthly Probability of being Employed After First Birth Conditional on being Employed 12 Months Before, Year-Regional Dummies, By Cohort in 1966 — Spanish Females



4.10.2 European Comparison

Figure 4.16: Employment Rates Around Birth, By Cohort — Country Comparison

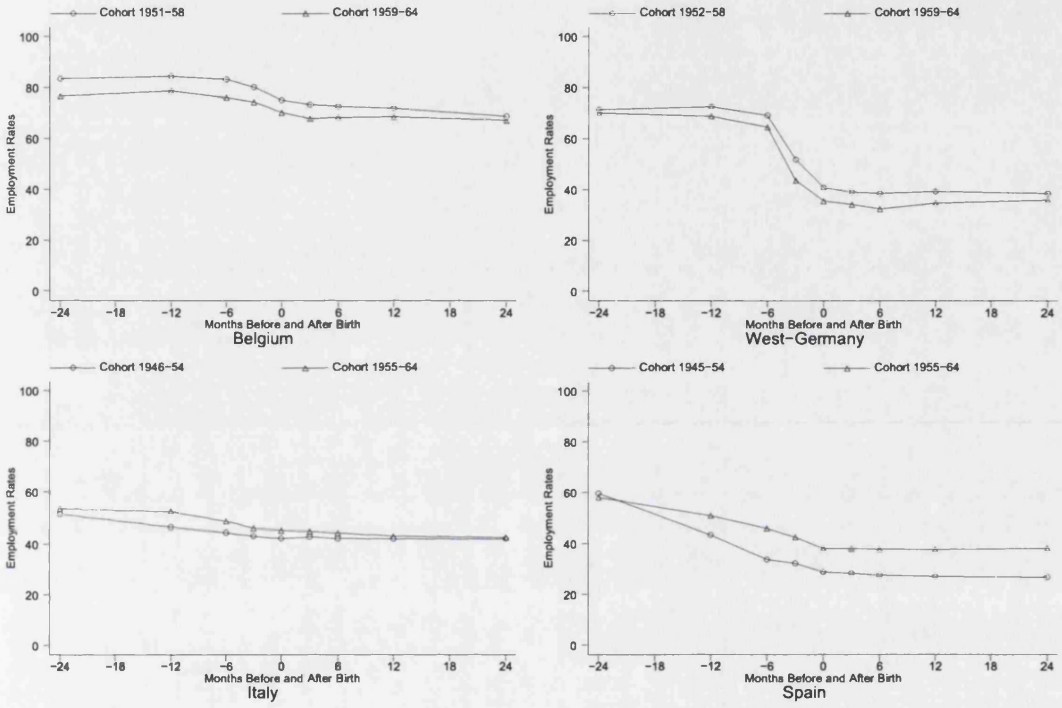


Figure 4.17: Employment Rates Around Marriage for Women Without Children, By Cohort — Country Comparison

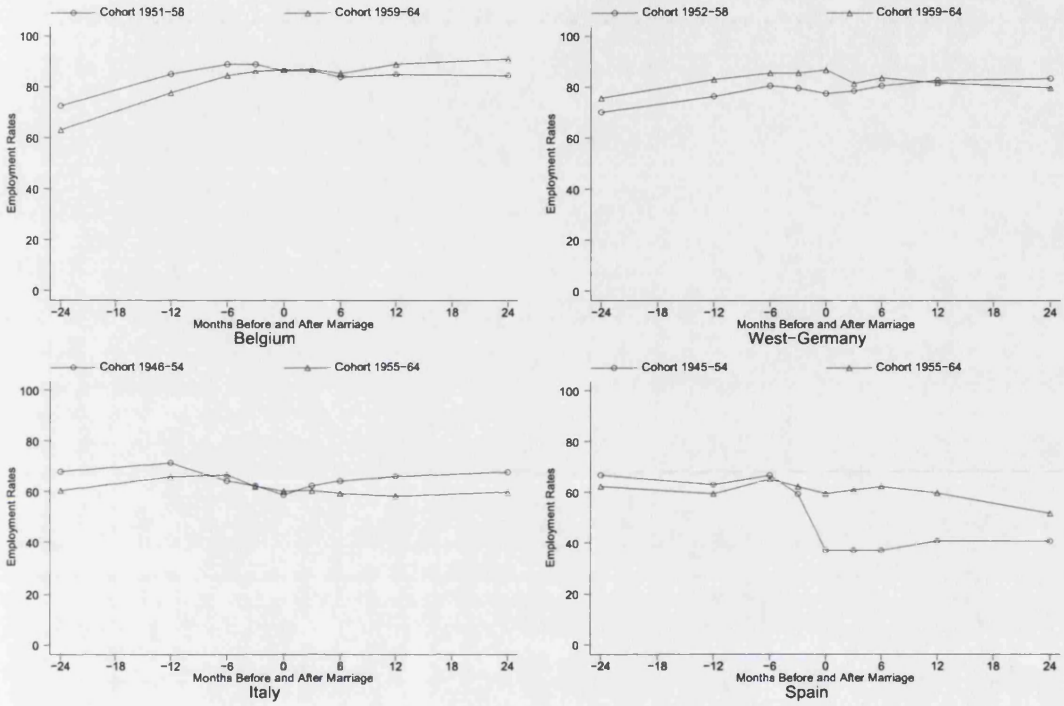
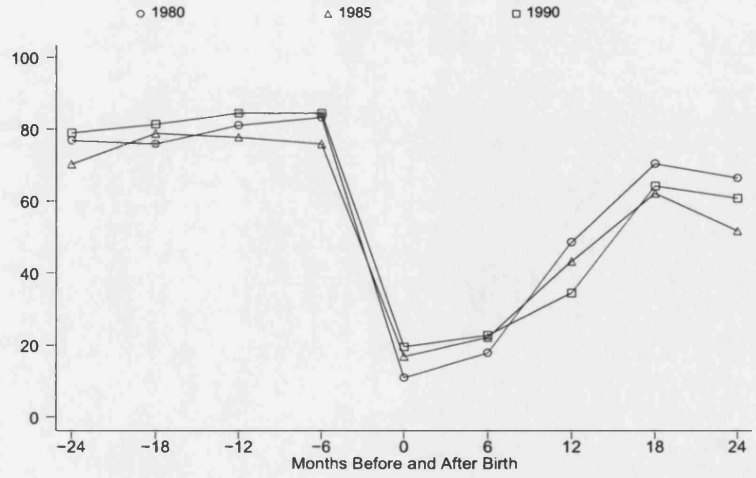


Figure 4.18: Employment Rates Before and After First Birth — Swedish Females



Chapter 5

Female Participation in the UK: 1974–2002

5.1 Introduction

Female participation rates have increased substantially in the UK between 1984 and 2002. The statistics show that the rise in female labour supply has occurred mainly among married women with children. In this chapter, we seek to find an explanation for this evolution and identify the groups of women with greater rises in employment.

The analysis is undertaken with two aims in mind. First, we investigate the overall sources of the increase in female participation. We wish to know the extent to which this rise has been caused by changes in the characteristics of the female population or whether it has primarily been due to changes in participation behaviour. Second, we analyse the relationship between family-friendly policies and the employment of married women with children. We focus on this subgroup of women since they have experienced the greatest growth in employment. In particular, we seek to isolate the birth cohorts whose mothers have had most rises in employment and link those to changes in policies.

Most of the recent work is focused on the evaluation of the impact of specific taxation policies (e.g. WFTC) on female participation (Blundell, Duncan, McCrae and Meghir (2000)) and are estimated for specific single years. Less research has been done to analyse the increasing rates of female participation from the 1980s onwards. The aim of this chapter is to fill in this gap and learn more about the trend. How much of the increase is explained by the female population acquiring those characteristics that make them more likely to be in the labour market? How much is due to the evolution of behaviour or anything else that we have not been able to capture in our specification such as maternity leave and

taxation policies? To explore these issues, we follow the approach of Gomulka and Stern (1989) in their analysis of the employment of married women in the UK between 1970 and 1983 using the Family Expenditure Survey. Other questions addressed in this chapter are focused on married women with young children. When did this group of women start to increase employment? How it was related to changes in policies? Which type of mothers experienced rises in employment?

The structure of Chapter 5 is as follows: we review some literature on female labour supply in Section 5.2. Section 5.3 describes briefly the main trends in female participation in the UK. Section 5.4 disentangles how much of the increase in female participation in the UK is due to changes in characteristics and how much is caused by changes in behaviour. Section 5.5 aims to identify those birth cohorts whose married women experienced an increase in employment. It also seeks to differentiate across groups of mothers. We write some concluding remarks in Section 5.6.

5.2 Previous Literature

Many authors are concerned about the micro-based factors that determine the labour supply decision. For example, Greenhalgh (1977) concentrates on the post-war period 1951–71 and estimates a labour supply function for married women using the New Earnings Survey 1971. She finds that the elasticity with respect to female wages (1.35) is larger in absolute terms than the elasticity with respect to husband's income (-0.86). This means that a rise in wages (keeping relative wages constant) leads to an increase in participation. Joshi (1986) uses the Women and Employment Survey in 1980 to analyse female participation in Britain. What is new from her study is that she constructs an index of each woman's earning potential and looks at its impact on female participation. She also pays special attention to the effect of work interruptions on female low pay.

In a series of papers, Blundell, Ham and Meghir investigate female labour supply at the individual level with cross-sectional data (British Family Expenditure Survey). Blundell, Ham and Meghir (1987) estimate a cross-sectional model for married female labour supply that embodies the possibility that there are unemployed workers who want to work at their perceived market wage but are unable to find a job. This means that zero hours of work represent not only non-participation but also unemployment. They find significant differences with respect to the model that takes as equivalent the probability of zero hours and not having positive desired hours of work. The same authors have extended this setting to discouraged workers (Blundell, Ham and Meghir (1998)).

Another branch of literature analyses the trends in female participation. Joshi, Layard and Owen (1985) build a time-series of aggregate data (1950–81) to explain the increasing number of women at work. They analyse the impact of wages, education, and fertility on female employment. They show that fertility had a small effect in the period 1951–70, whereas the decline in the number of children produced a significant rise in employment between 1971 and 1981. Evans (1998) studies the fall in unemployment in Britain, which he suggests, is mostly due to the decrease in female unemployment. He finds that the decline in female unemployment is associated with a fall in their inflow rate, which is highly concentrated among women with young children. He argues that the latter is caused by the reduction of market frictions that women experience after childbearing.

Very little research has been done up to now to investigate the trends in female participation in the period 1974–2002. This chapter updates and analyses the rising in female participation between 1974 and 2002.

5.3 Trends in Female Participation

The participation rate of women aged between 16 and 59 years old increased from 65% in 1984 to 72% in 2002. This trend has not been the same for all women. Table 5.1 shows different rates of female participation rates according to a set of characteristics. For example, single women have experienced a decline in participation rates of 8 percentage points (from 76% to 68%), whereas married women have seen participation rates rise by 12 percentage points (from 62% to 74%). There are also significant differences depending on the number of children in the household. Those women without any dependent children in the household have fairly constant participation rates across this period (from 74% to 77%). In contrast, the rise in participation has been substantial for women with dependent children. Rates have increased from 62% to 71% for women in households with one dependent child, from 56% to 69% for those with two, and from 40% to 51% for those with three or more dependent children. Thus, there is evidence that part of the increase in total participation rates has been driven by both married women and women who live in households with dependent children.

In the period 1984–2002, the gap in participation across education levels has widened. Female participation rates for the highly educated have increased 9 percentage points (from 79% to 88%), whereas those for women without qualifications have dropped by 10 percentage points (from 58% to 48%).

Table 5.1: Female Participation Rates (%) in the UK[1] by Category in 1984 and 2002

Years	*Total*	*Marital Status*		*Dependent Children*				*Qualifications*	
		Married	*Single*	*One*	*Two*	*Three +*	*None*	*Yes*	*No*
1984	65	62	76	62	56	40	74	79	58
2002	72	74	68	71	69	51	77	88	48

[1]All female aged between 16 and 59 years old in the LFS survey. For the estimation in Section 5.4, we take a sub-sample of female aged 16–59 who are either the heads of the household or their partners. They have an increase of participation from 62% to 73%.

The youngest group of women (those aged between 16 and 24 years old) have experienced a decline of 5 percentage points in participation rates due primarily to the increase in the enrolment in higher education. The rest of the age groups (25–34, 35–44 and 45–54) have increased their participation, especially for those women aged between 25–34 (their rates move from 60% to 75%).

5.4 Female Labour Force Participation in the UK: Evolving Characteristics or Changing Behaviour?[1]

5.4.1 Introduction

This section aims to answer the first question of the chapter, which is to measure the extent to which the rise in female participation in the period 1984–2002 has been caused by changes in the characteristics of the female population or whether it has primarily been due to changes in participation behaviour. Our methodology is inspired by Gomulka and Stern (1989) who analyse the employment of married women in the UK between 1970 and 1983. They disentangle the source of the rise in employment into two channels. First, changes in the variables describing the female population and, second, changes in the coefficients that capture the probability of being employed. They find that the increase in employment was mostly due to changes in the way the probability of employment of married women was determined. Interestingly, our results suggest that, between 1984 and 2002, changes in the distribution of the micro variables contribute to two thirds of the growth in female participation, whereas one third is explained by changes in behaviour.

Another objective of the section is to develop a method for forecasting female partic-

[1]This section draws on joint research with Brian Bell for a project at the Bank of England. I would like to thank him for his collaboration and instructive comments.

ipation. We use the estimated coefficients from our models and the estimated growth of the explanatory variables to predict the female participation rate in 2003 and 2004. Results suggest that the female participation rate will continue to rise by around 0.4–0.7 percentage points over the next two years.

For our analysis, we use the Labour Force Survey (LFS), which interviews about 60,000 households per year and has a rich description on labour force status, education and household structure, though not on incomes and wages. These variables have been made comparable across all years. Our data are not a panel, but a collection of annual cross sections.

The remainder of this Section is as follows: in Subsection 5.4.2 we examine the data and the choice of variables in our model. Subsection 5.4.3 explains the model and the empirical methodology. In Subsection 5.4.4 we outline the results of the estimation for female participation and in Subsection 5.4.5 we replicate those for males. Subsection 5.4.6 presents the forecasting approach. We conclude in the final subsection.

5.4.2 Data and Constructed Variables

We use the LFS from 1984 to 2002 and limit our sample to women aged between 16 and 59 years old, who are either the head of the household or the partner of the head. The LFS only provides a direct link between children and adults for heads of households and their partners. Since we are interested in the effect of children on participation, we therefore restrict our sample to heads and their partners to ensure that the children we account for belong to the individual. We also undertook the analysis for the whole group of females aged 16–59 and results were very similar. The annual number of women aged 16–59 in the sample is about 46,000. Our selection criteria reduce the sample to around 36,000 annual observations.

The dependent variable is one if a woman participates and zero otherwise. The percentage of women participating in our sample (aged between 16–59 who are either the head or their spouse) increases from 62% in 1984 to 73% in 2002. The explanatory variables are:[2] age, education, ethnicity, region, children, marital status, if lone parents, education and employment status of the partner. We control for age using interval dummies (16–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49, 50–54 and 55–59). We take the age group 35–39 as our reference group. Education is constructed in nine categories, from the lowest

[2]The definition and label of the explanatory variables are summarised in Appendix 5.7.

to the highest, as follows: *Edu1* (no qualifications, our omitted category), *Edu2* (other professional/vocational qualifications), *Edu3* (CSE), *Edu4* (completed apprenticeship, including City and Guilds), *Edu5* ('O' level), *Edu6* (mid vocational, ONC, OND), *Edu7* ('A' level), *Edu8* (high vocational, BTEC, HNC, HND and nurses) and *Edu9* (degree, including teachers).

Demographic characteristics are marital status (*Married* takes value 1 if the individual is married or in cohabitation, 0 otherwise), *Non–White* (dummy with value 1 being non-white), number of children in each age group (*Ndep0–2*, *Ndep3–4*, *Ndep5–10* and *Ndep11–15*), dummies 0-1 if the woman has at least a child in each of the age groups (*Ddep0–2*, *Ddep3–4*, *Ddep5–10* and *Ddep11–15*) and a dummy for being a single parent (*HOHSingle*). For those women who are married or in cohabitation, it is important to control for their partner's education (*EduP1–EduP9*) and employment status (0-1 dummy *EmpP*). This gives an indicator of their external income,[3] which theory predicts will have a substantial impact on female participation decisions. By doing this, we assume that females take their partner's income as exogenous in making their participation decision, rather than modelling a joint family problem. Finally, we control for region of residence (*Region1–Region12*).

5.4.3 Methodology

As mentioned in the introduction, we wish to disentangle the source of increase of female participation into two main effects: changes over time in the measured characteristics and changes in the coefficients of the model. We follow the approach of Gomulka and Stern (1989), which in turn uses the methodology of growth accounting proposed by Stoker (1985). The aim is to decompose the change of an aggregate variable (here the proportion of women who participate) into a change of the behavioural micro model (coefficients of the probit estimation for a series of cross-sections) and a change in the distribution of the micro variables (education, fertility, marital status, etc).

The coefficient estimates for each year differ because behaviour evolves over time; that is, people with the same characteristics do not react in an identical way in different years. This may reflect the fact that some factors that may influence female decisions have been excluded from our specification. For instance, some policy regulations (i.e. maternity leave and taxation) have changed between 1984 and 2002 and are likely to affect female

[3]The LFS lacks income and wage variables for the whole period 1984–2002. Thus, partners' education and employment status is a proxy for external income whenever the individual is married or in cohabitation.

Table 5.2: History of Institutional Changes linked to Female Participation in the UK: 1979–2002

Years	*New Policies*
1979	• Introduction of the Right of Reinstatement (possibility to return to the same job after motherhood) for specific eligibility conditions. • Introduction of the Maternity Pay for specific eligibility conditions.
1987	• Maternity Pay is extended.
1988	• Family Credit (in-work-benefits) replaced Family Income Supplement (dating from 1971) with increased generosity.
1990	• Joint taxation is substituted by separate taxation for married couples.
1994	• The Right of Reinstatement is applicable to all working women, no matter how long they are employed. Extra leave is possible under certain conditions.
1999	• Working Family Tax Credit replaces Family Credit, with increased generosity and child-care support.
2000	• The Right of Reinstatement is extended and the eligibility for the longer leave is relaxed. • Working Family Tax Credit increased in generosity.

choices, ceteris paribus. A summary of the main policy changes is shown in Table 5.2. Further information is given in Table 5.20 and 5.21 in Appendix 5.8, when we deal with the increase of employment for married women with children.

To illustrate the mechanism, we first show the decomposition for the linear case (due to Oaxaca (1973)). We assume that our dependent variable y can be explained by a linear regression as follows

$$y = \beta X + \varepsilon \tag{5.1}$$

where β is the vector of coefficients, X the vector of exogenous variables and ε the error term. This equation is valid for each year. Then, for a given year

$$\bar{y} = \hat{\beta}\bar{X} \tag{5.2}$$

where $\hat{\beta}$ is the ordinary least-squares estimate of β and $\bar{y}$ and $\bar{X}$ are the means across the observed individuals. This linear form can decompose changes of $\bar{y}$ into changes in $\hat{\beta}$ and changes in $\bar{X}$. That is, we can decompose the variation in two given periods, indexed by 0 and 1 in the following way:

$$\bar{y}^1 - \bar{y}^0 = (\hat{\beta}^1 - \hat{\beta}^0)\bar{X}^1 + (\bar{X}^1 - \bar{X}^0)\hat{\beta}^0 \tag{5.3}$$

The first term shows the change that comes from the changes in the coefficients at constant values of the variables, which is the contribution of a shift in behaviour. The second term captures the difference arising from changes in the variables, at constant coefficients, which measures changes in the average population.[4]

As in Gomulka and Stern (1989), our dependent variable is dichotomous and we use a probit model. This means that, for our decomposition, the change in the aggregate proportion of women who participate depends not only on the change in the means of the variables but also their distributions. The expected value of a binary variable y, that takes value one when a woman participates in the labour market and zero otherwise, at given set of characteristics and year is a function of X and β

$$Pr(y = 1|X) = f(\beta, X) \tag{5.4}$$

For a probability density function for X, $\phi(X)$, then the expectation in the population of the variable y is

$$E(y) = \int f(\beta, X)\phi(X)dX. \tag{5.5}$$

If $\hat{\beta}$ is a consistent estimate of β, and X is a random sample (this could be another sample than the one used to estimate $\hat{\beta}$), then it can be shown that the right hand side of (5.5) can be consistently estimated by the sample average across individuals i

$$\hat{y} \equiv \bar{f}(\hat{\beta}, X) \equiv \frac{1}{N}\sum_i f(\hat{\beta}, X) \tag{5.6}$$

The left-hand side of (5.5) is estimated consistently by the sample mean $\bar{y}$.

As with the linear case, we have that the change in the expected value of y in two different years, 0 and 1, can be written as

[4]Alternative, we can decompose equation 5.3 as $\bar{y}^1 - \bar{y}^0 = (\hat{\beta}^1 - \hat{\beta}^0)\bar{X}^0 + (\bar{X}^1 - \bar{X}^0)\hat{\beta}^1$.

$$E(y^1)-E(y^0) = \int (f(\beta^1, X)-f(\beta^0, X))\phi^1(X)dX + \int (\phi^1(X)-\phi^0(X))f(\beta^0, X)dX \quad (5.7)$$

The first integral in (5.7) measures the effects of changes in the values of the coefficients given the distribution of the explanatory variables. The second part evaluates the impact of a change in the distribution of the explanatory variables for given values of the coefficient, β^0.

We disentangle the change in the average value in the sample $\hat{y}^1 - \hat{y}^0$ as:

$$\hat{y}^1 - \hat{y}^0 = (\bar{f}(\hat{\beta}^1, X^1) - \bar{f}(\hat{\beta}^0, X^1)) + (\bar{f}(\hat{\beta}^0, X^1) - \bar{f}(\hat{\beta}^0, X^0)) \quad (5.8)$$

where $\bar{f}(\hat{\beta}^i, X^j)$ is the average across the sample X^j of the predicted probability using the coefficients $\hat{\beta}^i$. In our analysis, $\bar{f}(\hat{\beta}^i, X^j)$ is a 19×19 matrix.

We would also like to know the contribution of the different variables to the change in the predicted probability. That is, suppose we find that changes in the explanatory variables between two given years explain a significant part of the increase in female participation. Then, the next step is to identify which variables are driving the result. That is, is the increase mainly due to, for instance, the increase of female education or is it rather caused by a change in fertility? In order to calculate this, we use the marginal effects of our probit estimation. These provide the change in the probability for an infinitesimal change in each independent, continuous variable and, by default, the discrete change in the probability for dummy variables. In this exercise, one leaves the rest of the variables at their means. The mechanism is as follows. First, we compute the difference between each explanatory variable in two years, say for example 1984 and 2002. We then multiply each difference by the estimated marginal effect in 1984. This will give us the increase in probability of participation due to the change in that variable between the two years while keeping the rest of the variables at their means.

5.4.4 Empirical Results

Table 5.15 in Appendix 5.8 reports the proportions and standard deviations of all variables used in the analysis. It shows the increase in female education, the decline in fertility and the drop in married-cohabiting women. Table 5.16 in Appendix 5.8 shows the marginal effects of the probability of female participation for each variable and year. We observe that the women aged between 30 and 34 and between 35–39 (our reference group) are more likely to participate. There is also evidence that non-whites have a smaller proba-

bility of participating and this negative effect became stronger from the late 80s onwards. The regional dummies show that higher participation is predicted in southern areas and this pattern persists across the years.

Unsurprisingly, higher levels of education increase the probability of participation. Moreover, the positive effect of education is increasing across time since the magnitudes of the coefficients are becoming consistently larger. That is, those without any qualification (our base group) are less likely to participate, ceteris paribus, in 2002 than in 1984, compared to someone with education.

The structure of the family has an important role in explaining female participation. The number of dependent children in each age category, 0–2, 3–4, 5–10 and 11–15 reduces the probability of participation.[5] This negative effect is larger the younger the age of the children. Simultaneously, fertility dummies (e.g. *Ddep0–2* is 1 if the individual has at least a child between 0–2 years old) are also negative up to the age of ten. In these dummies, the comparison group is childless women. Notice that these children dummies appear to be more significant and greater in absolute value in the earlier years. One possible explanation could be that the negative effect of young children is falling in later years, due to, for example, changes in maternity and taxation policies.

Married women are less likely to participate.[6] However, those with working partners, for given partner's education, have a positive effect that partly offsets this negative effect. If we take partner's income as exogenous (we assume that the decision to participate is not simultaneously decided within a couple), we would expect to find that higher partners' income reduces the probability of participation. Although we do not have this information, we proxy it with partner's education. We find that those women whose partner have the highest qualifications are those who are less likely to participate, ceteris paribus.

In Table 5.3, we report the decomposition of female participation growth.[7] If we read along a row we observe the average of the predicted probabilities for year-sample i and coefficients of the probit between 1984 and 2002.

[5]Notice that the causality between number of children and female participation could go either way. Also, our analysis inevitably omits the relevant variable 'preference for work'. Since the number of children is negatively related to 'preference for work', the estimator for number of children is likely to be biased downwards.

[6]It is interesting to know if the probability of participation for married and single women is different with respect to the number of children. We re-estimated the model including interactions between marital status and number of children in each age category. Results show that married women with children are more likely to participate than single women with children, ceteris paribus.

[7]Standard errors are roughly 0.2 in all cells.

Table 5.3: Predicted Sample: Percentage of Female Participation in the UK using Coefficients for Year j and Sample for Year i

Sample Year	*Coefficient Year*																		
	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
1984	62.3	62.7	63.8	65.1	65.6	65.8	66.3	66.3	67.6	68.7	67.5	67.3	65.9	64.1	64.1	63.9	64.0	64.4	63.3
1985	62.2	62.7	63.9	64.9	65.8	65.9	66.4	66.6	67.5	68.6	67.6	67.3	65.9	64.3	64.0	64.0	64.1	64.5	63.5
1986	62.4	63.0	64.1	65.0	65.9	66.0	66.6	66.7	67.7	68.7	67.7	67.4	66.0	64.4	64.0	64.0	64.2	64.8	63.6
1987	62.6	63.1	64.2	65.3	66.0	66.1	66.7	66.8	67.9	68.8	67.8	67.5	66.3	64.6	64.5	64.4	64.5	65.1	63.9
1988	63.0	63.6	64.7	65.7	66.6	66.7	67.3	67.5	68.4	69.3	68.4	68.2	66.7	65.3	65.0	65.1	65.2	65.8	64.7
1989	63.6	64.2	65.5	66.4	67.3	67.5	68.1	68.4	69.2	70.1	69.3	69.1	67.8	66.4	66.2	66.2	66.4	66.9	65.8
1990	64.0	64.6	65.9	66.9	67.8	68.0	68.6	68.9	69.8	70.7	69.9	69.7	68.5	67.2	67.1	67.1	67.3	67.8	66.6
1991	63.7	64.4	65.7	66.5	67.5	67.7	68.2	68.7	69.3	70.3	69.5	69.2	68.0	66.7	66.5	66.6	66.9	67.3	66.3
1992	64.8	65.3	66.6	67.6	68.4	68.6	69.2	69.5	70.3	71.2	70.5	70.2	69.2	68.0	68.0	68.0	68.2	68.6	67.7
1993	64.2	64.7	66.1	67.0	67.9	68.1	68.6	69.0	69.7	70.6	69.9	69.6	68.7	67.4	67.4	67.5	67.7	68.1	67.2
1994	64.9	65.4	66.8	67.8	68.7	68.9	69.4	69.9	70.5	71.3	70.7	70.5	69.6	68.6	68.6	68.7	68.9	69.4	68.5
1995	65.3	65.8	67.1	68.2	69.0	69.3	69.8	70.3	70.9	71.7	71.1	70.9	70.4	69.5	69.6	69.7	69.9	70.2	69.5
1996	65.4	66.0	67.3	68.5	69.3	69.5	70.1	70.6	71.2	72.1	71.5	71.2	70.9	70.0	70.2	70.3	70.5	70.6	70.1
1997	66.0	66.6	67.9	69.1	69.9	70.1	70.8	71.3	71.8	72.6	72.1	71.9	71.6	70.8	71.0	71.2	71.3	71.5	70.9
1998	66.1	66.7	68.0	69.2	70.0	70.2	70.9	71.4	71.9	72.7	72.2	72.1	71.7	70.9	71.2	71.4	71.5	71.7	71.1
1999	66.6	67.1	68.4	69.6	70.5	70.7	71.3	71.8	72.3	73.1	72.7	72.5	72.1	71.4	71.6	71.8	72.0	72.2	71.6
2000	66.6	67.1	68.4	69.6	70.5	70.8	71.3	71.9	72.4	73.2	72.8	72.6	72.2	71.5	71.8	72.0	72.2	72.4	71.8
2001	67.0	67.3	68.6	69.7	70.7	70.9	71.4	71.8	72.5	73.2	72.8	72.6	71.9	71.0	71.2	71.4	71.6	72.3	71.3
2002	67.4	67.9	69.2	70.3	71.3	71.5	72.0	72.6	73.1	73.8	73.5	73.3	72.9	72.2	72.5	72.7	72.9	73.2	72.6
Pii[1]	62.3	62.7	64.1	65.3	66.6	67.5	68.6	68.7	70.3	70.6	70.7	70.9	70.9	70.8	71.2	71.8	72.2	72.3	72.6

[1] *Pii* stands for the mean of the predicted probability for year i using the coefficients estimated for the same year i.

For example, the first row takes the sample of 1984 and gives (from left to right) the mean of the predicted probability of participation, taking the coefficients previously estimated with sample 1984, then using those coefficients estimated with sample 1985 and so on. This tells us the average forecast probability of female participation if our explanatory variables had remained as in 1984, but the behaviour (captured by the coefficients) or other non-specified variables (such as maternity or taxation policies) had changed across years.

Down the table, we fix the coefficients and look at the mean of the predicted probabilities for changes in the distribution of characteristics. That is, changes due to changes in the explanatory variables from 1984 to 2002. For instance, the first column fixes the coefficients estimated in 1984, and calculates the mean of the probabilities for different year samples. Consequently, the diagonal entry corresponds to the mean of the predicted probability for the year using the coefficients estimated for that year and unsurprisingly are equal to the mean of female participation in the sample.

From Table 5.3, we can conclude that around two thirds of the increase in female participation between 1984 and 2002 is associated with changes in the characteristics of the female population. The other third is attributed to changes in the coefficients. This proportion is found as follows. By subtracting the first row from the last row in Table 5.3, we obtain, for each coefficient, the increase that it is caused by changes in characteristics between 1984 and 2002. These differences are in the range 5.1–9.3 percentage points. The average of these numbers (6.6 percentage points) gives an approximation of the growth in female participation in the period 1984–2002 because of changes in the distribution of variables.

Similarly, by subtracting the first column from the last column, we have for each sample year, the difference that it is caused by changes in coefficients. These numbers range between 1.0 and 5.2 percentage points. If we average these differences, we obtain 3.3 percentage points growth between 1984 and 2002 due to behavioural changes. Therefore, we find that changes in the structure of the population explain two thirds of the growth in female participation between 1984 and 2002, whereas one third is associated to changes in behaviour or other unspecified variables in our model. This is in marked contrast to the results of Gomulka and Stern (1989). Their results show that a major part of the growth in married women's employment between 1970 and 1983 is generated by changes in coefficients.

Interestingly, most of the increase in female participation between 1984 and 2002 takes place in 1984–92 (about 8 points of the total 10 percentage points). Notice in Table 5.3 that, in the 80s, changes in coefficients (i.e. behaviour) contribute significantly to the participation growth, whereas the majority of the growth in the 90s is driven by characteristics.[8] This suggests that periods of big rises in participation are those in which the coefficients (changes in behaviour or in other uncontrolled factors) move significantly. If changes in policies cause changes in the coefficients, we expect that new policies had a greater impact on the growth in participation in the 80s compared to the 90s, since changes in coefficients had a major role in female participation growth in the 80s.[9] There is scope for further research in order to identify the elements that cause part of the one third rise in female participation that is associated with changes in coefficients. This goes, however, beyond the scope of this section.

It is important to recognise that the separation between the effect of the coefficients and characteristics on participation growth could be biased if the characteristics are not pre-determined but evolve in response to changes in the coefficients. For example, in a given year, people might decide to marry less because they learn that they will have lower probability to participate. Similarly, women might decide to study longer because they perceive that education increases their probability to participate. We believe, however, that the size of this mechanism is generally small and is unlikely to affect the overall conclusions of this section.

Since we find that changes in the distribution of the variables have an important role in explaining the growth of female participation, the next step is to disentangle which of these variables have been the main influences. As explained in Section 5.4.3, we use the concept of marginal effects. As an illustration, we select the marginal effects in 1984 and we multiply them by the change in the explanatory variables between 1984 and 2002. This is done in Table 5.17 in Appendix 5.8 and has the following interpretation. For instance,

[8] As an illustration, we divide the whole period 1984–2002 into 1984–91 and 1992–2002 and calculate the increase in female participation related to characteristics and behaviour. We find that about two thirds of the whole period rise due to changes in characteristics happens between 1992 and 2002. By contrast, changes in coefficients between 1984 and 1991 contribute significantly to the rise in female participation. However, this positive effect is partially offset by the small negative impact that changes in behaviour have on female participation between 1992 and 2002, which makes that in the whole period 1984–2002, changes in coefficients account for less than changes in characteristics.

[9] Table 5.2 shows the chronological calendar of new policies. For example, the right of reinstatement (a period of unpaid leave after which the mother has the right to return to her previous job) is qualified from 1980 onwards and in 1994, conditions for its eligibility are relaxed. In 1988, the Family Credit (in-work benefits for children) replaced the Family Income Supplement with increased generosity. In 1990, taxation moved from a joint basis (the sum of the earnings of a couple) to a separate basis, which was expected to increase participation among married women.

if the variable *Ndep0–2* has a negative marginal effect in 1984, and the average number of children between 0 and 2 decreases in the period 1984–2002, we will have a positive contribution of this variable to the overall growth. In Table 5.17 we observe that changes in female education (its rise) explain the major increase in female participation associated with changes in the population. This is followed by the fertility explanatory variables, whose decline is also related to a significant growth in female participation. Note that the drop in the proportion of married women implies an increase in participation. However, this rise is offset by the negative effect of the education level of these women's partners.

5.4.5 Evidence on Male Participation

In marked contrast to the rise in female participation, male participation has declined from 89.5% in 1984 to 83.7% in 2002. Interestingly, only about 1 percentage point of the drop in 5.8 percentage points has occurred in the 80s and most of the fall was from 1993 onwards.

Although the analysis of male participation is beyond the scope of this section, for comparison we have reproduced the prediction of participation for different year coefficients and samples for men (Table 5.4). This exercise allows us to identify whether the decline in male participation is mainly caused by changes in characteristics or if it is due to changes in coefficients.

Table 5.4 shows that the pattern for males is explained by changes in coefficients, in contrast to our conclusions regarding female participation. Variation in coefficients between 1984 and 2002 generate a decline in male participation of about 8.7 percentage points, whereas changes in characteristics account for an increase of male participation of about 2.9 percentage points. Therefore, had behaviour[10] not changed, the net trend in characteristics would have caused a slight increase in male participation. Notice that from the total decline in the predicted participation in the period 1984–2002 due to coefficients, only one fifth occurs in the 80s and the rest from 1991 onwards. Changes in characteristics have a smoother impact on the probability of male participation, with three fifths of the changes happening in the 80s.

[10]Or other unobserved factors not accounted for in the model.

Table 5.4: Predicted Sample: Percentage of Male Participation in the UK using Coefficients for Year j and Sample for Year i

Sample Year	*Coefficient Year*																		
	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
1984	89.5	88.7	88.6	88.4	88.5	87.7	87.1	87.1	87.3	86.3	85.1	84.5	81.3	79.4	78.6	78.7	78.8	79.2	78.5
1985	89.7	88.9	88.8	88.6	88.7	87.9	87.4	87.3	87.5	86.5	85.4	84.8	81.6	79.8	79.1	79.2	79.2	79.6	79.0
1986	89.3	88.5	88.2	88.0	88.1	87.3	86.6	86.7	87.1	86 .0	84.9	84.2	80.8	78.8	78.0	77.9	77.9	78.2	77.6
1987	89.6	88.8	88.5	88.3	88.5	87.6	87.0	87.1	87.3	86.4	85.2	84.5	81.3	79.3	78.6	78.5	78.6	78.9	78.3
1988	89.6	88.8	88.5	88.3	88.5	87.7	87.1	87.2	87.3	86.3	85.3	84.5	81.3	79.5	78.8	78.7	78.7	79.2	78.5
1989	90.2	89.5	89.4	89.2	89.2	88.6	88.1	88.1	87.9	87.1	86.1	85.5	82.7	81.0	80.5	80.5	80.6	81.2	80.4
1990	90.5	89.8	89.7	89.5	89.6	88.9	88.5	88.4	88.3	87.4	86.5	85.9	83.3	81.7	81.2	81.2	81.3	82.0	81.1
1991	90.6	89.9	89.8	89.6	89.6	89.9	88.6	88.5	88.4	87.5	86.6	86.0	83.4	81.7	81.2	81.3	81.3	82.1	81.2
1992	90.8	90.2	90.1	89.8	89.9	89.4	89.0	88.9	88.6	87.8	87.0	86.4	83.8	82.2	81.8	81.9	81.9	82.8	81.8
1993	90.8	90.2	90.2	89.9	90.0	89.4	89.1	88.9	88.7	87.9	87.1	86.4	83.9	82.4	81.9	82.0	82.0	82.8	82.0
1994	91.0	90.5	90.5	90.2	90.3	89.8	89.5	89.3	88.9	88.1	87.4	86.8	84.5	83.1	82.7	82.8	82.8	83.8	82.8
1995	91.1	90.6	90.6	90.3	90.3	89.9	89.7	89.4	88.9	88.2	87.5	86.9	85.1	84.0	83.6	83.8	83.8	84.4	83.8
1996	90.9	90.4	90.3	90.0	90.1	89.6	89.3	89.1	88.7	88.0	87.3	86.6	84.9	84.1	83.7	83.8	83.9	84.2	83.8
1997	91.3	90.7	90.7	90.3	90.5	90.0	89.8	89.6	89.1	88.4	87.7	87.1	85.5	84.4	84.1	84.2	84.3	84.7	84.2
1998	91.2	90.6	90.6	90.2	90.4	89.9	89.7	89.5	89.0	88.2	87.6	87.0	85.4	84.3	84.0	84.1	84.2	84.6	84.1
1999	91.0	90.5	90.5	90.1	90.3	89.8	89.6	89.4	88.8	88.1	87.5	86.9	85.3	84.2	83.9	84.0	84.1	84.6	84.0
2000	91.1	90.5	90.5	90.1	90.3	89.8	89.6	89.4	88.8	88.1	87.5	86.9	85.3	84.2	83.9	84.0	84.1	84.6	84.0
2001	90.6	90.1	90.0	89.5	89.9	89.4	89.2	88.9	88.2	87.6	87.0	86.4	84.2	82.5	82.3	82.3	82.4	83.8	82.4
2002	90.9	90.4	90.3	89.9	90.1	89.7	89.5	89.2	88.6	87.9	87.2	86.7	85.1	83.8	83.6	83.7	83.7	84.4	83.7
Pii[1]	89.5	88.9	88.2	88.3	88.5	88.6	88.5	88.5	88.6	87.9	87.4	86.9	84.9	84.4	84	84	84.1	83.8	83.7

[1] *Pii* stands for the mean of the predicted probability for year i using the coefficients estimated for the same year i.

5.4.6 Forecasting Female Participation

Forecasting labour force participation is important to understand the fluctuations of other variables of interest such as employment, unemployment and wages. As discussed in Cutler and Turnbull (2001), the trends in participation rates for females and males move in offsetting ways. This makes it desirable to predict participation for women and men separately. In this section, we forecast female participation[11] for the years 2003 and 2004.

Results in Section 5.4.4 are estimated with a probit model, which has the property that the average of the predicted probabilities for participation for all individuals in the sample is approximately equal to the proportion of individuals who participate in that sample. However, because the probit is non-linear, this number is not equivalent to the predicted probability of participation of the average individual.[12] The latter depends on the distribution of the characteristics. As we explain later in the text, we forecast female participation for the average individual and we want this to be comparable to the proportion of women who participate. That is, we need a linear model and we consequently estimate a linear probability model.

Although the linear probability model is known to have two main problems (heteroskedasticity and the fact that predicted values can fall out of the band $[0, 1]$), it works better with very large samples (Maddala (1991)) such as the LFS. Table 5.18 in Appendix 5.8 replicates Table 5.3 for the linear probability model and shows the predicted probability of female participation for different year coefficients and samples. We observe that these two tables are very close, which suggests that forecasting with the linear probability model will be acceptable, especially since we are interested in the average of the explanatory variables.

To produce a forecast for female participation rate we need to project forward the average of every observable characteristic used in our estimation. Figure 5.5 in Appendix 5.9 shows the evolution across years of some of the explanatory variables in the model. The top left graph illustrates changes in the distribution of ages in the working age female population (16–59). We observe that female population is ageing in our sample since the proportion of women in their 20s declines, whereas those in their 50s increases across

[11] We have not attempted to predict male participation. This section applies a method for forecasting that relies on the coefficients being relatively constant over time. In Section 5.4.5 we found evidence that changes in male participation rates are mostly driven by changes in coefficients. Thus, the method used for predicting females' participation (see below) would not be adequate for predicting male participation.

[12] The average individual is a person who is characterised by the average of all explanatory variables in a given sample year.

years. The top right graph shows the rising trend in female education. We see the decline in fertility in the bottom left graph, as well as the drop in the proportion of women who are either married or cohabiting (bottom right graph).

We focus the projection analysis on the period 1993–2002.[13] We generate a two-step ahead forecast of female participation.[14] For example, we take the coefficients estimated for 2002 and apply the projection of the mean of the explanatory variables for 2004 in order to get the forecast in female participation for 2004. Starting earlier in 1993 allows us to evaluate the accuracy of our method since we can compare out turns for female participation with the forecast.

The projection of the mean of the explanatory variables is done as follows. We take the average growth rate over the previous three years for each average explanatory variable and apply this rate to calculate the numbers for the next two years.[15] For example, in 1993 we want to know the projected average characteristics for 1995. We use the average growth between 1990 and 1992 and apply this growth to the 1993's average characteristics to obtain the 1995's ones.

Once we have the projection of the average individual two years ahead (say $\hat{\bar{X}}_{t+2}$), we multiply them with the coefficients estimated with the sample at year t ($\hat{\beta}_t$) to obtain the forecast of female participation for year $t+2$. Table 5.5 shows the actual participation rates ($\hat{\beta}_{t+2}\bar{X}_{t+2}$), the forecast ($\hat{\beta}_t\hat{\bar{X}}_{t+2}$), the total error ($TE_{t+2}$) and also how much of the error is due to the fact that the model at t is not able to explain what happens in $t+2$ ($\bar{X}_{t+2}(\hat{\beta}_{t+2}-\hat{\beta}_t)$). The latter means comparing the predicted probability with coefficients estimated at t and the average of the real sample at $t+2$ ($\hat{\beta}_t\bar{X}_{t+2}$) *vs.* the actual participation rate. If this part of the error is small, the majority of the error is caused by the projection of characteristics.[16] By contrast, if this part contributes more on the error, it

[13]Since the 80s are characterised by big changes in the coefficients, this methodology of forecasting is expected to behave badly for this period. We have produced forecasts for the 80s in order to check if this is the case. We find that, for example, the forecasting error for 1989 is 2.2, much bigger than the errors we have in the 90s. This is why we base our forecasting exercise on the period 1993–2002.

[14]Note that in Section 5.4.4 we found that changes in coefficients are less important than changes in characteristics to explain female participation trend in the 90s. This means that coefficients from 2002 should be relatively good at predicting participation for 2004. However, Section 5.4.5 shows that male coefficients are driving most of the changes in participation from 1993, which makes it less reliable to trust previous coefficients to forecast men's participation.

[15]We assume that the relatively close past determines the characteristics of the following two-three years. We believe that this is more adequate than taking another criterion that weights more the distant past.

[16]This would imply that the criterion for projecting them is not capturing the real path and one should think of an alternative method.

Table 5.5: Forecasting Female Participation in the UK[1]

Year $t+2$	$\hat{\beta}_{t+2}\bar{X}_{t+2}$	$\hat{\beta}_t\hat{\bar{X}}_{t+2}$	$\hat{\beta}_t\bar{X}_{t+2}$	TE_{t+2}	$\bar{X}_{t+2}(\hat{\beta}_{t+2}-\hat{\beta}_t)$	$\hat{\beta}_t(\bar{X}_{t+2}-\hat{\bar{X}}_{t+2})$
1995	70.9	70.6	71.8	0.3	-0.9	1.2
1996	70.8	71.6	71.4	-0.8	-0.6	-0.2
1997	70.8	71.4	71.9	-0.6	-1.1	0.5
1998	71.2	72.3	71.8	-1.1	-0.6	-0.5
1999	71.8	72.3	71.4	-0.5	0.4	-0.9
2000	72.1	72.3	71.7	-0.2	0.4	-0.6
2001	72.3	72.9	71.4	-0.6	0.9	-1.5
2002	72.6	72.7	72.9	-0.1	-0.3	0.2
2003		72.8				
2004		73.3				

[1] *Measure of fit*: MSE = 0.37

is the model that causes the inaccuracy.

The total error in forecasting is:

$$TE_{t+2} = \hat{\beta}_{t+2}\bar{X}_{t+2} - \hat{\beta}_t\hat{\bar{X}}_{t+2} \tag{5.9}$$

Adding and subtracting $\hat{\beta}_t\bar{X}_{t+2}$ and adjusting terms yields:

$$TE_{t+2} = \bar{X}_{t+2}(\hat{\beta}_{t+2} - \hat{\beta}_t) + \hat{\beta}_t(\bar{X}_{t+2} - \hat{\bar{X}}_{t+2}) \tag{5.10}$$

The first part of the sum of the decomposition of the total error in forecasting is the inaccuracy caused by the coefficients being wrong. The second part is due to the fact that the projection of the characteristics is misleading.

Notice that we estimate the probability of female participation controlling for microeconomic variables. This implies that the constant term in our linear probabilistic model captures the cyclical movements of the macroeconomic variables. Therefore, using the constant for 2002 to predict female participation for 2004 might cause an error since we apply the macroeconomic characteristics of 2002 to 2004 and these could be rather different. Fortunately, the constant term is quite smooth across all years,[17] which implies that the impact of the non-captured macroeconomic variables is rather homogenous. Ideally, one would like to model the constant term so that this effect is eliminated. Nevertheless,

[17] The constant term is mostly around 0.6 in all years, with a minimum value of 0.54 and a maximum value of 0.82.

because of the few observations, we believe that modelling the constant term will have a poor contribution here and we therefore proceed without addressing this issue.

The failure to fit the past history has an important impact on the ability to forecast the future. Some adjustments have been proposed in the literature (Clements and Hendry (1998); Clements and Hendry (2002)). For example, the so-called 'intercept corrections' that consist of projecting into the future past forecast errors to get the model 'back on track'. This involves finding a sequence of residuals (which are in general the forecasts of future values for the residuals) that would enable the model to reproduce the recent past history. In Table 5.19 in Appendix 5.8 we adjust the forecast with a constant adjustment based on the average of the last three years forecasting errors.[18] Results are discussed later in the text.

We recognise that forecasting the age distribution as it is done here could be subject to the criticism that age is not a random variable and depends on the cohorts. In order to assess if this causes a greater error in predicting female participation, we have decomposed the error across the observable characteristics to identify those that contribute more to it. That is, we aim to check if the age distribution produces a systematic bigger increase in the error compared to the other variables. If this were the case, we should think of another method of predicting age. Since the decomposition of the errors in each year turns out to be no larger for age than for the rest of characteristics, we keep age prediction as it is carried out with the other covariates.

Similarly, another way of improving the out-of-sample female participation forecast is to smooth the coefficients in order to flatten their errors. We have reproduced the forecasting by taking the average of the coefficient between t and $t-1$ in order to predict participation for $t+2$. That is, the new forecasting value is determined by $\hat{\beta}^a_{t,t-1}\hat{\bar{X}}_{t+2}$ where $\hat{\beta}^a_{t,t-1} = \frac{\hat{\beta}_t + \hat{\beta}_{t-1}}{2}$. Since the errors from the forecasting using $\hat{\beta}^a_{t,t-1}$ are very close to those using $\hat{\beta}_t$ (slightly smaller) we rely on the prediction as previously described.

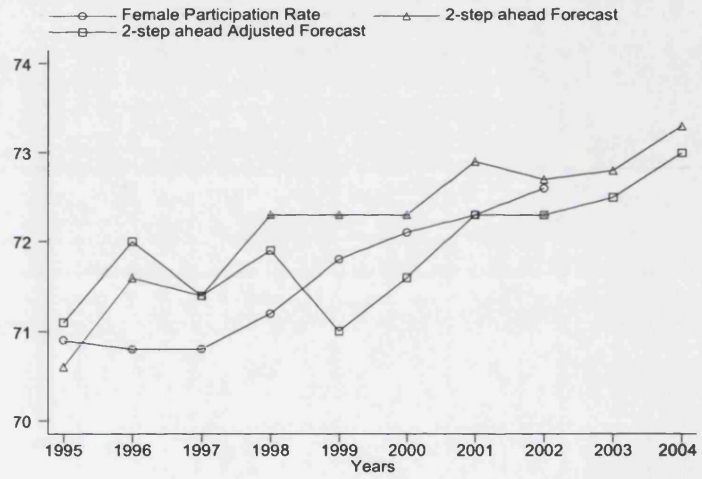
In Table 5.5, we observe that female participation is predicted to be 72.8 in 2003 and 73.3 in 2004. Thus, female participation will continue rising by around 0.7 percentage points in the next two years. The adjusted forecast value (see Table 5.19 in Appendix 5.8) is 73.0 for 2004, which implies an increase of 0.4 percentage points between 2002 and 2004. The mean squared error (MSE) is 0.37 for the forecast without adjustment and 0.41 for the adjusted one. It is not clear-cut that the adjusted forecast provides a better

[18]The forecasting for year 2004 is adjusted with the average errors of 2001 and 2002.

projection for the female participation rate in 2004. We therefore predict that the rise in female participation between 2002 and 2004 will be in the range of 0.4–0.7.

Interestingly, with another methodology,[19] Cutler and Turnbull (2001) estimated an increase of female participation in the range 0.4–0.7 percentage points between 2000 and 2002. Figure 5.1 shows female participation rates and the two-step ahead forecast (with and without adjustment) of the female participation rate. Our model is more accurate in the final years.

Figure 5.1: Two-step Ahead Forecast of the Female Participation Rate in the UK[1,2]



[1] We adjust the forecast adding the average of the last three forecasting errors.
[2] The adjustment for 2004 consists of adding the average error of 2001 and 2002.

[19] Schweitzer and Tinsley (2002) propose a forecasting approach that uses both micro-level and aggregate data. They find that their estimator outperforms conventional macro-econometric forecasts. But since they predict total participation (both male and female above the age of 16), it is difficult to compare their results with ours.

5.4.7 Summary and Conclusions

In this section, we have looked at two main issues. First, we analyse the increase in female participation between 1984 and 2002. Second, we make a two-step ahead forecast of female participation rates.

We decompose the growth in participation into two sources. On the one hand, changes in the characteristics of the female population such as education, fertility and marital status. On the other hand, changes in the coefficients that capture both differences in behaviour across these years and changes in other variables not included in our specification.

Female participation in our sample (aged between 16–59 who are either the heads or their spouse) rises from 62% to 73% during the period. We find that two thirds of the growth in female participation is associated with changes in the female population structure. The main contributors amongst the characteristics are the increase in education and the drop in fertility.

The other third of the rise in female participation is due to changes in the coefficients. This means a variation in behaviour (women with same observable variables respond differently across these years) and/or a change in other variables not accounted for in the model. The pattern is rather different from men, whose decline in participation is mainly driven by changes in behaviour, especially after 1993.

Most of the increase in female participation between 1984 and 2002 take place in 1984–92 (about 8 points of the total 10 percentage points). Interestingly, in the 80s, changes in coefficients (i.e. behaviour) contribute significantly to the participation growth, whereas the majority of the growth in the 90s is driven by characteristics. This implies that periods of greater female participation growth are those in which changes in the coefficients have a significant impact.

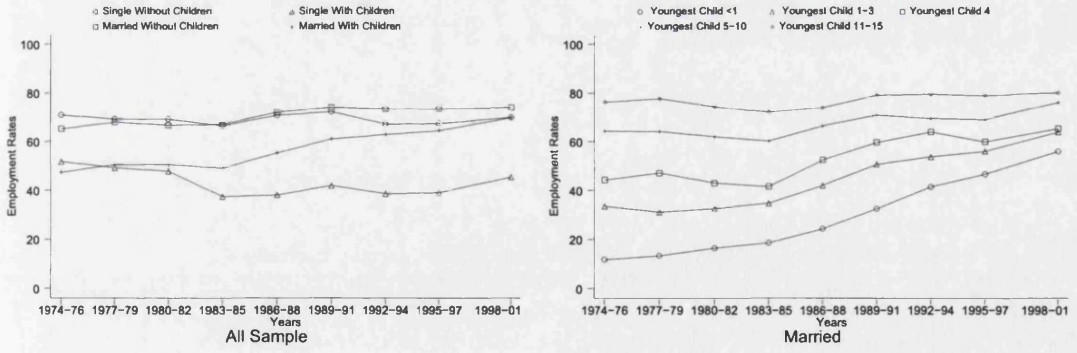
Given that changes in coefficients contribute less to female participation trends in the last few years, we can use the predicted coefficients in a particular year to forecast female participation two years ahead. Our forecasting approach implies an increase of female participation of about 0.4–0.7 percentage points between 2002 and 2004.

5.5 The Employment of Married Mothers in Great Britain: 1974–2000[20]

5.5.1 Introduction

Employment rates of married mothers (see Figure 5.2 and Table 5.6) have risen dramatically over the last twenty years. This increase in participation of married (or cohabiting) mothers is far in excess of that experienced by other women and is especially marked among those with children aged under five.[21] For example, married mothers' employment rates have risen by 15% since 1983, with employment of married mothers with children under the age of one rising by a staggering 40%. The purpose of this section is to analyse the impact of changes in maternity policies, take home pay and childcare on the labour market participation of mothers in Great Britain over this period. Our approach consists of isolating those birth cohorts whose mothers experienced significant increases in employment and relate those to changes in policies. Furthermore, we aim to differentiate the type of mothers who had significant rises in employment.

Figure 5.2: Female Employment Rates in Great Britain: 1974–2000[1,2]



[1] All Sample = women aged 16–59.
[2] Married = both married and women in cohabitation aged 16–59.

As we have shown in Section 5.4, changes in policies seem to have had a greater impact in the 80s and beginning of the 90s. Recall that these were found to be the years where changes in coefficients had contributed more to the rise in female participation. If we

[20] This section draws on joint research with Paul Gregg and Jane Waldfogel. I would like to thank them for their collaboration and instructive comments.
[21] From now on we will call married those women who are not only married but also cohabiting.

think that variation in coefficients partly reflects changes in policies not accounted for in the model, the analysis in the previous section seems to confirm that whatever new legislation was enacted in the last 20 years, it was probably more effective before 1992.

The results of this section suggest that maternity rights have had a profound effect on employment but this has operated interactively with mothers' wage opportunities. Maternity rights have induced a behaviour change to return to work in the first year post-birth, among many mothers who would have otherwise gone back to work when their children were age 3 to 5. This effect has been most marked among better-educated and higher-paid mothers and has strengthened as real wages have risen through time.

The rest of the section is set out as follows. Subsection 5.5.2 provides an overview of the policies and institutions in the period 1974–2000 in order to explore possible causal candidates for the change in mothers' employment. Subsection 5.5.3 describes data and methodology used in our analysis. In Subsection 5.5.4 we identify relative employment shifts by the presence and age of children for married women, controlling for characteristics. In Subsection 5.5.5 we isolate the effective policies by exploring the timing of when they came into effect and the variation in impact across groups more or less affected. We interpret these results in Subsection 5.5.6 and conclude in Subsection 5.5.7.

Table 5.6: Female Employment Rates in Great Britain: 1974–2000

	1974–76	*1977–79*	*1989–91*	*1998–01*	*Δ (2000-1974)*
Married Without Children	65.1	67.8	74.0	74.0	8.9
Married With Children	47.3	50.4	60.9	69.7	22.4

5.5.2 Policy and the Employment of Married Mothers

Right of Reinstatement and Maternity Leave

The 1974–79 Labour government passed two key employment provisions with concern to mothers expecting a child (both contained in the Employment Protection Act of 1975).[22] These were Maternity Leave (a period of paid leave from employment) and the Right of Reinstatement (*RofR* - effectively a period of unpaid leave after which the mother has the right to return to her previous job).

[22]See Harries (1975) for a summary of the introduction of the main maternity rights in the Employment Protection Act (1975).

Maternity leave legislation entitles women in employment who meet specific qualifying conditions (these have changed through the period of study) to receive a certain number of weeks of maternity pay after stopping work for childbirth. According to her recent employment history, a woman will be paid either by her employer through the Statutory Maternity Pay (*SMP*) or by the Department of Social Security through the Maternity Allowance (*MA*). Employers may also choose to make maternity payments in addition to the statutory minimum, or they may make payments to women who do not fulfill the statutory requirements through Contractual Maternity Pay (*CMP*). Many employers also attached return-to-work conditions to the receipt of *CMP*. Table 5.20 in Appendix 5.8 summarises the main changes in maternity leave legislation. For the most part, these have been intended to facilitate post-birth employment.

Payments under *MA* become more generous between 1979–2000 and in 1987, Maternity Pay was relabelled Statutory Maternity Pay (*SMP*) with minor administrative changes. In 1994, the eligibility for 6 weeks pay with 90% of the salary was relaxed. Women no longer needed to have continuously worked for 2 years/16 hours per week or 5 years/8–16 hours per week with the same employer. Therefore, the only criterion was to have worked for 26 weeks.

The second provision was the *RofR* and protection from unfair dismissal related to pregnancy.[23] This gives the right to return to the same job at any time up to 29 weeks after childbirth. In order to be eligible for this right, a mother had to have had two years of continuous employment prior to the 11^{th} (15^{th} from 1987) week before the expected week of confinement (*EWC*). In 1994,[24] the *RofR* after 14 weeks leave was extended to all pregnant women, regardless of their hours of work or length of service (raised to 18 weeks in 2000). Those with longer tenure were entitled to an extended *RofR* period of 29 weeks. Thus, there has been an important reduction in the conditions women need to meet in order to qualify for maternity leave.

Taxation

Some taxation changes affect married women disproportionately and, to the extent changes affect part-time workers more, these may have a differential impact on married mothers who are more likely to work part-time.

Both employers and employees pay National Insurance (*NI*) to cover the cost of cer-

[23]The Right of Reinstatement was qualified through the Employment Act in 1980 (Daniel (1981)).
[24]In October 1994 the government was forced to implement the EU Pregnant Workers Directive.

tain social security benefits. As reported in Adam and Frayne (2001), prior to the 1985 reform, a person paid no *NI* if earnings were below the Lower Earnings Limit (LEL). But once she crossed the line, a fixed percentage of total earnings (not just on income above the line) was due. Hence, in 1985 (in 2002 prices) no *NI* was due on earnings of £71.99 per week or below. However, at earnings of £72.00, *NI* of £14.00 was due, £6.48 (9%) from the employee and £7.56 (10.45%) from the employer. This step increase in *NI* payments was called an entry fee to gain access to *NI* benefits. This step created significant bunching in the labour market at this lower earnings limit and discouraged the use of part-time work, except for very short hours or the lowest paying jobs. In 1985, there was a reduction in the liability to £7.20 (5% employee and employer); this was cut to £2.88 in 1989 (2% employee and employer). In 1997, the government eliminated the jump in the liability on entering the *NI* system. These changes may have made part-time work more attractive to employers and employees and may have become especially beneficial to mothers.

The unit over which income tax is calculated may have an effect on the incentives to work within a married couple. Prior to 1990, the basis was the sum of the combined earnings of the couple (*Joint*) and, from 1990, the assessment was undertaken separately (*Separate*). Separate taxation gives a two earner couple a larger tax-free range than a one-earner couple on the same income. Hence, the marginal and average tax rates are usually higher under a *Joint* system. An extra tax allowance for one earner in a married couple (the Married Couples Allowance, *MCA*) was progressively reduced in value after 1990 and finally abolished in 2000. The introduction of *Separate* taxation is expected to increase the number of two-earner couples. Since the greatest gain is over the tax-free zone on income (the personal allowance), this effect may particularly encourage part-time employment.[25]

Table 5.21 in Appendix 5.8 summarises the history of financial support for children in the UK. In-work benefits are likely to have an impact on mothers' participation. At the beginning of our sample period there was the Family Income Supplement (*FIS*), first introduced in 1971. This was modified substantially in 1988 with the Family Credit (*FC*) and in 1999 with the Working Families' Tax Credit (*WFTC*). These in-work child benefit payments are all assessed on joint income for couples. These systems have become progressively more generous over the period and are likely to have the obverse effect from the tax changes since they are raising average and marginal deduction rates. However, these

[25]Under the British *Joint* taxation there was an earned income allowance that made it more similar to a *Separate* system. This means that the change in taxation only had an impact on those couples that were not eligible for this allowance.

negative effects only apply where there is a working partner on a low income. Thus, they tend to discourage part-time work (two full-time jobs normally lifts people well above qualification) among mothers with low earning partners.

In summary, both the *NI* reforms and the switch in taxation from a joint to a separate assessment have dramatically reduced the taxation of part-time employment for married women, which in turn has made part-time work more attractive for those with children. At the same time, the more generous in-work child benefit systems go the other way but only for mothers with low earning partners.

Childcare Legislation

The role of the government regarding childcare has changed substantially between 1979 and 2000.[26] Under the successive Conservative Governments (1979–92), policy was limited to the regulation of childcare provision. In 1983–87, there was a program devoted to under-fives for disadvantaged families. In 1988, the Children Bill required local authorities to review day care provision in their area. The Children Act in 1989 improved the Children Bill by obliging local authorities (*LA*) to register and inspect childcare services. Over the period the number of *LA* nurseries actually fell and there was an expansion of child minding and private and voluntary nurseries. Thus, 1979–1992 was characterised by the state regulating childcare rather than facilitating the services themselves.

During John Major's government (1992–97), the target was to make the private and voluntary sectors (and not the state) the providers of childcare. That is, the government wanted to concentrate on the demand rather than the supply of day care through childcare vouchers. From 1997, the Labour Government rejected the sole development of private childcare provision and accepted the need for a national childcare policy. The Working Families' Tax Credit in 1999 provides an explicit tax credit supplement for eligible childcare. Eligibility means that day care must be provided by registered childminders, private nurseries or after-school clubs on school premises, run by the school or *LA*. In addition to this, the government undertook to provide a free half-day childcare place for all four year olds by 1999 in schools and this has recently been extended to 3 year olds. If the child is with a private/voluntary carer the equivalent cost of provision by a school is met by the state. Furthermore, *LAs* have been encouraged to increase provision of after-school clubs and holiday schemes.

Both the improvement of quality requirements for day care centres in the 80s and 90s

[26] See Randall (2000) for further information.

and the introduction of childcare working credits are expected to have had a positive impact on mother's employment. The former make mothers less reluctant to use external childcare, as they know that the quality is regulated by the state. The latter (from 1993 on) reduces mothers' opportunity cost in their labour supply decision. However, any significant impact of childcare supply on mothers' employment decisions is likely to be restricted to the 90s and probably only to the period after 1999.

5.5.3 Data and Methodological Approach

We use the General Household Survey (GHS), which is a repeated annual cross-sectional study of private households in Great Britain. In particular, we use all surveys released from 1974 to 2000/01. The General Household Survey has experienced several modifications during this extended period. Major efforts have been undertaken to create a consistent database and build up new variables that unify all changes. The construction of the variables is explained in Appendix 5.7. The main advantages of the GHS database are its long history and its detailed information on birth histories of mothers. The GHS surveys contained responses from approximately 12,000 households per year prior to 1994 and 9,000 households annually thereafter.

Within any year we have information on 2500–3000 mothers[27] with children aged 0 to 15 and around 350 with a single year age group per year. As these samples are getting quite small we create 3-year cohorts of births. For instance, all births in 1980, 1981 and 1982 are grouped into a single cohort. Information on this birth cohort at age 5 will therefore reflect data on births in 1980 from survey year 1985, births in 1981 from survey year 1986 and births in 1982 from survey year 1987. We then track the birth cohorts in successive years, and although this is not true panel data, we are sampling from the same population of births as the children age, creating a pseudo-panel.

This approach differs from looking at mothers by the age of youngest child in that the mother remains identified as member of the original birth cohort as well as the new one if there is a subsequent birth. This means that we are always sampling from a constant population. In the analysis, birth order and the numbers of older and younger siblings are always included as control variables. The main advantage is that we can see far more clearly any persistence of responses to changes in behaviour when the children were younger. This should be clear to the reader as we deal with the actual data.

[27] Around 2000 mothers in the 1998 and 2000 GHS release.

Figure 5.2, in the introduction, showed the evolution of female employment by marital status and age of the youngest child. Substantial gains in employment were made by married mothers, which were largely not apparent for single or married women without children. These gains were of the order of 15 percentage points on average but were mainly concentrated among women with young children. The point here is to identify the reason for this movement, especially if it is linked to various policies.

Note that employment paths could have been driven by changes in specific characteristics across time in each of these groups. For instance, a rise in employment of married women with children could be due to the fact that this group is increasing their education across time. Therefore, we need to condition on observable characteristics.[28] There are also external common factors (e.g. economic performance) that could be driving the employment rate changes. This is why it is important to select a comparison group through all the analysis. We take married women without children as our reference group since they are affected by the aggregate economic cycle and policy changes unrelated to children but not by child-related policies.

Hence, we are using a standard difference in difference technique but assessing changes over successive cohorts where a range of different policies may have cumulative effects. If after this benchmarking against similar married women without children we still observe an upward trend in mothers' employment, the aim is to relate it to changing institutional policies or labour market opportunities. First, we identify both the time and the specific birth cohorts for which any policies kicked in. Second, we focus on sub-groups who are likely to be more or less affected by aspects of policy change.

5.5.4 Employment of Married Women with Children 1974–2000

We base our analysis on three-year grouped birth cohorts between 1974 and 2000 (1974–76, 1977–79, 1980–82, 1983–85, 1986–88, 1989–91, 1992–94, 1995–97 and 1998–2001) and track these birth cohorts as the child ages from 0 to 15.[29] We then test for how large 'em-

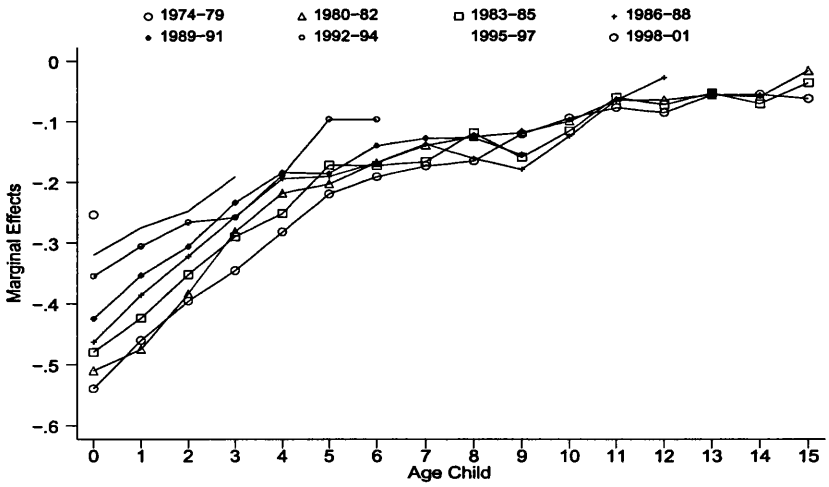
[28] In Figure 5.6 in Appendix 5.9 we observe a significant increase in the employment pattern of married women with children once we control for observable characteristics.

[29] For the testing and marginal effects' graphs, we always ensure that we have at least 18 months of observations. Note that this is relevant for two reasons. First, the release of GHS in 1996–97, 1998–99 and 2000–01 does not include the whole annual data. For example, the release 2000–01 has data from April 2000 to March 2001, which implies that January to March is missing for year 2000 and, April to December is missing for year 2001. Second, the later the survey years are, the younger the birth cohorts that these year surveys can comprise. Because of these two facts, for birth cohorts 1986–88, we only consider up to age of child is 12; for 1989–91 up to age of 9; 1992–94 up to age of 6; 1995–97 up to age of 3; 1998–2001 up to age of 0.

ployment gaps' of mothers in these birth cohorts are, relative to married women without children but with similar characteristics.

The initial focus is on the impact of the introduction of maternity leave and pay rights in 1979. So our first two birth cohorts are pre-maternity rights. First, we investigate whether there was any significant relative gain by married mothers before maternity rights for any age (i.e. whether the 1974–76 birth cohort is significantly different from the birth cohort 1977–79).[30] If these two birth cohorts are not different, we can merge them into one 1974–79, as this creates a larger sample to use as our base, making comparisons more robust. For this testing, we group the ages of the children in: 0–4, 5–10 and 11–15. For example, we test whether birth cohort 1980–82 is significantly different from 1974–79 for children age 0 to 4 (or 5 to 10, or 11 to 15). Tests for whether the birth cohorts for 1974–76 and 1977–79 differ are rejected for all age groupings together and separately. Therefore, in all results from here on we merge them into a single birth cohort from 1974–79 and continue the analysis by comparing the later birth cohorts with it.

Figure 5.3: Marginal Effects on the Probability of Employment, By Children's Birth Cohorts and Age[1] — Married Females in Britain



[1] Comparison group are all married childless women.

Married women without children have seen modest increases in employment rates over the period, from 65% in 1974–76 to 74% in 1998–2001. Figure 5.3 shows the employment gaps of married mothers with children in each birth cohort against the benchmark

[30] Previous birth cohorts 1962–64, 1965–67, 1968–70 and 1971–73 are calculated and included in regressions but the coefficients are not reported.

of married women without children who have the same observable characteristics, from 1974–79 to 1998–2001. In the 1974–79 period, mothers employment always lay below the employment of married women without children. However, there is a very pronounced arc shape since the excess deficit is 50% for women with children under 1 but narrowed to just over 20% by age 5, and to 10% at age 11, where the gap stabilises.

The are three main points from Figure 5.3. First, the steady rise of employment among mothers with children age 0 and 1. Nevertheless, there is the concern that, after the introduction of maternity rights, mothers might report to be employed when they are on leave, and move to inactivity when the period of leave expires. This mechanism would lead to increases in the observed employment rates among recent mothers that are partly fictitious. However, Figure 5.3 shows that there is a rise when the child is aged 1 that is parallel to that of age 0. Since women whose child is one year old can not be on maternity leave, this means that the increase at age 0 is not just more mothers saying they are on maternity leave but not actually returning to work.[31] Second, there is little increase in employment at age 5 and above relative to married women without children. This makes clear that the relative employment gain of married mothers is confined to those with young children. Third, the change in the first post-maternity leave period is very modest but the impact appears to have increased progressively since.

Table 5.7 reports both the mean gap of the coefficients for each birth cohort relative to the base 1974–79 for the age groups 0–4, 5–10, 11–15 and 0–15, and the joint significance of these cohort specific age effects (p-value). We observe that the average difference between the base 1974–79 cohort and the 1980–82 cohort is 3 percentage points up to age 4 and significant, but around 1.5 points at older ages and not significant. The average gap widens to 4.5 points in 1983–85 for age 0–4 and reaches 13 points for the 1992–94 cohort. Notice that this is the last cohort to have reached age 5 by 2000 since the subsequent cohorts only cover children up to age 3 (1995–97) and age 0 (1998–2001). Each successive cohort has added 2 to 3 percentage points to that of the previous one in reducing the employment deficit with respect to married women without children. Thus, it appears to be a sustained catch up at a broadly constant rate.

Table 5.7 also shows that there are no significant cohort effects once the children are aged between 5 and 10 or older than 11 years old, at any point in time. This suggests

[31] Figure 5.7 in Appendix 5.9 confirms this view since it shows that employment rates after birth are rather flat within any cohort but gradually shift upwards across cohorts. There is, however, a slight decline of mothers' employment rates in 1998–01, which suggests that more generous maternity leave periods could have some positive bias effect for this birth cohort.

Table 5.7: Tests whether Later Birth Cohorts are Different from 1974–79 in All Married Sample — Females in Britain

Base 1974–79	*Age Child*	*Employed=1*[1]		*Fulltime=1*[2]	
		Mean Gap	*p-value*	*Mean Gap*	*p-value*
1980–82	*0–4*	0.0311	0.0001	0.0131	0.0001
	5–10	0.0187	0.3490	0.0139	0.0314
	11-15	0.0152	0.6104	0.0085	0.2738
	All	0.0215	0.0041	0.0120	0.0001
1983–85	*0–4*	0.0454	0.0000	0.0147	0.0000
	5–10	0.0101	0.0792	0.0121	0.1058
	11-15	0.0088	0.9323	0.0196	0.0428
	All	0.0208	0.0000	0.0153	0.0000
1986–88[3]	*0–4*	0.0804	0.0000	0.0290	0.0000
	5–10	0.0008	0.1199	0.0103	0.1606
	11-15	0.0349	0.2577	0.0257	0.1521
	All	0.0367	0.0000	0.0198	0.0000
1989–91[4]	*0–4*	0.1043	0.0000	0.0322	0.0000
	5–10	0.0270	0.0637	0.0218	0.0074
	11-15				
	All	0.0656	0.0000	0.2703	0.0000
1992–94[5]	*0–4*	0.1300	0.0000	0.0384	0.0000
	5–10	0.1090	0.0001	0.0592	0.0000
	11-15				
	All	0.1240	0.0000	0.0443	0.0000
1995–97[6]	*0–4*	0.1708	0.0000	0.0521	0.0000
	5–10				
	11-15				
	All	0.1708	0.0000	0.0521	0.0000
1998–01[7]	*0–4*	0.2856	0.0000	0.0740	0.0000
	5–10				
	11-15				
	All	0.2856	0.0000	0.0740	0.0000

[1]Reference group: all childless married women.

[2]Reference group: all childless married women. Note that the dependent variable in this column is *Fulltime*, whereas in all other tables is *Employed*.

[3]Only up to the age of 12 to ensure that we have at least 18 months of observations. The GHS in 1996–97, 1998–99 and 2000–01 does not include the whole annual data.

[4]Only up to the age of 9.

[5]Only up to the age of 6.

[6]Only up to the age of 3.

[7]Only up to the age of 0.

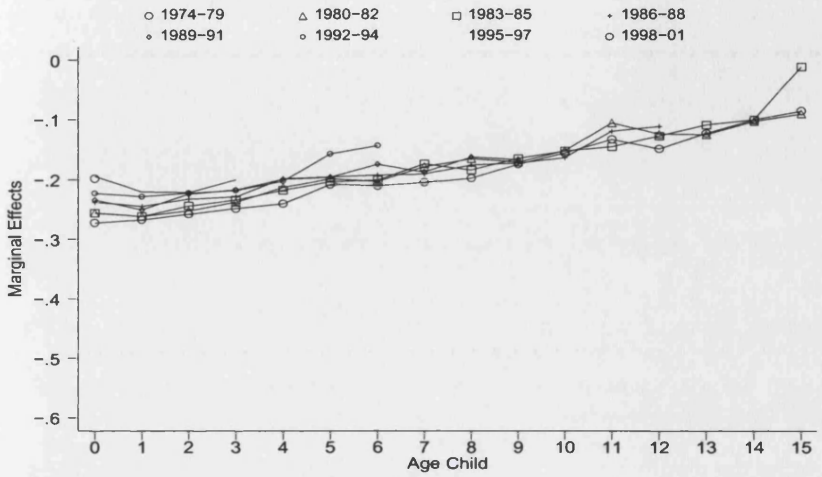
that there has been a marked shift in the pattern of return to work after birth, from mothers whose child is 3 to 5 years old to mothers whose child is 0 years old. This means that women make use of maternity rights and they do not delay anymore to first return to work when their child is over 5. This type of response to having maternity rights is also found by Burgess, Gregg, Propper and Washbrook (2002) in a study using a panel of births in the Avon district from 1991–92. Graphically this appears like a ramp being raised with the pivot point at age 5. Hence, there are progressively smaller gains in employment (with respect to married women without children) at ages 2 to 6, and little further rise once the children are aged 5 or 6. Furthermore, this process has not yet stopped with the last two cohorts, who have not reached age 5 yet, posting gains fully in line with past cohorts.

To summarise, there is a behavioural change towards more women successively returning to work within the first year after birth, instead of staying out of employment until the child is 5 years old. The rise is more pronounced for birth cohort 1980–82, which clearly highlights the role of the introduction of maternity rights policies. However, the smooth delayed reaction for the subsequent three year birth cohorts suggests that there are other factors interacting.

Before moving on to explore what else has been important, we first investigate the pattern of full-time employment by mothers over these cohorts. Full-time employment is considered to be 30 hours or more per week. Table 5.7 and Figure 5.4 report the same information for full-time employment only. The upward slope of employment as the child ages is markedly shallower for full-time employment and the initial deficit relative to married women without children is smaller. This implies that a sizeable part of the initial employment deficit is from lower part-time as well as full-time work.

More importantly, there is a very small decrease in the relative full-time employment deficit over time and it is broadly the same for ages above and below 5. Hence, almost all the increase in mothers' employment when children are under 5 is stemming from increases in part-time employment. Burgess et al. (2002) show that around 75% of returners in the first year post-birth do so to part-time work in a cohort of births in 1991–92. This is despite the fact that there is no legal right to return to part-time jobs if the mother was employed full-time prior to the birth. The observed change in behaviour toward increased employment in the first year after birth, mainly restricted to part-time work, is consistent with the *NI* changes from 1985, 1989 and 1997 and the switch to separate taxation in 1990, which reduced the tax burden on part-time work for married women relative to full-time work.

Figure 5.4: Marginal Effects on the Probability of Full-time Employment, By Children's Birth Cohorts and Age[1] — Married Females in Britain



[1] Comparison group are all married childless women.

In summary, it is clear that maternity policies have had a big impact on employment behaviour after a birth with a sharp shift in employment returns to the first year post-birth from the period 2 to 5 years post-birth. However, this has happened in a progressive way through time and is largely restricted to increases in part-time work relative to married women without children with similar characteristics, which is probably a response to the changes in tax treatment of part-time work for second earners over the period.

5.5.5 Isolating Effective Policies

First Birth *vs.* Higher Order Birth

Maternity rights have been extended through the period most notably in 1994 with the ending of the longer qualifying period for mothers working less than 16 hours prior to the birth to be eligible for the full 29 weeks with *RofR*. Furthermore, there was a more limited period (14 week-long) even for those with less than 2 years tenure.

One way of exploring this change in the required tenure to be eligible for maternity rights, without knowing the employment status of mothers before the birth, is to look at mothers for whom it was a first or second or subsequent birth. The data reported in Burgess et al. (2002) confirms the expectation that only 8% of women were working part-time prior to their first birth in 1991. In contrast, 30% of women worked part-time before a second or later birth. Part-time workers generally have shorter tenure, which means that many of

the women working prior to a second birth will have limited job tenure. However, the data in Table 5.8 shows a marked increase in employment amongst first births after 1994.[32] Thus, it is surprising to see the divergence in employment patterns between first and second births from 1994 onwards. This suggests that the extension of maternity rights from 1994, aimed to cover more part-time workers, has not been fruitful in increasing early return among mothers of second or higher order children (who are highly likely to be part-time workers). This may be because the change in eligibility for maternity rights for part-time workers only applies to those with less than 16 hours employment per week. Hence, this change may be too marginal to be observed in such aggregate data.

Childcare Support

Childcare policy involved little direct provision or extra financial support until the introduction of childcare vouchers in 1995 (Randall (2000)).[33] This, as well as the later guaranteed half day childcare places in 1999, were focused exclusively on 4-year-olds. Although it might be early to evaluate the most recent change, there is no extra jump in the employment of the mothers of 4-year-olds in cohorts reaching that age in the middle to late 90s (see Figure 5.3). Therefore, there is evidence that these policies did not raise employment for this group of mothers. We would like to point out, however, that the aim of providing childcare of a reasonable quality to all 4-year-olds whose parents wanted it was not primarily to raise mothers' employment.

Level of Education, Age at First Birth and Predicted Wage

The major candidates for progressively raising the use of maternity rights through time, other than changing tastes, are rising wages and taxation changes. These can make work more worthwhile and increase the cost of not staying in one's old job.[34] To explore which groups have been more responsive, we repeat the earlier analysis but split mothers by education, age at first birth and predicted wage. We investigate these alternatives as returns to education and experience have risen over this period (see Schmitt (1995) or Machin (1999)). Rising returns to education are likely to imply that the wage is increasing returns to working relative to the cost of childcare, which is generally provided by low skilled labour. Furthermore, returns to experience are likely to be eroded or lost by an extended separation from the labour market after child birth.

[32] See also Figures 5.8 and 5.9 in Appendix 5.9.

[33] The vouchers experiment was short-lived since the Labour government rapidly repudiated it. The vouchers scheme helped the establishment of the Labour's Early Years Development and the universalising of the provision for 4- and ultimately 3-years-olds (Randall (2000)).

[34] Akin to the cost of job loss literature see Farber (1993), Kuhn (2002), Gregg and Wadsworth (2002), Nickell, Jones and Quintini (2000).

Table 5.8: Tests whether Later Birth Cohorts are Different from 1974–79 by Parity — Females in Britain

Base 1974–79	*Age Child*	1^{st} *Birth*[1]		2^{nd+}*Birth*[2]	
		Mean Gap	*p-value*	*Mean Gap*	*p-value*
1980–82	*0–4*	0.0189	0.0016	0.0400	0.0012
	5–10	0.0407	0.0802	0.0489	0.0005
	11-15	0.0223	0.4134	0.0281	0.2697
	All	0.0281	0.0027	0.0396	0.0000
1983–85	*0–4*	0.0511	0.0001	0.0695	0.0000
	5–10	0.0508	0.0175	0.0667	0.0000
	11-15	-0.0012	0.9967	0.0320	0.1339
	All	0.0347	0.0004	0.0567	0.0000
1986–88[3]	*0–4*	0.1081	0.0000	0.1116	0.0000
	5–10	0.0785	0.0000	0.4460	0.0002
	11-15	0.0319	0.5064	0.0558	0.1713
	All	0.0827	0.0000	0.0721	0.0000
1989–91[4]	*0–4*	0.1641	0.0000	0.1420	0.0000
	5–10	0.1399	0.0000	0.0606	0.0046
	11-15				
	All	0.1520	0.0000	0.1012	0.0000
1992–94[5]	*0–4*	0.2243	0.0000	0.1800	0.0000
	5–10	0.2236	0.0000	0.1797	0.0000
	11-15				
	All	0.2241	0.0000	0.1799	0.0000
1995–97[6]	*0–4*	0.2819	0.0000	0.2136	0.0000
	5–10				
	11-15				
	All	0.2819	0.0000	0.2136	0.0000
1998–01[7]	*0–4*	0.4407	0.0000	0.2678	0.0000
	5–10				
	11-15				
	All	0.4407	0.0000	0.2678	0.0000

[1]Reference group: all childless married women.

[2]Reference group: all childless married women.

[3]Only up to the age of 12 to ensure that we have at least 18 months of observations. The GHS in 1996–97, 1998–99 and 2000–01 does not include the whole annual data.

[4]Only up to the age of 9.

[5]Only up to the age of 6.

[6]Only up to the age of 3.

[7]Only up to the age of 0.

Table 5.9: Tests whether Later Birth Cohorts are Different from 1974–79 by Education Level — Females in Britain

Base 1974–79	*Age Child*	*High Education*[1]		*Low Education*[2]	
		Mean Gap	*p-value*	*Mean Gap*	*p-value*
1980–82	*0–4*	0.0688	0.0089	0.0208	0.0085
	5–10	0.0042	0.7832	0.0183	0.3041
	11-15	0.0250	0.2436	0.0132	0.3747
	All	0.0309	0.0647	0.0175	0.0336
1983–85	*0–4*	0.0794	0.0005	0.0337	0.0054
	5–10	0.0089	0.5225	0.0121	0.0402
	11-15	0.0530	0.1174	-0.0124	0.7969
	All	0.0381	0.0026	0.0111	0.0083
1986–88[3]	*0–4*	0.0950	0.0000	0.0727	0.0000
	5–10	0.0066	0.4602	-0.0042	0.0399
	11-15	0.0812	0.0921	0.0062	0.8639
	All	0.0521	0.0005	0.0270	0.0000
1989–91[4]	*0–4*	0.1151	0.0000	0.0948	0.0000
	5–10	0.0156	0.5475	0.0294	0.3244
	11-15				
	All	0.0653	0.0000	0.0621	0.0000
1992–94[5]	*0–4*	0.1743	0.0000	0.1128	0.0000
	5–10	0.0908	0.0934	0.0976	0.0728
	11-15				
	All	0.1504	0.0000	0.1084	0.0000
1995–97[6]	*0–4*	0.2285	0.0000	0.1593	0.0000
	5–10				
	11-15				
	All	0.2285	0.0000	0.1593	0.0000
1998–00[7]	*0–4*	0.3581	0.0000	0.2728	0.0000
	5–10				
	11-15				
	All	0.3581	0.0000	0.2728	0.0000

[1]Reference group: childless married women with high education.

[2]Reference group: childless married women with low education.

[3]Only up to the age of 12 to ensure that we have at least 18 months of observations. The GHS in 1996–97, 1998–99 and 2000–01 does not include the whole annual data.

[4]Only up to the age of 9.

[5]Only up to the age of 6.

[6]Only up to the age of 3.

[7]Only up to the age of 0.

Table 5.10: Tests whether Later Birth Cohorts are Different from 1974–79 by Age At First Birth — Females in Britain

Base 1974–79	*Age Child*	>= 30[1]		< 30[2]	
		Mean Gap	*p-value*	*Mean Gap*	*p-value*
1980–82	*0–4*	0.0539	0.0175	0.0304	0.0011
	5–10	0.0128	0.5161	0.0230	0.4251
	11-15	0.0112	0.2803	0.0190	0.2568
	All	0.0252	0.0284	0.0241	0.0084
1983–85	*0–4*	0.0902	0.0048	0.0434	0.0000
	5–10	0.0381	0.2282	0.0112	0.2729
	11-15	0.0361	0.6531	0.0109	0.8259
	All	0.0493	0.0283	0.0212	0.0006
1986–88[3]	*0–4*	0.1494	0.0000	0.0748	0.0000
	5–10	0.0211	0.0194	0.0041	0.1352
	11-15	0.0506	0.2826	0.0409	0.0945
	All	0.0750	0.0000	0.0369	0.0000
1989–91[4]	*0–4*	0.1913	0.0000	0.0953	0.0000
	5–10	0.0791	0.0581	0.0249	0.2048
	11-15				
	All	0.1352	0.0000	0.0601	0.0000
1992–94[5]	*0–4*	0.2142	0.0000	0.1232	0.0000
	5–10	0.1764	0.0074	0.1098	0.0007
	11-15				
	All	0.2034	0.0000	0.1194	0.0000
1995–97[6]	*0–4*	0.2698	0.0000	0.1641	0.0000
	5–10				
	11-15				
	All	0.2698	0.0000	0.1641	0.0000
1998–00[7]	*0–4*	0.3595	0.0000	0.2881	0.0000
	5–10				
	11-15				
	All	0.3595	0.0000	0.2881	0.0000

[1]Reference group: all childless married women.

[2]Reference group: all childless married women.

[3]Only up to the age of 12 to ensure that we have at least 18 months of observations. The GHS in 1996–97, 1998–99 and 2000–01 does not include the whole annual data.

[4]Only up to the age of 9.

[5]Only up to the age of 6.

[6]Only up to the age of 3.

[7]Only up to the age of 0.

Table 5.11: Tests whether Later Birth Cohorts are Different from 1974–79 by Predicted Wage — Females in Britain

Base 1974–79	*Age Child*	*Lower 1/3*[1]		*Medium 1/3*[2]		*Higher 1/3*[3]	
		Mean Gap	*p-value*	*Mean Gap*	*p-value*	*Mean Gap*	*p-value*
1980–82	*0–4*	0.0137	0.2513	0.0291	0.0155	0.0559	0.0116
	5–10	-0.0246	0.7000	0.0258	0.3217	0.0094	0.1568
	11-15	0.0106	0.9201	0.0030	0.9801	0.0173	0.4078
	All	-0.0016	0.7004	0.0197	0.1672	0.0264	0.0219
1983–85	*0–4*	0.0423	0.1765	0.0288	0.3088	0.0608	0.0018
	5–10	-0.0130	0.6977	-0.0140	0.0921	0.0069	0.5429
	11-15	-0.0004	0.1436	-0.0002	0.9835	0.0152	0.6207
	All	-0.0004	0.1436	0.0037	0.3441	0.0263	0.0306
1986–88[4]	*0–4*	0.0089	0.2505	0.0773	0.0000	0.0984	0.0000
	5–10	0.2664	0.0425	-0.0431	0.0078	-0.0038	0.3503
	11-15	-0.0377	0.6768	0.0483	0.5675	0.0424	0.2558
	All	0.1084	0.1322	0.0172	0.0000	0.0426	0.0000
1989–91[5]	*0–4*	-0.0297	0.2659	0.0988	0.0000	0.1102	0.0000
	5–10	-0.1866	0.2205	0.0289	0.2587	0.0057	0.0953
	11-15						
	All	-0.1082	0.2008	0.0639	0.0000	0.0579	0.0000
1992–94[6]	*0–4*	0.0102	0.3171	0.1177	0.0000	0.1396	0.0000
	5–10	0.1754	0.5946	0.1592	0.0080	0.0649	0.1438
	11-15						
	All	0.0574	0.1174	0.1296	0.0000	0.1182	0.0000
1995–97[7]	*0–4*	0.0435	0.5403	0.1751	0.0000	0.1935	0.0000
	5–10						
	11-15						
	All	0.0435	0.5403	0.1751	0.0000	0.1935	0.0000
1998–00[8]	*0–4*	0.2672	0.0000	0.2512	0.0000	0.3702	0.0000
	5–10						
	11-15						
	All	0.2672	0.0000	0.2512	0.0000	0.3702	0.0000

[1]Reference group: childless married women in lower 1/3 predicted wage.

[2]Reference group: childless married women in medium 1/3 predicted wage.

[3]Reference group: childless married women in higher 1/3 predicted wage.

[4]Only up to the age of 12 to ensure that we have at least 18 months of observations. The GHS in 1996–97, 1998–99 and 2000–01 does not include the whole annual data.

[5]Only up to the age of 9.

[6]Only up to the age of 6.

[7]Only up to the age of 3.

[8]Only up to the age of 0.

The literature of the cost of job loss highlights how separation from employment results in lower earnings on return to the labour market. This research also points out that this penalty rises with the duration of the period out of work and never fully recovers (see Gregory and Jukes (2001), or Borland, Gregg, Knight and Wadsworth (2002)). Furthermore, Nickell et al. (2000) show that these costs of separation have risen over this period and are more marked for more highly educated workers. Thus, the rising returns to education and experience, and the growing wage penalty associated with loss of employment among these groups make continued attachment to the labour market increasingly worthwhile.

The rising returns to education and age can be combined by looking at the position of the mother in the distribution of wages predicted by her characteristics. This has the advantage of also capturing the increasing prevalence of higher education and delayed first child birth in the population of mothers.

Tables 5.9, 5.10 and 5.11 report the changing employment patterns for the normal cohorts split by education,[35] age at first birth and predicted wage. The better-educated mothers see larger increases in employment in the first two birth cohorts. Afterwards, there is broad equivalence across the groupings or even a slight narrowing in favour of the less well educated. Older mothers (at first birth) are those that have changed their behaviour most as a result of the advent of maternity rights. This is more pronounced than for better-educated mothers and the gap between younger and older mothers is maintained throughout the period. Using predicted wage terciles shows a broadly monotonic pattern with the higher predicted wage groupings having a more rapid response, although the lowest grouping is somewhat unstable. The picture appears to be that the third with the highest potential wage responded to maternity rights legislation most strongly in the first two cohorts, with some modest further gains thereafter. The middle third in the predicted wage distribution made significant gains between 1986 and 1991, a period of more rapidly rising wages and wage inequality, whereas the lowest earning third sees virtually no increase in employment.

Real wages of women within the lowest earning tercile have risen (much more than for men – Machin (2003)) over this period despite rising wage inequality. The fact that the employment behaviour amongst these women has not changed, despite extended rights for part-time workers, may suggest that the cost of childcare is a limitation for them. As wages in the caring professions largely fall in the lowest tercile of wages, the cost of childcare is likely to have risen in line with earnings of lowest paid workers. Since earn-

[35]For education, see also Figures 5.10 and 5.11 in Appendix 5.9.

ings have risen faster for higher paid women than for the lowest paid, the relative cost of childcare has declined for better paid groups but not for the lowest paid.

Partner's Employment Status

The final area of variation we explore is partners' status. Women with non-working partners face very different incentives to work relative to those with working partners, especially for part-time work. This follows from the UK welfare system which has little dependence on insurance benefits and, instead, relies on a joint income test for a couple. The family unit loses welfare payments pound for pound (apart from a small disregard) until the family welfare entitlement is exhausted. However, the existence of an in-work support system for families with children complicates this issue. Under *FIS* and *FC* prior to 1992, if one earner in a couple worked 24 hours per week or more, then they could receive in-work support, which was withdrawn at 70p in the pound for net earnings above a threshold. This eases work disincentives for mothers with non-working partners. However, the high withdrawal rate reduces incentives to work whenever the partner has a low paid job. Reliance on these in-work systems was never very extensive since only around 10% of couples with children was claiming this benefit.

These systems have become more generous and coverage of couples with children on *FC/WFTC* has grown over time. As this support will be entirely restricted to situations where the partner is working with a low paid job, we might expect these schemes to diminish employment growth among this particular group.

The employment situation for mothers according to their partners status and education is shown in Tables 5.12 and 5.13. There is no evidence that the occupation and education status of the partner matters in the observed change in behaviour among women with young children. However, those with a non-working partner show very minimal relative employment gains over the period, even though the comparison is being made relative to those childless couples with non-working partners. Hence, the disincentive effects of welfare withdrawal means that mothers with non-working spouses are not utilizing maternity leave rights.

Table 5.12: Tests whether Later Birth Cohorts are Different from 1974–79 by Partner's employment and Partner's occupation level — Females in Britain

Base 1974–79	*Age Child*	*Employed in High*[1]		*Employed in Low*[2]		*Non-Employed*[3]	
		Mean Gap	*p-value*	*Mean Gap*	*p-value*	*Mean Gap*	*p-value*
1980–82	*0–4*	0.0227	0.1600	0.0502	0.0000	0.0117	0.7913
	5–10	0.0084	0.2117	0.0298	0.1992	0.0181	0.8051
	11-15	0.0263	0.5126	0.0020	0.0778	0.0220	0.9207
	All	0.0185	0.1968	0.0275	0.0000	0.0173	0.9778
1983–85	*0–4*	0.0504	0.0002	0.0393	0.0145	-0.0264	0.6945
	5–10	0.0088	0.3535	0.0146	0.3280	0.0366	0.0764
	11-15	0.0157	0.8264	-0.0134	0.0198	0.0204	0.8765
	All	0.0240	0.0060	0.0136	0.0737	0.0113	0.4374
1986–88[4]	*0–4*	0.0864	0.0000	0.0549	0.0002	0.0650	0.1667
	5–10	-0.0156	0.0119	0.0162	0.7837	0.0208	0.5373
	11-15	0.0343	0.6637	0.0821	0.1090	-0.1046	0.2661
	All	0.0313	0.0000	0.0413	0.0019	0.0185	0.2542
1989–91[5]	*0–4*	0.0956	0.0000	0.1014	0.0000	0.0334	0.7260
	5–10	0.0290	0.0122	0.0028	0.4664	0.0733	0.3596
	11-15						
	All	0.0623	0.0000	0.0521	0.0000	0.0533	0.5718
1992–94[6]	*0–4*	0.1342	0.0000	0.1179	0.0000	0.0400	0.4388
	5–10	0.0897	0.0470	0.0948	0.0757	0.1854	0.0624
	11-15						
	All	0.1215	0.0000	0.1179	0.0000	0.0816	0.1622
1995–97[7]	*0–4*	0.1635	0.0000	0.1798	0.0000	0.0425	0.4574
	5–10						
	11-15						
	All	0.1635	0.0000	0.1798	0.0000	0.0425	0.4574
1998–00[8]	*0–4*	0.2572	0.0000	0.3456	0.0000	0.0651	0.2969
	5–10						
	11-15						
	All	0.2572	0.0000	0.3456	0.0000	0.0651	0.2969

[1]Reference group: childless married women with employed partner in high occupation.

[2]Reference group: childless married women with employed partner in low occupation.

[3]Reference group: childless married women with non-employed partner.

[4]Only up to the age of 12 to ensure that we have at least 18 months of observations.
The GHS in 1996–97, 1998–99 and 2000–01 does not include the whole annual data.

[5]Only up to the age of 9.

[6]Only up to the age of 6.

[7]Only up to the age of 3.

[8]Only up to the age of 0.

Table 5.13: Tests whether Later Birth Cohorts are Different from 1974–79 by Partner's education — Females in Britain

Base 1974–79	*Age Child*	*High Education*[1]		*Low Education*[2]	
		Mean Gap	*p-value*	*Mean Gap*	*p-value*
1980–82	*0–4*	0.0149	0.0229	0.0414	0.0000
	5–10	-0.0038	0.4137	0.0352	0.0579
	11-15	0.0068	0.9746	0.0198	0.5768
	All	0.0053	0.2284	0.0324	0.0000
1983–85	*0–4*	0.0408	0.0325	0.0460	0.0001
	5–10	0.0082	0.3127	0.0182	0.0364
	11-15	0.0269	0.5919	-0.0070	0.9116
	All	0.0242	0.1044	0.0191	0.0005
1986–88[3]	*0–4*	0.0610	0.0004	0.0853	0.0000
	5–10	-0.0133	0.0495	0.0085	0.2909
	11-15	0.0063	0.7652	0.0531	0.3244
	All	0.0183	0.0007	0.0449	0.0000
1989–91[4]	*0–4*	0.1044	0.0000	0.0960	0.0000
	5–10	0.0233	0.3630	0.0298	0.0557
	11-15				
	All	0.0639	0.0000	0.0629	0.0000
1992–94[5]	*0–4*	0.1327	0.0000	0.1262	0.0000
	5–10	0.0606	0.1402	0.1417	0.0002
	11-15				
	All	0.1121	0.0000	0.1306	0.0000
1995–97[6]	*0–4*	0.1969	0.0000	0.1571	0.0000
	5–10				
	11-15				
	All	0.1969	0.0000	0.1571	0.0000
1998–00[7]	*0–4*	0.3508	0.0000	0.2607	0.0000
	5–10				
	11-15				
	All	0.3508	0.0000	0.2607	0.0000

[1]Reference group: childless married women with partner with high education.

[2]Reference group: childless married women with partner with low education.

[3]Only up to the age of 12 to ensure that we have at least 18 months of observations. The GHS in 1996–97, 1998–99 and 2000–01 does not include the whole annual data.

[4]Only up to the age of 9.

[5]Only up to the age of 6.

[6]Only up to the age of 3.

[7]Only up to the age of 0.

5.5.6 Interpretation and Expectations for Current Policy Reform

The results presented earlier in Table 5.7 suggest that mothers with children born between 1992–94 had employment rates (up to the child reaching age 4) which were on average 13% higher than in 1974–79. This equates to an average increase in labour market experience for this cohort of mothers of just 6 months. Even allowing for two births, this does not amount to a huge change over the average woman's lifetime. However, the impact on current job tenure may be greater as the *RofR* will keep contact with the previous employer. We also observe a rise in the proportion of employed mothers with one child under 1 and tenure longer than one year. These are women who have remained in the same job after motherhood and did not interrupt their employment, except for the legitimate maternity leave period, which maintains their human capital. The percentage of employed mothers with tenure greater than one year jumps from 61% for birth cohorts 1974–79 to 78% for 1980–82, reflecting the introduction of *RofR*. This proportion stays rather constant until the birth cohorts 1992–94, when it rises to 82.5%. Then the percentage increases smoothly until 88% for birth cohorts 1998–01, perhaps a reflection of the relaxation of the eligibility conditions for the *RofR* and *MA*.

Up to the child reaching age 4, there are two observed effects. First, more women with short tenure are working because of the *RofR*. Second, those who would have worked anyway are increasingly coming back to the same employer on return to work. Notice also that some women did return to work shortly after a birth even in 1974–79 and these are likely to be those who were strongly attached to the labour market and thus had long job tenure. These twin effects make it rather difficult to determine what will happen to average tenure amongst those in work with children under age of 4. However, by age 5, the first effect weakens and we are left with just the effect of increased return to the original employer.

Following the same methodology as described in Subsection 5.5.3, we estimate the probability (conditioned on being employed) of having tenure less than one and tenure more than five years. The results are presented in Table 5.14. For reasons given above, we focus on the group of mothers whose youngest child is aged between 5 and 10 years old. There are immediate positive consequences on their expected tenure profile.[36] The proportion

[36] We would expect that for mothers, an increase in tenure will have a positive effect on their wages (this is not straightforward for other groups of population that are more likely to change job whenever they are offered an increase in their current wage). Furthermore, we would also expect rises in mothers' wages since they accumulate more experience by returning earlier to their jobs. However, we have estimated wages using the same methodology and we have found no significant reductions in wage deficits for

of mothers with children aged 5 to 10 with tenure less than one year falls by 5 percentage points for the 1989–91 cohort. More importantly, the proportion with tenure in excess of 5 years rises sharply by 8 percentage points of working mothers. The increase in job tenure is most marked when children of each cohort are aged 5 to 6, which is consistent with the contact with the pre-birth employer being maintained.

From April 2003 maternity rights legislation is being revamped. The changes involve extending the period of flat-rate paid leave to 26 weeks, increasing the generosity of the payment and extending the *RofR* period to reach to one year post-birth. The legislation also requires employers to consider favourably requests to return to part-time employment, except when there is a clear over-riding business case against such a move.

On the basis of the past experience shown here, we expect that these changes might lead to an increased incidence of returning to work by mothers in the first year after birth. Furthermore, we expect that this increase in employment will mainly be part-time work. These amendments will probably not have any observable impact on employment of mothers once the child is about 5 or 6 years old since the changes in behaviour primarily involve switches in timing of return up to age 5 but not much thereafter.

The evidence presented also suggests that the employment patterns of mothers with characteristics that place them within the lowest paying third of mothers will not be substantially affected by these reforms alone. This does not mean that the recently rise in low wages does not have any observable effect. Rather, the evidence is consistent with a perception that it is the relative wage that matters, with the relativity being with respect to the wage of the likely carers of pre-school children. In other words, the cost of childcare has been prohibitive to mothers with low potential earnings. This may be reinforced by, first, a higher incidence of worklessness amongst their partners and, second, by the likelihood that the wage gap between the current job and future replacement is lower than for better-educated women or those with more experience. However, it is possible that the explicit subsidy of childcare costs in *WFTC* since 1999 and the expansion of state provision of low cost care in poorer neighbourhoods (as part of the National Childcare strategy) will mean that employment rates for mothers with low potential earnings will now begin to rise.

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married mothers with young children *vs.* childless married women. This could be explained by the fact that most of the increase in mothers' employment is part-time work, which is found to be worse paid in the literature (e.g. Ferber and Waldfogel (2000)).

Table 5.14: Tests whether Later Birth Cohorts are Different from 1974–79 by Tenure

Base 1974–79	*Age Child*	*Tenure < 1 Year*[1]		*Tenure > 5 Years*[2]	
		Mean Gap	*p-value*	*Mean Gap*	*p-value*
1980–82	*0–4*	0.0300	0.0826	-0.0268	0.3505
	5–10	-0.0305	0.0093	0.0275	0.1115
	11-15	-0.0320	0.0498	0.0377	0.0135
	All	-0.0120	0.0015	0.0137	0.0179
1983–85	*0–4*	0.0502	0.0033	-0.0462	0.0002
	5–10	-0.0172	0.5152	0.0483	0.0002
	11-15	-0.0226	0.0900	0.0482	0.0043
	All	0.0022	0.0089	0.0187	0.0000
1986–88[3]	*0–4*	0.0096	0.0274	0.0134	0.1520
	5–10	-0.0239	0.2296	0.0548	0.0010
	11-15	-0.0015	0.9504	0.0089	0.2972
	All	-0.0076	0.0776	0.0318	0.0014
1989–91[4]	*0–4*	-0.0314	0.0125	0.0576	0.0000
	5–10	-0.0471	0.0069	0.0756	0.0000
	11-15				
	All	-0.0392	0.0004	0.0667	0.0000
1992–94[5]	*0–4*	-0.0525	0.0019	0.0745	0.0000
	5–10	-0.0626	0.0459	0.1080	0.0090
	11-15				
	All	-0.0554	0.0006	0.0841	0.0000
1995–97[6]	*0–4*	-0.0485	0.0367	0.5840	0.0001
	5–10				
	11-15				
	All	-0.0485	0.0367	0.5840	0.0001
1998–00[7]	*0–4*	-0.0427	0.1352	-0.0580	0.1859
	5–10				
	11-15				
	All	-0.0427	0.1352	-0.0580	0.1859

[1]Reference group: all childless married women with tenure less than one year.

[2]Reference group: all childless married women with tenure more than five years.

[3]Only up to the age of 12 to ensure that we have at least 18 months of observations. The GHS in 1996–97, 1998–99 and 2000–01 does not include the whole annual data.

[4]Only up to the age of 9.

[5]Only up to the age of 6.

[6]Only up to the age of 3.

[7]Only up to the age of 0.

5.5.7 Conclusions

Maternity rights legislation introduced by the 1974–79 Labour government has transformed the employment patterns of around two thirds of new mothers. In other words, there has been a dramatic increase in part-time employment of women with higher potential wages in the first year after a birth. However, this transformation has been largely dependent on the increase in relative earnings and a reduction in the taxation of part-time work by second earners within couples, which occurred through the Conservative years.

Those women with low potential earnings have seen no increase in employment. Nor have those with non-working partners. The reforms to maternity rights legislation due to come into force in April 2003 are mainly intended to change the work-life balance choices facing mothers, allowing them to stay at home longer whilst receiving an income and a right to return to the same job. The likely consequence of these reforms on mothers' employment behaviour will be to induce some mothers (who would have otherwise stayed at home until the child reached 3 to 5) to return part-time after one year.

The differential rewards to maintenance of labour market attachment and the relative cost of childcare to take-home pay mean that it is higher earning women who take advantage of such rights. The total effect on the labour market experience of mothers over their lifetime is modest. However, the preservation of contact with the pre-birth employer has a sizable impact on longer job tenure patterns up to when children reach around age of 10.

5.6 Summary of Main Findings

First, this chapter comprised an empirical investigation of the rising trends in female participation in the UK over the period 1984–2002. Using the LFS, we found the following key results:

- Two thirds of the growth in female participation in the period 1984–2002 is associated with changes in the female population structure, mainly the rise in education and the drop in fertility.
- However, greater changes in participation rates occur in those years when variation in the coefficients (i.e. because of new policies or unobserved heterogeneity), namely behaviour, have a significant impact.
- Female participation is forecasted to increase around 0.4–0.7 percentage points between 2002 and 2004.

Furthermore, this chapter analysed the rise in married mothers' employment in Britain over the period 1974-2000. We identified (using the GHS) the birth cohorts whose mothers experienced increases in employment, compared to the base group of childless married women. We also investigated which groups were further affected. Our results reveal the following:

- After the introduction of maternity rights legislation, there has been a massive rise in part-time employment in the first year after the birth. However, this has been restricted to mothers with higher potential wages.
- Neither women with low earnings nor those with non-working partners have experienced any increase in employment. This is because their relative wages with respect to childcarers have not improved over this period.
- The latter suggests that it is required state childcare provision for poor households in order to increase the employment of mothers with low potential earnings.
- Maternity rights have resulted in longer job tenure for mothers, which is noticed once their younger child is about 5 years old.

5.7 Appendix A: Labels for the Variables

5.7.1 Female Labour Force Participation in the UK: Evolving Characteristics or Changing Behaviour?

- Age: 0–1 dummies indicating if individual belongs to each age band. These are *Ag16–19*, *Ag20–24*, *Ag25–29*, *Ag30–34*, *Ag35–39*, *Ag40–44*, *Ag45–49*, *Ag50–54*, and *Ag55–59*. The base group is *Ag35–39*.
- *Non–White*: dummy 0–1 where 1 means non-white.
- Regions: twelve 0-1 dummies, being Region1 being the reference group. *Region1* (North East), *Region2* (Yorkshire), *Region3* (East Midlands), *Region4* (East Anglia), *Region5* (London), *Region6* (South-East), *Region7* (South-West), *Region8* (West Midlands), *Region9* (North West), *Region10* (Wales), *Region11* (Scotland) and *Region12* (Northern Ireland).
- Education: nine 0–1 dummies, being the lowest level *Edu1* the base group. These are *Edu1* (no qualifications, our omitted category), *Edu2* (other professional/vocational qualifications), *Edu3* (CSE), *Edu4* (completed apprenticeship, including City and Guilds), *Edu5* ('O' level), *Edu6* (mid vocational, ONC, OND), *Edu7* ('A' level), *Edu8* (high vocational, BTEC, HNC, HND and nurses) and *Edu9* (degree, including teachers).
- Number of dependent children in age bands. *Ndep0–2* (number of dependent children aged between 0 and 2 years), *Ndep3–4* (number of dependent children aged between 3 and 4), *Ndep5–10* (number of dependent children aged between 5 and 10), *Ndep11–15* (number of dependent children between 11 and 15).
- Children 0–1 dummies if a woman has at least one child in each of the age groups. These are *Ddep0–2*, *Ddep3–4*, *Ddep5–10* and *Ddep11–15*.
- *Married*: dummy 0–1 if the individual is either married or in cohabitation.
- Partner employment status (*EmpP*): 0–1 dummy that takes value one for those female whose partner is employed, zero otherwise.
- Partner education status: group of nine 0–1 dummies (*Edu1P–Edu9P*) for the level of education of the partner (same categories than for the female), with the lowest level *Edu1P* being the omitted variable.
- *HOHSingle*: 0–1 dummy for those individuals who are single parents.

5.7.2 The Employment of Married Mothers in Great Britain: 1974–2000

• Education: Four 0–1 dummies that capture the highest education level achieved by each individual. *Edu1* is 1 if the person has a postgraduate, graduate, pgce or any other high degree. *Edu2* is 1 if she/he has a nursing degree or A level. *Edu3* is 1 if she/he obtained an O level or equivalent. *Edu4* is 1 if the person has not have any qualification or is missing or the person did not attend school.

• Tenure: Three 0–1 dummies. *TenureL1* is 1 if the person has been less than one year in the current job, *Tenure1–5* is 1 if she has been from 1 to 5 years, and *TenureM5* is 1 if more than five.

• Labour Force Status: *Employed* is 1 if the person is employed, 0 otherwise; *Fulltime* is 1 if the person works 30 or more hours, 0 otherwise; *Empfull* is 1 if individual is employed full-time, 0 if employed part-time or inactive.

• Wage and income: *Wkearngr* is the weekly earnings of the individual. In order to make feasible the comparison for all years, this variable has been converted into prices of December 2001 by using the retail price index (rpi); *Wagehrs* is the hourly wages (in December 2001 units); *ExtInc* is the individuals' external income. That is, that income that provides from outside his/her working activities. This variable has been also transformed into units of December 2001; *MissEI* is dummy that takes value one if external income is missing, 0 otherwise; *EI* is the external income where missing values have been substituted by the median external income value (in per thousands).

• *Age*: interval dummies (*Ag16–19*, *Ag20–24*, *Ag25–29*, *Ag30–34*, *Ag35–39*, *Ag40–44*, *Ag45–49*, *Ag50–54* and *Ag55–59*).

• Social variables (dummies): *Married* is 1 if the person is married or cohabiting. Before 1986, it only includes marriage, since the option cohabitation is not given in the survey; *Non–White* is 1 if the individual is not white; *Immigrant* is 1 if immigrant.

• Regions: 10 dummies. 1 (North), 2 (Yorks Humber), 3 (West), 4 (East Midlands), 5 (West Midlands), 6 (Eastern), 7 (London), 8 (South West), 9 (Wales) and 10 (Scotland).

• *Unemrm*: Yearly-regional male unemployment rate.

• Children: *Agyestch* is the age of the youngest child; *NSibl1* is 1 if number of other siblings is one; *NSibl2M* is 1 if number of other siblings is two or more.

• Interactions between age of the youngest child bands, marital status and year (periods of three years jointly): *SNC't't+2'* is 1 if the individual is single without children in year from 't' to 't+2'; *MNC't't+2'* is 1 if married (or cohabiting) without children in year from 't' to 't+2'; *SCU1–'t't+2'* is one if single with youngest child under one in year from 't' to 't+2'; *MCU1–'t't+2'* is 1 if married with youngest child under one in year from 't'

to 't+2'; *SC13–'t''t+2'* or *MC13–'t''t+2'* is 1 if youngest child is between one and three for single and married respectively; *SC4–'t''t+2'* or *MC4–'t''t+2'* is 1 if youngest child is four; *SC510–'t''t+2'* or *MC510–'t''t+2'* is 1 if youngest child is between five and ten; *SC1115–'t''t+2'* or *MC1115–'t''t+2'* is 1 if youngest child is between eleven and fifteen.

• Interactions between age of each child at survey time and their birth cohorts: *b't''t+2''a'* is 1 if the individual has a child born between 't' and 't+2' with age 'a' ('a' is from 0 to 15) at the survey date.

• Year dummies

• Childcare information: Yearly-regional per thousand children under five: England (North, Central, South and London), Wales and Scotland. *Nursery*: Day nurseries look after under fives for the length of the adult working day. They may be run by Social Services Departments (or Education Departments), voluntary organizations, private companies or individuals as a business, community groups as a co-operative enterprise, employers in the public or private sectors including local authorities and Government Departments for their workforce, or any of these bodies on a partnership basis; *Childmind*: Childminders look after children aged under five and school age children outside school hours and in the holidays on domestic premises, usually the childminder's own home. Parents and childminders negotiate terms and conditions; *Playgroup*: Playgroups provide care for children aged between three and five, although some may take children aged two and a half. They are normally on part-time basis.

5.8 Appendix B: Tables

5.8.1 Female Labour Force Participation in the UK: Evolving Characteristics or Changing Behaviour?

Table 5.15: Means and Standard Deviations of the Variables — Females in the UK

	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
N. Observ	37016	37793	37761	37171	37650	37320	35997	35636	38821	39448	38738	37698	36420	37137	36446	36083	35125	34227	34503
Ag16–19	0.01	0.009	0.008	0.007	0.008	0.006	0.006	0.004	0.008	0.007	0.007	0.007	0.007	0.007	0.008	0.007	0.007	0.007	0.006
	(0.098)	(0.092)	(0.090)	(0.083)	(0.089)	(0.078)	(0.076)	(0.065)	(0.086)	(0.083)	(0.082)	(0.085)	(0.086)	(0.085)	(0.089)	(0.086)	(0.082)	(0.082)	(0.078)
Ag20–24	0.084	0.081	0.077	0.075	0.071	0.067	0.061	0.058	0.073	0.068	0.068	0.065	0.058	0.056	0.054	0.051	0.052	0.049	0.053
	(0.278)	(0.273)	(0.267)	(0.263)	(0.256)	(0.250)	(0.239)	(0.234)	(0.261)	(0.253)	(0.252)	(0.247)	(0.233)	(0.230)	(0.225)	(0.220)	(0.222)	(0.216)	(0.224)
Ag25–29	0.13	0.135	0.131	0.13	0.128	0.129	0.128	0.128	0.137	0.138	0.135	0.131	0.127	0.125	0.120	0.116	0.110	0.101	0.099
	(0.337)	(0.341)	(0.338)	(0.337)	(0.335)	(0.335)	(0.334)	(0.334)	(0.344)	(0.345)	(0.342)	(0.338)	(0.333)	(0.330)	(0.325)	(0.320)	(0.313)	(0.301)	(0.298)
Ag30–34	0.143	0.144	0.144	0.143	0.140	0.140	0.143	0.144	0.148	0.155	0.156	0.153	0.155	0.157	0.154	0.156	0.151	0.149	0.148
	(0.350)	(0.351)	(0.351)	(0.350)	(0.347)	(0.347)	(0.350)	(0.351)	(0.355)	(0.362)	(0.362)	(0.360)	(0.362)	(0.364)	(0.361)	(0.363)	(0.358)	(0.356)	(0.355)
Ag40–44	0.127	0.13	0.134	0.145	0.154	0.157	0.159	0.160	0.145	0.138	0.136	0.133	0.134	0.134	0.134	0.138	0.138	0.145	0.150
	(0.333)	(0.337)	(0.340)	(0.352)	(0.361)	(0.363)	(0.365)	(0.367)	(0.352)	(0.345)	(0.343)	(0.339)	(0.340)	(0.341)	(0.341)	(0.345)	(0.345)	(0.352)	(0.357)
Ag45–49	0.119	0.116	0.119	0.118	0.123	0.126	0.129	0.130	0.138	0.142	0.142	0.146	0.149	0.140	0.133	0.131	0.131	0.126	0.127
	(0.324)	(0.321)	(0.323)	(0.323)	(0.329)	(0.332)	(0.336)	(0.337)	(0.345)	(0.349)	(0.349)	(0.353)	(0.356)	(0.347)	(0.340)	(0.337)	(0.338)	(0.331)	(0.333)
Ag50–54	0.113	0.113	0.111	0.113	0.115	0.118	0.12	0.121	0.111	0.109	0.111	0.116	0.119	0.129	0.139	0.141	0.14	0.142	0.136
	(0.316)	(0.316)	(0.314)	(0.316)	(0.319)	(0.322)	(0.325)	(0.326)	(0.314)	(0.312)	(0.314)	(0.320)	(0.323)	(0.335)	(0.346)	(0.348)	(0.347)	(0.349)	(0.342)
Ag55–59	0.119	0.116	0.115	0.116	0.114	0.113	0.112	0.111	0.102	0.103	0.101	0.105	0.106	0.103	0.106	0.106	0.110	0.118	0.123
	(0.324)	(0.320)	(0.319)	(0.321)	(0.317)	(0.316)	(0.315)	(0.314)	(0.303)	(0.304)	(0.302)	(0.307)	(0.308)	(0.304)	(0.308)	(0.308)	(0.313)	(0.323)	(0.329)
Non–White	0.106	0.109	0.11	0.108	0.113	0.111	0.108	0.114	0.110	0.107	0.113	0.088	0.059	0.069	0.069	0.074	0.074	0.129	0.083
	(0.308)	(0.312)	(0.313)	(0.310)	(0.316)	(0.314)	(0.311)	(0.318)	(0.313)	(0.310)	(0.317)	(0.283)	(0.236)	(0.253)	(0.254)	(0.261)	(0.262)	(0.335)	(0.275)
Region2	0.089	0.088	0.087	0.085	0.084	0.085	0.084	0.086	0.084	0.085	0.084	0.086	0.085	0.087	0.087	0.087	0.089	0.089	0.089
	(0.284)	(0.284)	(0.281)	(0.279)	(0.277)	(0.279)	(0.277)	(0.281)	(0.278)	(0.279)	(0.278)	(0.281)	(0.278)	(0.282)	(0.282)	(0.281)	(0.285)	(0.285)	(0.285)
Region3	0.067	0.065	0.069	0.069	0.069	0.067	0.068	0.069	0.068	0.07	0.069	0.069	0.069	0.07	0.071	0.071	0.069	0.072	0.072
	(0.251)	(0.246)	(0.253)	(0.253)	(0.254)	(0.251)	(0.252)	(0.254)	(0.252)	(0.255)	(0.254)	(0.253)	(0.253)	(0.256)	(0.257)	(0.256)	(0.254)	(0.258)	(0.259)
Region4	0.036	0.037	0.038	0.035	0.036	0.034	0.036	0.035	0.035	0.035	0.035	0.037	0.038	0.036	0.037	0.037	0.037	0.039	0.036
	(0.186)	(0.188)	(0.190)	(0.184)	(0.186)	(0.182)	(0.185)	(0.183)	(0.184)	(0.184)	(0.183)	(0.189)	(0.190)	(0.186)	(0.190)	(0.189)	(0.190)	(0.193)	(0.185)
Region5	0.095	0.098	0.098	0.105	0.105	0.103	0.099	0.099	0.104	0.107	0.108	0.109	0.103	0.111	0.108	0.111	0.110	0.110	0.109
	(0.293)	(0.297)	(0.297)	(0.307)	(0.307)	(0.304)	(0.299)	(0.299)	(0.305)	(0.310)	(0.310)	(0.312)	(0.304)	(0.314)	(0.311)	(0.314)	(0.313)	(0.312)	(0.311)

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Table 5.15: *continued*

	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
Region6	0.175	0.175	0.178	0.178	0.176	0.172	0.176	0.177	0.184	0.185	0.184	0.187	0.186	0.186	0.189	0.187	0.186	0.193	0.197
	(0.380)	(0.380)	(0.382)	(0.383)	(0.381)	(0.378)	(0.381)	(0.382)	(0.387)	(0.389)	(0.387)	(0.390)	(0.389)	(0.389)	(0.392)	(0.390)	(0.389)	(0.394)	(0.398)
Region7	0.074	0.076	0.073	0.072	0.075	0.082	0.078	0.074	0.078	0.078	0.078	0.081	0.077	0.079	0.08	0.0817	0.082	0.085	0.086
	(0.262)	(0.264)	(0.260)	(0.259)	(0.264)	(0.274)	(0.268)	(0.262)	(0.268)	(0.269)	(0.269)	(0.273)	(0.267)	(0.270)	(0.272)	(0.274)	(0.274)	(0.279)	(0.280)
Region8	0.088	0.086	0.089	0.087	0.081	0.086	0.087	0.085	0.089	0.085	0.086	0.088	0.088	0.091	0.091	0.0913	0.086	0.086	0.087
	(0.283)	(0.280)	(0.285)	(0.282)	(0.273)	(0.280)	(0.281)	(0.278)	(0.284)	(0.279)	(0.281)	(0.283)	(0.283)	(0.288)	(0.288)	(0.288)	(0.281)	(0.281)	(0.281)
Region9	0.105	0.108	0.107	0.106	0.106	0.102	0.104	0.109	0.105	0.104	0.104	0.108	0.109	0.106	0.103	0.1032	0.103	0.096	0.096
	(0.306)	(0.310)	(0.309)	(0.307)	(0.308)	(0.303)	(0.306)	(0.311)	(0.306)	(0.306)	(0.305)	(0.311)	(0.312)	(0.308)	(0.304)	(0.304)	(0.304)	(0.295)	(0.295)
Region10	0.048	0.051	0.048	0.046	0.045	0.044	0.047	0.047	0.047	0.046	0.047	0.048	0.05	0.049	0.048	0.0474	0.049	0.048	0.049
	(0.213)	(0.219)	(0.213)	(0.209)	(0.208)	(0.204)	(0.211)	(0.212)	(0.212)	(0.209)	(0.211)	(0.215)	(0.217)	(0.215)	(0.214)	(0.212)	(0.216)	(0.214)	(0.217)
Region11	0.098	0.090	0.087	0.093	0.096	0.098	0.098	0.093	0.090	0.091	0.089	0.093	0.095	0.094	0.096	0.0952	0.094	0.094	0.091
	(0.297)	(0.287)	(0.282)	(0.291)	(0.295)	(0.297)	(0.298)	(0.290)	(0.286)	(0.288)	(0.285)	(0.291)	(0.293)	(0.291)	(0.294)	(0.293)	(0.293)	(0.292)	(0.288)
Region12	0.071	0.072	0.070	0.068	0.069	0.067	0.068	0.07	0.062	0.058	0.063	0.037	0.034	0.036	0.036	0.034	0.039	0.035	0.034
	(0.256)	(0.258)	(0.255)	(0.251)	(0.254)	(0.251)	(0.251)	(0.256)	(0.241)	(0.234)	(0.244)	(0.189)	(0.182)	(0.187)	(0.185)	(0.182)	(0.193)	(0.185)	(0.182)
Edu2	0.056	0.055	0.069	0.072	0.084	0.089	0.087	0.077	0.080	0.073	0.095	0.106	0.1	0.112	0.111	0.112	0.108	0.105	0.100
	(0.230)	(0.228)	(0.253)	(0.259)	(0.278)	(0.285)	(0.282)	(0.266)	(0.272)	(0.260)	(0.293)	(0.308)	(0.300)	(0.315)	(0.314)	(0.315)	(0.310)	(0.307)	(0.300)
Edu3	0.041	0.043	0.046	0.04	0.043	0.044	0.043	0.041	0.047	0.048	0.055	0.06	0.044	0.047	0.047	0.043	0.043	0.041	0.041
	(0.199)	(0.204)	(0.209)	(0.197)	(0.202)	(0.205)	(0.202)	(0.199)	(0.211)	(0.214)	(0.228)	(0.238)	(0.205)	(0.211)	(0.211)	(0.203)	(0.202)	(0.199)	(0.198)
Edu4	0.048	0.047	0.03	0.039	0.036	0.057	0.062	0.067	0.076	0.092	0.096	0.084	0.073	0.081	0.08	0.081	0.082	0.085	0.088
	(0.213)	(0.211)	(0.171)	(0.193)	(0.187)	(0.233)	(0.241)	(0.250)	(0.265)	(0.288)	(0.294)	(0.277)	(0.260)	(0.272)	(0.272)	(0.273)	(0.274)	(0.278)	(0.283)
Edu5	0.162	0.169	0.171	0.176	0.187	0.185	0.198	0.199	0.205	0.179	0.196	0.211	0.220	0.226	0.218	0.216	0.216	0.213	0.210
	(0.369)	(0.375)	(0.376)	(0.381)	(0.390)	(0.388)	(0.398)	(0.399)	(0.404)	(0.384)	(0.397)	(0.408)	(0.415)	(0.418)	(0.413)	(0.411)	(0.411)	(0.410)	(0.407)
Edu6	0.007	0.008	0.007	0.007	0.009	0.013	0.015	0.015	0.019	0.017	0.018	0.017	0.019	0.026	0.029	0.034	0.037	0.040	0.045
	(0.083)	(0.089)	(0.084)	(0.085)	(0.096)	(0.113)	(0.122)	(0.120)	(0.135)	(0.131)	(0.133)	(0.130)	(0.137)	(0.160)	(0.168)	(0.182)	(0.189)	(0.196)	(0.208)
Edu7	0.043	0.047	0.047	0.048	0.050	0.052	0.056	0.059	0.056	0.054	0.061	0.059	0.061	0.063	0.066	0.066	0.066	0.069	0.069
	(0.204)	(0.211)	(0.211)	(0.213)	(0.219)	(0.222)	(0.230)	(0.235)	(0.231)	(0.225)	(0.239)	(0.235)	(0.240)	(0.244)	(0.247)	(0.247)	(0.248)	(0.253)	(0.254)
Edu8	0.048	0.051	0.053	0.051	0.052	0.052	0.052	0.053	0.064	0.073	0.079	0.078	0.081	0.079	0.082	0.083	0.084	0.085	0.085
	(0.214)	(0.22)	(0.223)	(0.221)	(0.222)	(0.221)	(0.223)	(0.225)	(0.244)	(0.259)	(0.270)	(0.269)	(0.272)	(0.269)	(0.275)	(0.276)	(0.278)	(0.278)	(0.279)

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Table 5.15: *continued*

	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
Edu9	0.078	0.083	0.084	0.083	0.083	0.087	0.091	0.092	0.103	0.110	0.111	0.115	0.117	0.123	0.128	0.139	0.146	0.151	0.161
	(0.268)	(0.275)	(0.277)	(0.276)	(0.275)	(0.282)	(0.288)	(0.290)	(0.304)	(0.313)	(0.315)	(0.319)	(0.322)	(0.328)	(0.334)	(0.345)	(0.353)	(0.358)	(0.368)
Ndep0–2	0.18	0.184	0.178	0.177	0.179	0.175	0.173	0.176	0.171	0.172	0.171	0.163	0.16	0.156	0.157	0.152	0.153	0.144	0.137
	(0.437)	(0.446)	(0.438)	(0.431)	(0.435)	(0.431)	(0.429)	(0.441)	(0.426)	(0.422)	(0.425)	(0.414)	(0.409)	(0.405)	(0.405)	(0.400)	(0.401)	(0.388)	(0.384)
Ndep3–4	0.123	0.123	0.120	0.118	0.120	0.120	0.120	0.122	0.114	0.119	0.117	0.119	0.112	0.110	0.109	0.106	0.108	0.105	0.102
	(0.347)	(0.346)	(0.343)	(0.340)	(0.345)	(0.343)	(0.344)	(0.347)	(0.333)	(0.341)	(0.338)	(0.342)	(0.329)	(0.327)	(0.328)	(0.323)	(0.326)	(0.320)	(0.315)
Ndep5–10	0.338	0.346	0.348	0.345	0.345	0.359	0.358	0.351	0.324	0.338	0.337	0.337	0.34	0.338	0.334	0.333	0.337	0.332	0.325
	(0.650)	(0.662)	(0.662)	(0.663)	(0.667)	(0.682)	(0.675)	(0.674)	(0.645)	(0.659)	(0.656)	(0.660)	(0.661)	(0.655)	(0.650)	(0.652)	(0.652)	(0.642)	(0.634)
Ndep11–15	0.349	0.337	0.317	0.304	0.289	0.276	0.279	0.275	0.256	0.267	0.268	0.267	0.264	0.263	0.264	0.267	0.272	0.275	0.279
	(0.659)	(0.641)	(0.618)	(0.604)	(0.592)	(0.575)	(0.581)	(0.579)	(0.565)	(0.575)	(0.580)	(0.576)	(0.573)	(0.573)	(0.573)	(0.575)	(0.576)	(0.583)	(0.588)
Ddep0–2	0.159	0.161	0.157	0.157	0.159	0.155	0.153	0.154	0.152	0.154	0.153	0.147	0.144	0.141	0.141	0.137	0.137	0.13	0.123
	(0.365)	(0.367)	(0.364)	(0.364)	(0.365)	(0.362)	(0.360)	(0.361)	(0.359)	(0.361)	(0.360)	(0.354)	(0.351)	(0.348)	(0.349)	(0.344)	(0.344)	(0.336)	(0.328)
Ddep3–4	0.118	0.118	0.114	0.112	0.113	0.114	0.114	0.116	0.109	0.113	0.112	0.113	0.107	0.106	0.104	0.101	0.102	0.101	0.098
	(0.322)	(0.322)	(0.318)	(0.316)	(0.317)	(0.318)	(0.318)	(0.320)	(0.312)	(0.317)	(0.316)	(0.317)	(0.310)	(0.308)	(0.306)	(0.302)	(0.303)	(0.302)	(0.297)
Ddep5–10	0.249	0.252	0.255	0.25	0.249	0.258	0.259	0.254	0.237	0.246	0.246	0.244	0.247	0.247	0.245	0.244	0.248	0.248	0.243
	(0.432)	(0.434)	(0.436)	(0.433)	(0.432)	(0.438)	(0.438)	(0.435)	(0.425)	(0.431)	(0.431)	(0.430)	(0.431)	(0.431)	(0.430)	(0.429)	(0.432)	(0.432)	(0.429)
Ddep11–15	0.258	0.253	0.243	0.234	0.223	0.216	0.218	0.213	0.197	0.204	0.204	0.204	0.203	0.202	0.202	0.205	0.211	0.211	0.213
	(0.437)	(0.435)	(0.429)	(0.423)	(0.416)	(0.412)	(0.413)	(0.410)	(0.398)	(0.403)	(0.403)	(0.403)	(0.402)	(0.401)	(0.402)	(0.404)	(0.408)	(0.408)	(0.410)
Married	0.847	0.841	0.832	0.836	0.819	0.819	0.814	0.808	0.808	0.803	0.79	0.78	0.777	0.773	0.767	0.764	0.763	0.758	0.751
	(0.360)	(0.365)	(0.373)	(0.379)	(0.385)	(0.385)	(0.389)	(0.394)	(0.394)	(0.398)	(0.407)	(0.414)	(0.416)	(0.419)	(0.422)	(0.425)	(0.425)	(0.428)	(0.432)
EmpP	0.708	0.697	0.686	0.679	0.686	0.696	0.700	0.68	0.667	0.652	0.644	0.642	0.639	0.636	0.637	0.635	0.637	0.636	0.629
	(0.455)	(0.459)	(0.464)	(0.467)	(0.464)	(0.460)	(0.458)	(0.466)	(0.471)	(0.476)	(0.479)	(0.479)	(0.480)	(0.481)	(0.481)	(0.481)	(0.481)	(0.481)	(0.483)
EduP2	0.028	0.030	0.039	0.049	0.061	0.063	0.06	0.051	0.053	0.056	0.075	0.08	0.074	0.084	0.083	0.079	0.075	0.074	0.075
	(0.164)	(0.170)	(0.194)	(0.216)	(0.239)	(0.243)	(0.238)	(0.219)	(0.224)	(0.230)	(0.264)	(0.271)	(0.261)	(0.277)	(0.276)	(0.270)	(0.263)	(0.262)	(0.263)
EduP3	0.019	0.019	0.02	0.015	0.021	0.017	0.017	0.017	0.021	0.023	0.025	0.027	0.019	0.022	0.022	0.023	0.021	0.023	0.022
	(0.136)	(0.136)	(0.139)	(0.123)	(0.143)	(0.129)	(0.128)	(0.128)	(0.142)	(0.151)	(0.157)	(0.163)	(0.138)	(0.145)	(0.148)	(0.149)	(0.143)	(0.150)	(0.147)
EduP4	0.209	0.202	0.133	0.16	0.145	0.225	0.225	0.222	0.229	0.215	0.212	0.208	0.202	0.2	0.193	0.189	0.185	0.178	0.173
	(0.406)	(0.401)	(0.339)	(0.367)	(0.352)	(0.417)	(0.418)	(0.415)	(0.420)	(0.411)	(0.409)	(0.406)	(0.401)	(0.400)	(0.395)	(0.391)	(0.388)	(0.382)	(0.378)

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Table 5.15: *continued*

	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
EduP5	0.076	0.080	0.080	0.069	0.083	0.072	0.076	0.075	0.079	0.074	0.08	0.082	0.083	0.085	0.084	0.083	0.084	0.087	0.088
	(0.265)	(0.272)	(0.271)	(0.254)	(0.275)	(0.258)	(0.264)	(0.264)	(0.271)	(0.262)	(0.272)	(0.274)	(0.276)	(0.279)	(0.278)	(0.276)	(0.278)	(0.282)	(0.283)
EduP6	0.021	0.022	0.018	0.018	0.019	0.022	0.024	0.024	0.024	0.018	0.02	0.019	0.021	0.023	0.025	0.025	0.028	0.03	0.032
	(0.143)	(0.147)	(0.134)	(0.131)	(0.138)	(0.147)	(0.153)	(0.153)	(0.153)	(0.132)	(0.139)	(0.135)	(0.142)	(0.150)	(0.157)	(0.157)	(0.165)	(0.171)	(0.176)
EduP7	0.034	0.037	0.036	0.036	0.036	0.035	0.038	0.041	0.038	0.037	0.041	0.039	0.041	0.042	0.041	0.042	0.043	0.043	0.043
	(0.183)	(0.189)	(0.186)	(0.186)	(0.187)	(0.184)	(0.192)	(0.198)	(0.191)	(0.188)	(0.198)	(0.193)	(0.198)	(0.200)	(0.198)	(0.200)	(0.202)	(0.202)	(0.204)
EduP8	0.032	0.034	0.031	0.031	0.035	0.033	0.036	0.039	0.046	0.05	0.056	0.058	0.058	0.058	0.06	0.061	0.061	0.06	0.057
	(0.177)	(0.182)	(0.172)	(0.174)	(0.183)	(0.180)	(0.186)	(0.194)	(0.209)	(0.219)	(0.230)	(0.233)	(0.235)	(0.234)	(0.238)	(0.239)	(0.240)	(0.238)	(0.233)
EduP9	0.091	0.097	0.102	0.099	0.097	0.096	0.100	0.102	0.112	0.121	0.116	0.119	0.118	0.119	0.122	0.128	0.133	0.134	0.135
	(0.287)	(0.295)	(0.302)	(0.298)	(0.296)	(0.294)	(0.300)	(0.303)	(0.315)	(0.326)	(0.320)	(0.324)	(0.323)	(0.323)	(0.327)	(0.334)	(0.339)	(0.341)	(0.341)
HOHSingle	0.149	0.171	0.179	0.177	0.192	0.194	0.191	0.206	0.196	0.207	0.22	0.225	0.227	0.229	0.234	0.238	0.239	0.244	0.251
	(0.356)	(0.376)	(0.384)	(0.381)	(0.394)	(0.395)	(0.393)	(0.405)	(0.397)	(0.405)	(0.414)	(0.418)	(0.419)	(0.420)	(0.424)	(0.426)	(0.426)	(0.429)	(0.434)

Table 5.16: Marginal Effects on Probability of Female Participation in the UK: 1984–2002
(Standard Errors in Brackets)

	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
Ag16–19	-0.1977	-0.2575	-0.2127	-0.1476	-0.2222	-0.1317	-0.2416	-0.2644	-0.1937	-0.2023	-0.2512	-0.2042	-0.2256	-0.2523	-0.1366	-0.2182	-0.1881	-0.2033	-0.1621
	(0.031)	(0.0319)	(0.0329)	(0.0354)	(0.0329)	(0.0376)	(0.039)	(0.0455)	(0.0337)	(0.0347)	(0.0353)	(0.0349)	(0.0341)	(0.0344)	(0.0325)	(0.0349)	(0.0362)	(0.0377)	(0.0378)
Ag20–24	-0.0422	-0.0725	-0.0557	-0.0545	-0.0816	-0.0612	-0.0828	-0.1327	-0.0711	-0.0973	-0.1281	-0.1044	-0.1142	-0.1283	-0.1089	-0.1504	-0.1608	-0.1568	-0.1176
	(0.014)	(0.0139)	(0.0139)	(0.014)	(0.0142)	(0.0142)	(0.0151)	(0.0156)	(0.0133)	(0.0137)	(0.014)	(0.0141)	(0.0149)	(0.0149)	(0.0151)	(0.0156)	(0.0157)	(0.0162)	(0.0155)
Ag25–29	0.0114	0.0051	0.0099	0.022	-0.0112	-0.0006	-0.0106	-0.0263	-0.0052	-0.0147	-0.0196	0.0004	-0.024	-0.0296	-0.0105	-0.0207	-0.0279	-0.0475	-0.0345
	(0.0114)	(0.0112)	(0.011)	(0.0109)	(0.0111)	(0.0109)	(0.0111)	(0.0113)	(0.0102)	(0.0102)	(0.0102)	(0.0101)	(0.0107)	(0.0106)	(0.0104)	(0.0105)	(0.0108)	(0.0114)	-0.0114
Ag30–34	-0.0129	-0.0019	0.018	0.0292	0.0189	0.0172	0.0115	-0.0112	-0.0019	0.001	-0.0033	-0.0051	0.0098	0.0007	0.0118	0.0112	0.0039	-0.0019	-0.007
	(0.0104)	(0.0101)	(0.0097)	(0.0097)	(0.0097)	(0.0097)	(0.0098)	(0.0101)	(0.0093)	(0.0091)	(0.0091)	(0.0092)	(0.0092)	(0.0091)	(0.009)	(0.0089)	(0.009)	(0.0092)	(0.0092)
Ag40–44	-0.0463	-0.0297	-0.0323	-0.0334	-0.0294	-0.0327	-0.0361	-0.0298	-0.0245	-0.037	-0.0291	-0.0274	-0.0207	-0.0197	-0.0147	-0.0281	-0.0153	-0.0275	-0.0251
	(0.0109)	(0.0106)	(0.0104)	(0.0103)	(0.010)	(0.010)	(0.0101)	(0.0102)	(0.0098)	(0.0099)	(0.0099)	(0.010)	(0.0101)	(0.0099)	(0.0098)	(0.0098)	(0.0097)	(0.0098)	(0.0096)
Ag45–49	-0.1007	-0.0882	-0.0884	-0.0859	-0.0951	-0.0793	-0.0957	-0.0907	-0.073	-0.0983	-0.0848	-0.0752	-0.0709	-0.082	-0.0584	-0.0574	-0.065	-0.0691	-0.0566
	(0.0118)	(0.0117)	(0.0116)	(0.0117)	(0.0116)	(0.0115)	(0.0118)	(0.0117)	(0.0108)	(0.0109)	(0.0109)	(0.0108)	(0.011)	(0.0111)	(0.0109)	(0.0109)	(0.011)	(0.0113)	(0.0111)
Ag50–54	-0.1611	-0.1781	-0.1786	-0.1628	-0.1819	-0.1589	-0.1887	-0.1781	-0.1642	-0.1765	-0.1715	-0.1616	-0.1704	-0.149	-0.1372	-0.1455	-0.137	-0.1527	-0.132
	(0.0123)	(0.0121)	(0.0122)	(0.0123)	(0.0123)	(0.0123)	(0.0126)	(0.0126)	(0.0122)	(0.0124)	(0.0123)	(0.0124)	(0.0125)	(0.012)	(0.0118)	(0.0117)	(0.0118)	(0.012)	(0.012)
Ag55–59	-0.2898	-0.2854	-0.287	-0.2716	-0.2807	-0.2644	-0.2965	-0.2909	-0.289	-0.3085	-0.2931	-0.2668	-0.2867	-0.2943	-0.2717	-0.2673	-0.2545	-0.2753	-0.2585
	(0.0119)	(0.0119)	(0.012)	(0.0122)	(0.0123)	(0.0126)	(0.0128)	(0.0129)	(0.0126)	(0.0126)	(0.0128)	(0.013)	(0.0131)	(0.013)	(0.0131)	(0.013)	(0.0131)	(0.0131)	(0.0129)
Non–White	0.0208	-0.0348	-0.0268	-0.0563	-0.0388	-0.0362	-0.066	-0.0924	-0.0439	-0.0665	-0.0745	-0.0887	-0.1764	-0.2143	-0.2169	-0.2213	-0.2299	-0.1139	-0.2205
	(0.0152)	(0.0149)	(0.0143)	(0.0144)	(0.0134)	(0.0132)	(0.014)	(0.014)	(0.0121)	(0.0121)	(0.0123)	(0.0126)	(0.0126)	(0.0118)	(0.0119)	(0.0116)	(0.0118)	(0.0085)	(0.0114)
Regio2	-0.002	0.0268	0.0271	0.0206	0.0075	0.0069	0.0083	0.0065	0.0243	0.0397	0.0262	0.0265	0.098	0.0107	0.0442	0.016	0.0324	0.0337	0.0097
	(0.0146)	(0.0138)	(0.0137)	(0.0138)	(0.0137)	(0.0134)	(0.0135)	(0.0136)	(0.0125)	(0.012)	(0.0126)	(0.0123)	(0.0101)	(0.0129)	(0.0121)	(0.0127)	(0.0123)	(0.0124)	(0.0129)
Regio3	0.012	0.0436	0.0284	0.005	0.0199	0.0397	0.0397	0.0275	0.0382	0.0482	0.0188	0.041	0.1044	0.0447	0.0554	0.0397	0.0542	0.0449	0.0362
	(0.0153)	(0.0145)	(0.0143)	(0.0146)	(0.0141)	(0.0135)	(0.0136)	(0.0139)	(0.0128)	(0.0123)	(0.0132)	(0.0126)	(0.0103)	(0.0127)	(0.0123)	(0.0126)	(0.0124)	(0.0126)	(0.0128)
Regio4	-0.0432	0.0181	0.0063	-0.0052	0.0219	0.0015	0.0449	0.0145	0.0165	0.0264	0.0349	0.029	0.0843	0.0088	0.0413	0.0229	0.0318	0.0504	0.032
	(0.0187)	(0.0173)	(0.0171)	(0.0178)	(0.0168)	(0.0171)	(0.0161)	(0.017)	(0.0158)	(0.0154)	(0.0155)	(0.0152)	(0.0128)	(0.0161)	(0.0149)	(0.0154)	(0.0151)	(0.0146)	(0.0155)
Regio5	0.0103	0.0632	0.02	0.0024	-0.005	-0.0172	0.0113	0.0093	-0.0064	0.0215	-0.0085	0.0171	0.0987	0.0387	0.0557	0.0408	0.0464	0.0074	0.0195
	(0.0146)	(0.0133)	(0.0137)	(0.0137)	(0.0136)	(0.0135)	(0.0133)	(0.0135)	(0.0128)	(0.0122)	(0.013)	(0.0123)	(0.0098)	(0.0121)	(0.0117)	(0.0119)	(0.0119)	(0.0128)	(0.0126)
Regio6	0.0003	0.029	0.015	0.0112	0.0081	0.0031	0.0214	0.0122	0.0294	0.0274	0.0175	0.0309	0.0961	0.024	0.0493	0.0241	0.0416	0.0422	0.0319
	(0.0132)	(0.0125)	(0.0124)	(0.0125)	(0.0123)	(0.012)	(0.012)	(0.0122)	(0.0111)	(0.011)	(0.0115)	(0.011)	(0.0094)	(0.0114)	(0.0109)	(0.0113)	(0.0111)	(0.0111)	(0.0113)

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Table 5.16: *continued*

	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
Regio7	-0.0325	0.034	-0.0056	0.0124	0.0062	0.0082	0.0141	0.0186	0.0163	0.0418	0.0215	0.0378	0.0934	0.025	0.0549	0.0354	0.047	0.0443	0.0354
	(0.0154)	(0.0142)	(0.0146)	(0.0144)	(0.0141)	(0.0135)	(0.0138)	(0.0139)	(0.0129)	(0.0122)	(0.0129)	(0.0123)	(0.0104)	(0.0129)	(0.0121)	(0.0124)	(0.0122)	(0.0123)	(0.0125)
Regio8	-0.0099	0.0583	0.0246	0.0124	0.0094	0.0092	0.0185	0.0179	0.0085	0.0417	0.0267	0.0307	0.0968	0.0211	0.055	0.0459	0.0532	0.0426	0.0308
	(0.0147)	(0.0135)	(0.0136)	(0.0138)	(0.0138)	(0.0133)	(0.0133)	(0.0135)	(0.0126)	(0.012)	(0.0125)	(0.0122)	(0.01)	(0.0125)	(0.0117)	(0.0119)	(0.0118)	(0.0122)	(0.012)
Regio9	0.0122	0.0633	0.0461	0.0333	0.0376	0.0225	0.01	0.0093	0.0175	0.0294	0.004	0.0104	0.0802	-0.0034	0.0255	0.0088	0.0189	0.0345	0.0292
	(0.014)	(0.0128)	(0.0129)	(0.0131)	(0.0127)	(0.0127)	(0.013)	(0.013)	(0.0121)	(0.0118)	(0.0125)	(0.0121)	(0.0101)	(0.0127)	(0.0122)	(0.0124)	(0.0123)	(0.0122)	(0.0123)
Regio10	-0.0363	-0.0052	-0.0182	-0.0256	-0.03	-0.0302	-0.007	-0.0015	-0.021	-0.0069	-0.0279	0.0039	0.0582	-0.0062	0.0123	-0.0134	-0.0045	-0.0102	-0.013
	(0.0171)	(0.016)	(0.0164)	(0.0166)	(0.0164)	(0.0163)	(0.0158)	(0.0158)	(0.0152)	(0.0148)	(0.0155)	(0.0145)	(0.0125)	(0.0149)	(0.0146)	(0.0152)	(0.015)	(0.0154)	(0.0153)
Regio11	-0.0403	0.0127	-0.0136	-0.01	-0.023	-0.0159	0.0014	-0.0181	0.0032	0.001	-0.007	0.0156	0.0636	-0.0086	0.0259	0.0049	0.0249	0.0231	0.018
	(0.0146)	(0.0139)	(0.0141)	(0.0139)	(0.0138)	(0.0134)	(0.0134)	(0.0139)	(0.0128)	(0.0126)	(0.0131)	(0.0124)	(0.0107)	(0.0131)	(0.0123)	(0.0127)	(0.0124)	(0.0126)	(0.0127)
Regio12	-0.0554	0.0358	0.0141	0.0035	-0.0066	-0.0096	0.0391	0.0625	0.0158	0.018	0.021	0.0516	0.0304	-0.0112	0.0026	-0.0231	-0.0319	-0.0098	-0.0204
	(0.0222)	(0.0198)	(0.0198)	(0.0199)	(0.0192)	(0.019)	(0.018)	(0.0171)	(0.0172)	(0.0169)	(0.0169)	(0.0171)	(0.0147)	(0.0164)	(0.0161)	(0.0169)	(0.0166)	(0.0167)	(0.0172)
Edu2	0.0801	0.0921	0.1041	0.1036	0.0734	0.0901	0.1071	0.1087	0.1076	0.0932	0.0998	0.1123	0.1187	0.1389	0.1486	0.1535	0.143	0.1524	0.1484
	(0.0111)	(0.0108)	(0.0094)	(0.0091)	(0.0086)	(0.0081)	(0.0079)	(0.0082)	(0.0074)	(0.0078)	(0.0071)	(0.0067)	(0.0067)	(0.0062)	(0.0059)	(0.0057)	(0.0059)	(0.0058)	(0.0058)
Edu3	0.0632	0.0719	0.0536	0.0596	0.0548	0.0823	0.0717	0.0913	0.0606	0.0553	0.0849	0.0958	0.1002	0.1294	0.122	0.1157	0.135	0.1463	0.1311
	(0.0137)	(0.013)	(0.0127)	(0.013)	(0.0124)	(0.0114)	(0.0118)	(0.0113)	(0.0107)	(0.0103)	(0.0093)	(0.0088)	(0.0098)	(0.0086)	(0.0086)	(0.0089)	(0.0082)	(0.0079)	(0.0083)
Edu4	0.0713	0.0543	0.1178	0.0937	0.0807	0.0739	0.0806	0.0841	0.0817	0.0901	0.1115	0.1019	0.1262	0.1316	0.1505	0.1535	0.1652	0.1673	0.1686
	(0.012)	(0.0121)	(0.0134)	(0.0121)	(0.0123)	(0.01)	(0.0095)	(0.0091)	(0.0081)	(0.0073)	(0.0069)	(0.0074)	(0.0073)	(0.007)	(0.0065)	(0.0062)	(0.0059)	(0.0058)	(0.0056)
Edu5	0.0967	0.1227	0.1159	0.1188	0.1258	0.1264	0.1314	0.1425	0.1278	0.1189	0.1267	0.1356	0.1525	0.1705	0.1894	0.1725	0.1787	0.19	0.1846
	(0.0077)	(0.0072)	(0.0072)	(0.0069)	(0.0066)	(0.0065)	(0.0063)	(0.0062)	(0.0059)	(0.006)	(0.006)	(0.0059)	(0.0058)	(0.0057)	(0.0054)	(0.0055)	(0.0054)	(0.0053)	(0.0053)
Edu6	0.1825	0.1626	0.1599	0.164	0.1722	0.1748	0.1766	0.1974	0.1497	0.1331	0.1552	0.1831	0.1781	0.2016	0.2099	0.2106	0.2136	0.2009	0.2084
	(0.0255)	(0.0241)	(0.0246)	(0.0234)	(0.0187)	(0.0155)	(0.0139)	(0.0125)	(0.0122)	(0.0131)	(0.0115)	(0.0101)	(0.0099)	(0.0073)	(0.0063)	(0.0055)	(0.0052)	(0.0056)	(0.0049)
Edu7	0.073	0.0796	0.0971	0.087	0.1064	0.1098	0.1252	0.1403	0.1062	0.1113	0.1261	0.1258	0.1326	0.1526	0.1672	0.1721	0.183	0.1877	0.1679
	(0.0129)	(0.0122)	(0.0116)	(0.0115)	(0.0105)	(0.0101)	(0.0093)	(0.0087)	(0.0088)	(0.0086)	(0.008)	(0.0081)	(0.0078)	(0.0072)	(0.0065)	(0.0061)	(0.0057)	(0.0055)	(0.006)
Edu8	0.2067	0.2056	0.2077	0.2063	0.1946	0.2062	0.1952	0.2060	0.1872	0.1840	0.2003	0.1918	0.2031	0.2239	0.2254	0.2268	0.2229	0.2247	0.2244
	(0.0097)	(0.0092)	(0.0087)	(0.0084)	(0.0081)	(0.0075)	(0.0075)	(0.0071)	(0.0064)	(0.0061)	(0.0055)	(0.0058)	(0.0055)	(0.0049)	(0.0046)	(0.0044)	(0.0044)	(0.0043)	(0.0042)

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Table 5.16: *continued*

	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
Edu9	0.2096	0.2256	0.2289	0.2207	0.2217	0.2298	0.2185	0.2241	0.2162	0.2115	0.2316	0.2238	0.2322	0.2479	0.2538	0.2565	0.2514	0.2601	0.2623
	(0.0089)	(0.0081)	(0.0076)	(0.0074)	(0.0070)	(0.0065)	(0.0064)	(0.0062)	(0.0055)	(0.0054)	(0.0050)	(0.0052)	(0.0051)	(0.0047)	(0.0044)	(0.0043)	(0.0044)	(0.0043)	(0.0043)
Ndep0-2	-0.2195	-0.2048	-0.1926	-0.1958	-0.1666	-0.1863	-0.1656	-0.1359	-0.1907	-0.1929	-0.1613	-0.1555	-0.1492	-0.1565	-0.1436	-0.1171	-0.1241	-0.1664	-0.1941
	(0.0211)	(0.0195)	(0.0197)	(0.0201)	(0.0185)	(0.0186)	(0.0186)	(0.0179)	(0.0178)	(0.0181)	(0.0174)	(0.0183)	(0.0193)	(0.0196)	(0.0188)	(0.0188)	(0.0189)	(0.0208)	(0.0206)
Ndep3-4	-0.1317	-0.1500	-0.1642	-0.0977	-0.0625	-0.0981	-0.0798	-0.0420	-0.0664	-0.1313	-0.0933	-0.1845	-0.1604	-0.1373	-0.0767	-0.0890	-0.0671	-0.0972	-0.0957
	(0.0367)	(0.0372)	(0.0349)	(0.0337)	(0.0317)	(0.0329)	(0.0308)	(0.0328)	(0.0331)	(0.0310)	(0.0316)	(0.0312)	(0.0368)	(0.0355)	(0.0330)	(0.0325)	(0.0317)	(0.0366)	(0.0365)
Ndep5-10	-0.0909	-0.0802	-0.0663	-0.0688	-0.0618	-0.0586	-0.0605	-0.0522	-0.0652	-0.0753	-0.0781	-0.0437	-0.0712	-0.0783	-0.0727	-0.0780	-0.0697	-0.0676	-0.0739
	(0.0098)	(0.0092)	(0.0091)	(0.0091)	(0.0087)	(0.0083)	(0.0085)	(0.0085)	(0.0083)	(0.0080)	(0.0081)	(0.0081)	(0.0081)	(0.0083)	(0.0083)	(0.0082)	(0.0083)	(0.0086)	(0.0087)
Ndep11-15	-0.0503	-0.0346	-0.0587	-0.0415	-0.0270	-0.0465	-0.0425	-0.0389	-0.0453	-0.0522	-0.0440	-0.0371	-0.0384	-0.0513	-0.0271	-0.0439	-0.0564	-0.0775	-0.0481
	(0.0094)	(0.0097)	(0.0101)	(0.0105)	(0.0105)	(0.0109)	(0.0107)	(0.0109)	(0.0103)	(0.0101)	(0.0100)	(0.0102)	(0.0106)	(0.0103)	(0.0105)	(0.0103)	(0.0102)	(0.0101)	(0.0100)
Ddep0-2	-0.1593	-0.1602	-0.1673	-0.1437	-0.1379	-0.1123	-0.1372	-0.1498	-0.0962	-0.0711	-0.1129	-0.1146	-0.1101	-0.0844	-0.1034	-0.1202	-0.1014	-0.0539	-0.0354
	(0.0258)	(0.0244)	(0.0248)	(0.0253)	(0.0239)	(0.0238)	(0.0244)	(0.0240)	(0.0230)	(0.0228)	(0.0231)	(0.0242)	(0.0253)	(0.0250)	(0.0247)	(0.0253)	(0.0252)	(0.0260)	(0.0253)
Ddep3-4	-0.1226	-0.0661	-0.0614	-0.1237	-0.1596	-0.0915	-0.1289	-0.1593	-0.1322	-0.0599	-0.0985	-0.0005	-0.0054	-0.0229	-0.1153	-0.0659	-0.0912	-0.0893	-0.0870
	(0.0413)	(0.0413)	(0.0391)	(0.0393)	(0.0379)	(0.0383)	(0.0372)	(0.0400)	(0.0404)	(0.0359)	(0.0381)	(0.0335)	(0.0393)	(0.0391)	(0.0406)	(0.0385)	(0.0389)	(0.0441)	(0.0441)
Ddep5-10	-0.0543	-0.0686	-0.0904	-0.0630	-0.0548	-0.0605	-0.0571	-0.0537	-0.0533	-0.0440	-0.0424	-0.0741	-0.0545	-0.0335	-0.0243	-0.0144	-0.0223	-0.0377	-0.0173
	(0.0151)	(0.0146)	(0.0146)	(0.0146)	(0.0140)	(0.0136)	(0.0138)	(0.0139)	(0.0134)	(0.0130)	(0.0131)	(0.0135)	(0.0135)	(0.0133)	(0.0133)	(0.0130)	(0.0133)	(0.0137)	(0.0134)
Ddep11-15	0.0142	-0.0087	0.0212	0.0109	-0.0127	0.0186	-0.0092	-0.0086	0.0083	0.0045	-0.0111	-0.0157	-0.0056	0.0138	-0.0123	0.0093	0.0132	0.0475	0.0051
	(0.0142)	(0.0146)	(0.0146)	(0.0151)	(0.0153)	(0.0152)	(0.0155)	(0.0157)	(0.0149)	(0.0146)	(0.0148)	(0.0151)	(0.0154)	(0.0147)	(0.0153)	(0.0148)	(0.0145)	(0.0139)	(0.0145)
Married	-0.2075	-0.0956	-0.0560	-0.2233	-0.0941	-0.0536	-0.0566	0.0177	-0.1125	-0.1081	-0.0726	-0.1292	-0.0959	-0.0884	-0.1819	-0.1072	-0.0804	-0.1218	-0.0280
	(0.0200)	(0.0211)	(0.0219)	(0.0252)	(0.0197)	(0.0223)	(0.0352)	(0.0240)	(0.0180)	(0.0212)	(0.0230)	(0.0280)	(0.0385)	(0.0430)	(0.0427)	(0.0453)	(0.0546)	(0.0454)	(0.0602)
EmpP	0.2590	0.2505	0.2707	0.2528	0.2694	0.2649	0.2529	0.2362	0.2519	0.2587	0.2679	0.2915	0.2704	0.2541	0.2410	0.2378	0.2509	0.2541	0.2300
	(0.0083)	(0.0081)	(0.0080)	(0.0079)	(0.0082)	(0.0086)	(0.0088)	(0.0084)	(0.0075)	(0.0072)	(0.0074)	(0.0076)	(0.0078)	(0.0078)	(0.0081)	(0.0082)	(0.0083)	(0.0085)	(0.0084)
EduP2	-0.0060	-0.0218	-0.0187	-0.0062	0.0054	-0.0063	-0.0009	0.0076	0.0068	-0.0284	-0.0293	-0.0176	-0.0180	-0.0033	-0.0274	-0.0232	-0.0418	-0.0484	-0.0333
	(0.0169)	(0.0162)	(0.0142)	(0.0127)	(0.0113)	(0.0113)	(0.0117)	(0.0124)	(0.0116)	(0.0116)	(0.0109)	(0.0107)	(0.0112)	(0.0106)	(0.0111)	(0.0112)	(0.0118)	(0.0122)	(0.0119)
EduP3	0.0344	0.0291	0.0031	0.0364	0.0545	0.0018	0.0293	0.0434	0.0366	0.0385	0.0353	0.0413	0.0212	0.0502	0.0151	0.0530	0.0321	0.0095	0.0146
	(0.0202)	(0.0201)	(0.0198)	(0.0214)	(0.0175)	(0.0206)	(0.0202)	(0.0196)	(0.0171)	(0.0159)	(0.0157)	(0.0154)	(0.0186)	(0.0168)	(0.0179)	(0.0163)	(0.0179)	(0.0183)	(0.0180)

continued on next page

Table 5.16: *continued*

	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
EduP4	0.0161	0.0086	0.0086	0.0128	0.0126	0.0224	0.0054	0.0248	0.0127	0.0138	0.0123	0.0121	0.0106	0.0188	0.0197	0.0159	0.0103	-0.0130	0.0017
	(0.0076)	(0.0077)	(0.0087)	(0.0082)	(0.0083)	(0.0074)	(0.0077)	(0.0075)	(0.0073)	(0.0073)	(0.0079)	(0.0082)	(0.0083)	(0.0085)	(0.0087)	(0.0088)	(0.0090)	(0.0095)	(0.0094)
EduP5	-0.0193	-0.0112	-0.0215	-0.0225	-0.0038	-0.0185	-0.0126	-0.0129	-0.0001	0.0180	0.0066	0.0101	0.0215	0.0206	0.0017	0.0113	-0.0099	-0.0136	0.0133
	(0.0114)	(0.0111)	(0.0110)	(0.0117)	(0.0106)	(0.0114)	(0.0113)	(0.0114)	(0.0105)	(0.0105)	(0.0107)	(0.0109)	(0.0108)	(0.0108)	(0.0113)	(0.0111)	(0.0115)	(0.0118)	(0.0112)
EduP6	-0.0079	0.0352	-0.0263	0.0302	-0.0039	0.0102	-0.0006	0.0058	0.0074	0.0332	0.0285	0.0068	-0.0025	0.0164	0.0131	0.0278	-0.0008	-0.0156	0.0129
	(0.0199)	(0.0187)	(0.0210)	(0.0207)	(0.0197)	(0.0184)	(0.0183)	(0.0178)	(0.0169)	(0.0187)	(0.0182)	(0.0197)	(0.0191)	(0.0177)	(0.0175)	(0.0169)	(0.0171)	(0.0174)	(0.0162)
EduP7	-0.0797	-0.0799	-0.0949	-0.1000	-0.0764	-0.0753	-0.0676	-0.0308	-0.0158	-0.0451	-0.0327	-0.0424	-0.0433	-0.0102	-0.0489	-0.0442	-0.0750	-0.0669	-0.0420
	(0.0164)	(0.0159)	(0.0160)	(0.0160)	(0.0156)	(0.0160)	(0.0157)	(0.0149)	(0.0146)	(0.0149)	(0.0147)	(0.0155)	(0.0152)	(0.0147)	(0.0156)	(0.0153)	(0.0160)	(0.0162)	(0.0155)
EduP8	-0.0440	-0.0454	-0.0330	-0.0238	-0.0208	-0.0133	-0.0143	-0.0180	-0.0233	-0.0216	-0.0133	-0.0055	-0.0107	-0.0216	-0.0146	-0.0257	-0.0397	-0.0289	-0.0286
	(0.0165)	(0.0160)	(0.0167)	(0.0165)	(0.0154)	(0.0157)	(0.0156)	(0.0150)	(0.0136)	(0.0130)	(0.0127)	(0.0128)	(0.0130)	(0.0132)	(0.0131)	(0.0131)	(0.0135)	(0.0138)	(0.0138)
EduP9	-0.0907	-0.1051	-0.1264	-0.1213	-0.0917	-0.0927	-0.1143	-0.1073	-0.0954	-0.0861	-0.1018	-0.0842	-0.1052	-0.1031	-0.1130	-0.1115	-0.0970	-0.1258	-0.1073
	(0.0121)	(0.0117)	(0.0114)	(0.0116)	(0.0115)	(0.0120)	(0.0121)	(0.0121)	(0.0113)	(0.0108)	(0.0117)	(0.0118)	(0.0121)	(0.0122)	(0.0124)	(0.0122)	(0.0122)	(0.0126)	(0.0124)
HOHSingle	-0.0515	0.0533	0.0951	-0.1248	0.0647	0.0910	0.0550	0.1209	-0.0350	-0.0318	0.0191	-0.0317	-0.0080	-0.0040	-0.1365	-0.0298	0.0011	-0.0525	0.0468
	(0.0259)	(0.0212)	(0.0204)	(0.0367)	(0.0197)	(0.0207)	(0.0349)	(0.0195)	(0.0214)	(0.0251)	(0.0241)	(0.0345)	(0.0438)	(0.0480)	(0.0638)	(0.0542)	(0.0605)	(0.0570)	(0.0583)

Table 5.17: Decomposition of Female Participation Growth in the UK across Variables

Variables	$MgEff_{84}$	$X_{02} - X_{84}$	$MgEff_{84} * (X_{02} - X_{84})$
Ag16–19	-0.19775	-0.00364	0.00072
Ag20–24	-0.04224	-0.0314	0.00133
Ag25–29	0.01144	-0.03177	-0.00036
Ag30–34	-0.01289	0.00559	-0.00007
Ag40–44	-0.04632	0.02224	-0.00103
Ag45–49	-0.10072	0.00783	-0.00079
Ag50–54	-0.16106	0.02283	-0.00368
Ag55–59	-0.28978	0.00471	-0.00136
Non–White	0.02079	-0.02373	-0.00049
Region2	-0.00196	0.00049	0.0000
Region3	0.01196	0.0048	0.00006
Region4	-0.04317	-0.00021	0.00001
Region5	0.0103	0.01365	0.00014
Region6	0.00033	0.02165	0.00001
Region7	-0.03255	0.01133	-0.00037
Region8	-0.00986	-0.00081	0.00001
Region9	0.01215	-0.00873	-0.00011
Region10	-0.03628	0.00162	-0.00006
Region11	-0.04031	-0.0066	0.00027
Region12	-0.05545	-0.03638	0.00202
Edu2	0.08011	0.04409	0.00353
Edu3	0.06316	-0.00043	-0.00003
Edu4	0.07126	0.04004	0.00285
Edu5	0.09669	0.04766	0.00461
Edu6	0.18249	0.03848	0.00702
Edu7	0.07297	0.02582	0.00188
Edu8	0.20667	0.03735	0.00772
Edu9	0.20962	0.08301	0.0174
Ndep0–2	-0.21948	-0.04295	0.00943
Ndep3–4	-0.13167	-0.02187	0.00288
Ndep5–10	-0.09093	-0.01272	0.00116
Ndep11–15	-0.05033	-0.07009	0.00353
Ddep0–2	-0.15929	-0.03577	0.0057
Ddep3–4	-0.12257	-0.01993	0.00244
Ddep5–10	-0.05433	-0.00519	0.00028
Ddep11–15	0.01417	-0.04455	-0.00063
Married	-0.20749	-0.09574	0.01986
EmpP	0.25902	-0.07971	-0.02065
EduP2	-0.00598	0.04685	-0.00028
EduP3	0.03444	0.00337	0.00012
EduP4	0.01614	-0.03585	-0.00058
EduP5	-0.01934	0.01241	-0.00024
EduP6	-0.00791	0.01105	-0.00009
EduP7	-0.07971	0.0088	-0.0007
EduP8	-0.044	0.02499	-0.0011
EduP9	-0.09075	0.04374	-0.00397
HOHSingle	-0.05149	0.10238	-0.00527
Sum of the $MgEff_{84} * (X_{02} - X_{84})$ *for all variables*			0.05311

Table 5.18: Predicted Sample: Percentage of Female Participation using Coefficients for Year j and Sample for Year i, Linear Probability Model

Sample Year	*Coefficient Year*																		
	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
1984	62.1	62.5	63.6	65.0	65.5	65.7	66.1	66.2	67.4	68.5	67.2	66.9	65.7	63.8	63.6	63.4	63.5	63.9	62.8
1985	62.0	62.6	63.8	64.8	65.7	65.8	66.2	66.5	67.4	68.4	67.3	66.9	65.7	64.0	63.5	63.5	63.6	64.0	63.0
1986	62.3	62.8	63.9	64.9	65.8	65.9	66.5	66.6	67.6	68.5	67.4	67.0	65.8	64.1	63.6	63.6	63.8	64.3	63.2
1987	62.5	63.0	64.1	65.2	65.9	66.0	66.6	66.8	67.5	68.7	67.6	67.2	66.1	64.4	64.0	64.0	64.1	64.6	63.5
1988	62.9	63.4	64.6	65.6	66.5	66.6	67.2	67.4	68.3	69.2	68.2	67.9	66.7	65.1	64.7	64.7	64.8	65.4	64.3
1989	63.5	64.1	65.4	66.3	67.2	67.5	68.0	68.4	69.1	70.0	69.1	68.8	67.6	66.2	65.8	65.9	66.1	66.5	65.4
1990	63.9	64.5	65.8	66.9	67.8	67.9	68.5	68.9	69.7	70.6	69.7	69.5	68.4	67.0	66.8	66.8	67.0	67.4	66.3
1991	63.6	64.2	65.5	66.4	67.4	67.6	68.1	68.7	69.2	70.1	69.3	69.0	67.9	66.5	66.2	66.3	66.5	67.0	65.9
1992	64.7	65.2	66.5	67.5	68.4	68.6	69.1	69.5	70.3	71.2	70.4	70.1	69.1	67.8	67.8	67.8	67.9	68.4	67.4
1993	64.2	64.6	66.0	67.0	67.9	68.1	68.6	69.0	69.7	71.3	69.8	69.4	68.6	67.3	67.2	67.3	67.5	67.9	67.0
1994	64.8	65.3	66.7	67.7	68.6	68.9	69.4	70.0	70.5	70.6	70.7	70.4	69.6	68.5	68.4	68.6	68.7	69.3	68.3
1995	65.2	65.7	67.0	68.2	69.1	69.3	69.8	70.3	70.9	71.8	71.1	70.9	70.4	69.4	69.5	69.6	69.8	70.1	69.4
1996	65.3	65.9	67.2	68.4	69.3	69.5	70.1	70.6	71.1	72	71.4	71.2	70.8	69.9	70.0	70.2	70.3	70.4	69.9
1997	65.9	66.5	67.8	69.0	69.9	70.1	70.7	71.3	71.8	72.7	72.1	71.9	71.6	70.8	70.9	71.1	71.3	71.4	70.8
1998	66.0	66.6	67.9	69.1	70.0	70.3	70.9	71.5	71.9	72.8	72.3	72.1	71.8	71.0	71.2	71.3	71.5	71.7	71.1
1999	66.5	67.0	68.3	69.5	70.4	70.7	71.2	71.9	72.3	73.2	72.7	72.5	72.2	71.4	71.6	71.8	72.0	72.2	71.6
2000	64.5	67.0	68.3	69.5	70.5	70.8	71.3	72.0	72.4	73.2	72.8	72.6	72.2	71.5	71.7	72.0	72.1	72.4	71.8
2001	66.9	67.2	68.5	69.6	70.7	70.9	71.3	71.8	72.5	73.2	72.8	72.5	71.8	70.9	71.1	71.4	71.5	72.3	71.2
2002	67.3	67.8	69.0	70.2	71.2	71.5	71.9	72.6	73.0	73.8	73.5	73.3	72.9	72.2	72.4	72.7	72.9	73.3	72.6
Pii[1]	62.1	62.6	64.1	65.2	66.5	67.5	68.5	68.7	70.3	71.3	70.7	70.9	70.8	70.8	71.2	71.8	72.1	72.3	72.6

[1] *Pii* stands for the mean of the predicted probability for year i using the coefficients estimated for the same year i.

Table 5.19: Forecasting Female Participation in the UK with an Adjusting Factor[1,2]

Year $t+2$	$\hat{\beta}_{t+2}\bar{X}_{t+2}$	$\hat{\beta}_t\hat{\bar{X}}_{t+2}$	TE_{t+2}	*Forecast with Adjustment*	*Error for the Adjusted Forecast*
1992	70.3	69.7	0.6		
1993	70.6	69.4	1.2		
1994	70.6	71.1	-0.4		
1995	70.9	70.6	0.3	71.1	-0.2
1996	70.8	71.6	-0.8	72.0	-1.2
1997	70.8	71.4	-0.6	71.4	-0.6
1998	71.2	72.3	-1.1	71.9	-0.7
1999	71.8	72.3	-0.5	71.0	0.8
2000	72.1	72.3	-0.2	71.6	0.5
2001	72.3	72.9	-0.6	72.3	0.0
2002	72.6	72.7	-0.1	72.3	0.3
2003		72.8		72.5	
2004		73.3		73.0	

[1]We adjust the forecast adding the average of the last three forecasting errors.
The adjustment for 2004 consists of adding the average error of 2001 and 2002.
[2]*Measure of fit*: MSE = 0.41

5.8.2 The Employment of Married Mothers in Great Britain: 1974–2000

Table 5.20: History of Maternity Rights in Great Britain: Statutory Requirements and Type of Payment Received[1,2]

Year		*Statutory requirements*	*Duration of Leave and Payments*
1979	*RofR*	• 2 years/16 hours pw or 5 years/8-16 hours pw continuous employment with same employer into the 11^{th} prior EWC	return to work at any time up to 29 weeks after confinement
	MP	• 2 years/16 hrs pw or 5 years/8-16 hours pw continuous employment with same employer into the 11^{th} prior EWC	6 weeks maternity pay at 90% salary less flat-rate *MA*; and 18 weeks flat-rate *MA*
1987	*RofR*	• 2 years/16 hours pw or 5 years/8-16 hours pw continuous employment with same employer into the 15^{th} prior EWC	return to work at any time up to 29 weeks after confinement
	MP	• 2 years/16 hours pw or 5 years/8-16 hours pw continuous employment with same employer into the 15^{th} prior *EWC* • 6 months of insured employment with same employer in previous 12 months into the 15^{th} week before *EWC* • 6 months of insured employment in previous 12 months, prior to the 15^{th} week before *EWC* • Most employers use *CMP* to 'top-up' *SMP*, many of them attached return-to-work conditions to its receipt	6 weeks *SMP* pay at 90% of the salary 18 weeks of flat-rate *SMP* (£32.85 pw) 18 weeks flat-rate state *MA* (£30.05 pw)
1994	*RofR*	• All pregnant women regardless of their hours of work • 2 years continuous service have additional leave	14 weeks of leave 28 weeks of leave
	MP	• 26 weeks insured employment with same employer in previous 12 months into the 15^{th} week before *EWC* • 52 weeks of insured employment in previous 66 weeks, which precede their *EWC*	6 weeks paid at 90% of average weekly earnings and 12 weeks of flat-rate *SMP* (£52.50 pw) 18 weeks flat-rate state *MA* (£52.20 pw)
2000	*RofR*	• All pregnant women regardless of their hours of work • 1 year continuous service have additional leave	18 weeks of leave 29 weeks of leave
	MP	• 26 weeks insured employment with same employer in previous 12 months into the 15^{th} week before *EWC* • 52 weeks of insured employment in previous 66 weeks, which precede their *EWC*	6 weeks paid at 90% of average weekly earnings and 12 weeks of flat-rate *SMP* (£75 pw) 18 weeks *MA* depending on average earnings standard rate (£75 pw)
2003	*RofR*	• All pregnant women regardless of their hours of work • 1 year continuous service have additional leave	26 weeks of leave 52 weeks of leave
	MP	• Employed without a break for at least 26 weeks into the 15^{th} week before *EWC* and earning at least £77 pw • Employed or self-employed and earning at least £30 pw	6 weeks paid at 90% of average weekly earnings and 20 weeks of flat-rate *SMP* (£100 pw) 26 weeks *MA* up to a standard weekly rate (£100), depending on your earnings

[1]Source: McRae (1991), Callender et al. (1996), Palmer (1996), *Department of Trade and Industry* and *Department for Work and Pensions*.
[2]*RofR* stands for Right of Reinstatement; *EWC* means expected week of childbirth; *MP* denotes any form of maternity pay; *MA* stands for Maternity Allowance; *SMP* means Statutory Maternity Pay; *CMP* denotes Contractual Maternity Pay.

Table 5.21: Chronological Evolution of Financial Support for Children in the UK: 1970–2000[1]

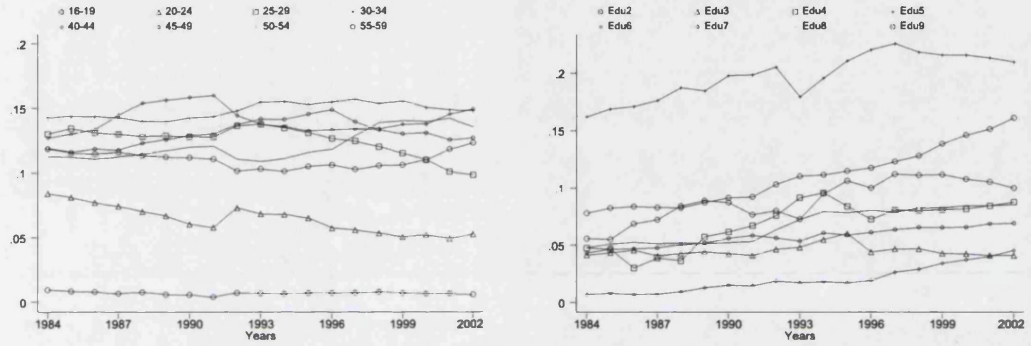
Years	*Non-Means Tested Payments*	*Support through Tax System*	*Means-tested Benefits*	*In-Work Benefits*
1971				Family Income Supplement (FIS) introduced as a means-tested
1977	Child benefit introduced	Child tax allowances abolished (1977–79)	Family allowance abolished	
1988				Family Credit (FC) replaced FIS with increased generosity and lower marginal withdrawal rates 24 hours' work pw to qualify
1991	Higher rate for eldest child			
1992				Cut to 16 hours pw to qualify
1995				Extra credit for working more than 30 hours pw
1996				
1998			Rates of child premiums equalised for children < 16	Rates of child credits equalised for children < 16
1999				Working Families' Tax Credit (WFTC) replaces FC, with increased generosity and childcare support
2000		Children's tax credit replaced married couple's and related allowances	Increase in real value	WFTC increase in generosity Credit paid through wage-packet

[1]Source: Brewer, Myck and Reed (2001) and Brewer (2001).

5.9 Appendix C: Graphs

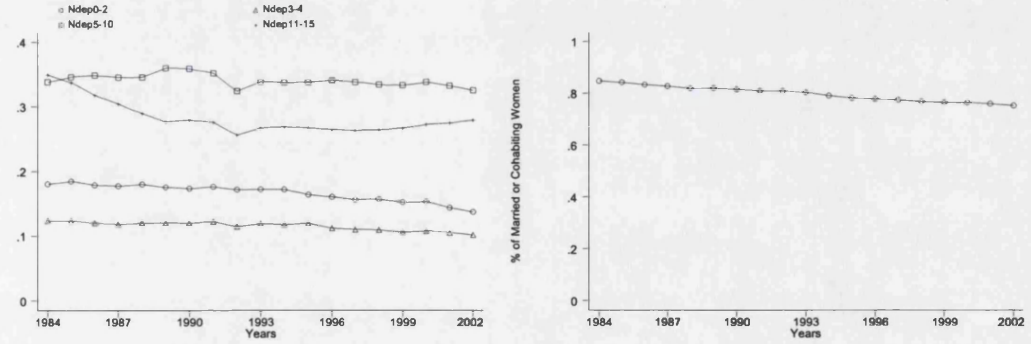
5.9.1 Female Labour Force Participation in the UK: Evolving Characteristics or Changing Behaviour?

Figure 5.5: Trends in Female Characteristics in the UK



Age Distribution

Education

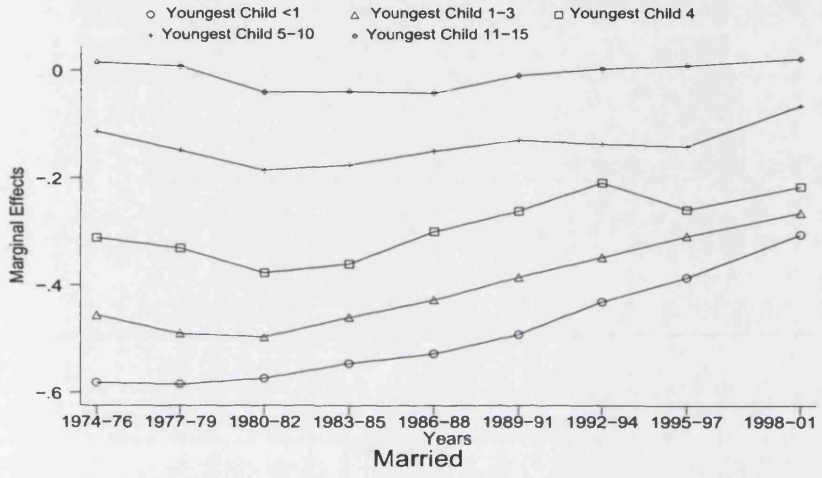


Number of Children

Marital Status

5.9.2 The Employment of Married Mothers in Great Britain: 1974–2000

Figure 5.6: Marginal Effects on the Probability of Employment: 1974–2000[1,2] — Married Females in Britain



[1] Married = both married and women in cohabitation aged 16–59.
[2] Reference group in the probit estimation is married women without children.

Figure 5.7: Employment Rates After Birth — Married Mothers in Britain

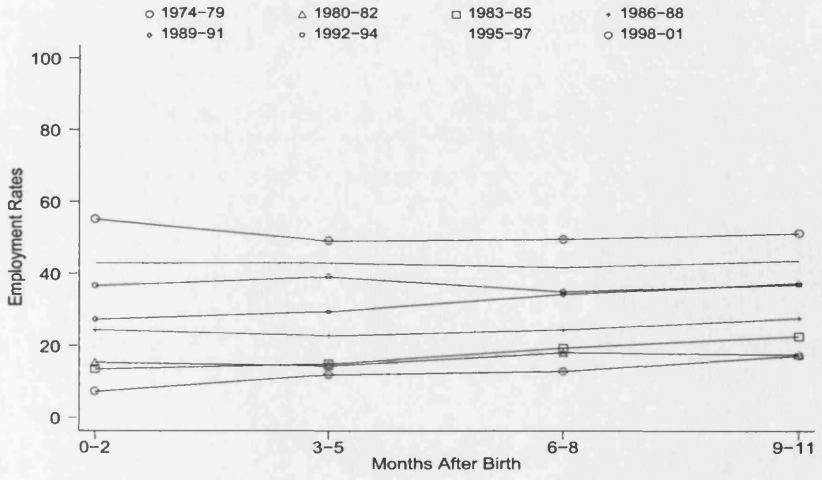
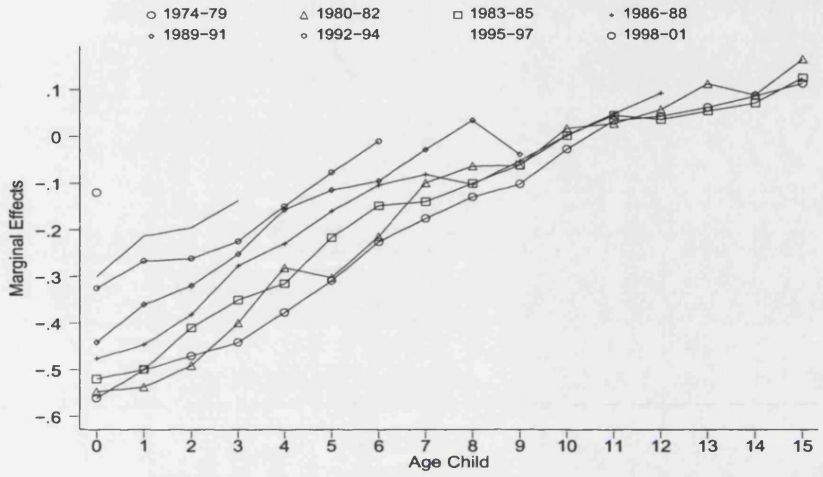
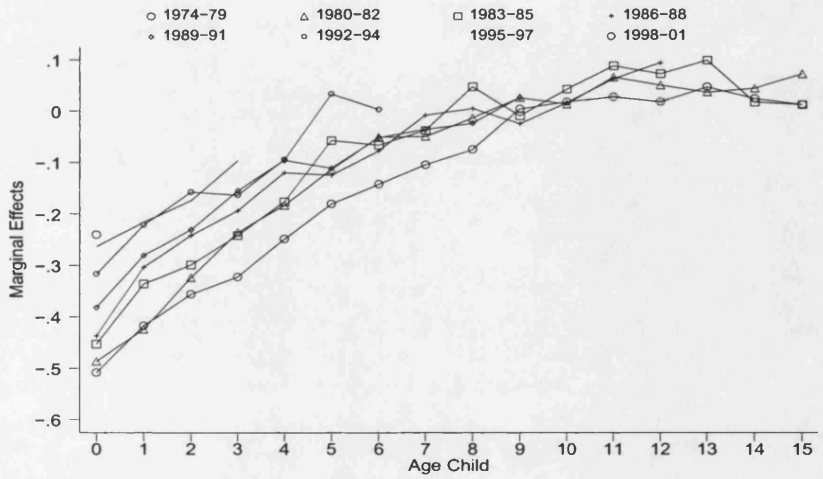


Figure 5.8: Marginal Effects on the Probability of Employment, By Children's Birth Cohorts and Age, Only First Birth[1] — Married Females in Britain



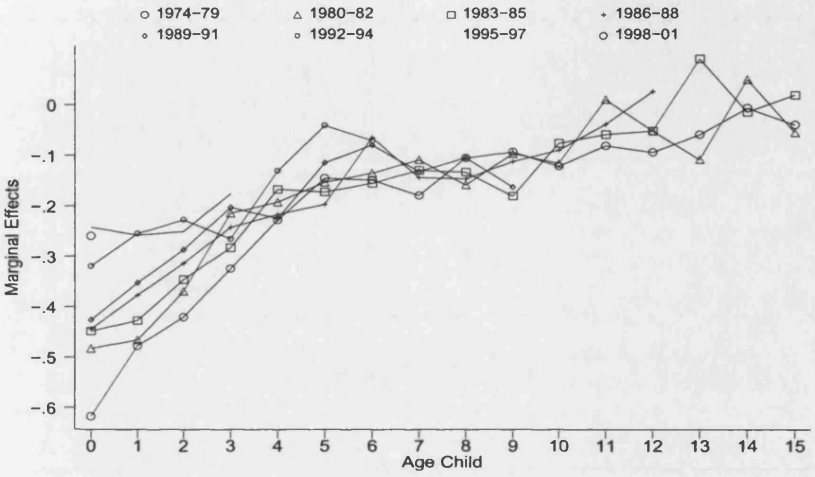
[1] Comparison group are all married childless women.

Figure 5.9: Marginal Effects on the Probability of Employment, By Children's Birth Cohorts and Age, Second and Higher Order Birth[1] — Married Females in Britain



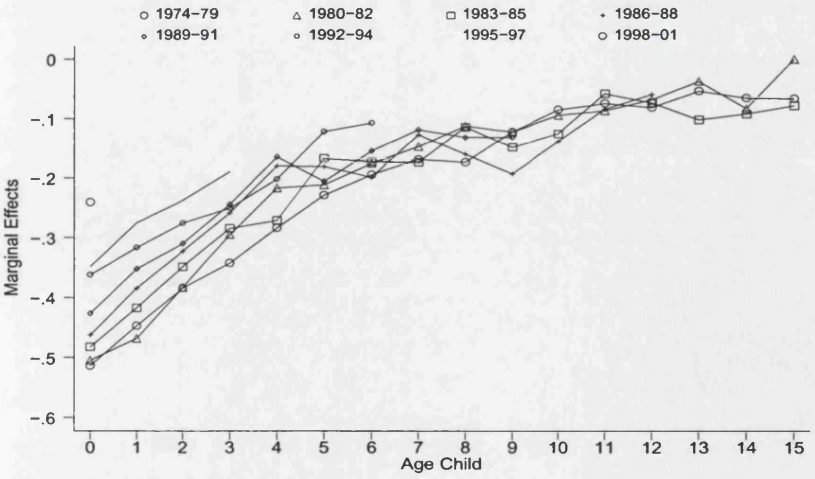
[1] Comparison group are all married childless women.

Figure 5.10: Marginal Effects on the Probability of Employment, By Children's Birth Cohorts and Age[1,2] — Married Females with High Education in Britain



[1] High education means A level and superior.
[2] Comparison group are all married childless women with high education.

Figure 5.11: Marginal Effects on the Probability of Employment, By Children's Birth Cohorts and Age[1,2] — Married Females with Low Education in Britain



[1] Low education means below A level.
[2] Comparison group are all married childless women with low education.

Chapter 6

Overall Conclusions

This thesis addresses how women reconcile family and work in Belgium, West-Germany, Italy, Spain, Sweden and Great Britain. In Europe, it is a common pattern that women have increased their educational qualifications and their employment rates during the 70s, 80s and 90s. This means that nowadays young couples across share similar questions regarding family and work. When is the right timing for childbearing? When (if ever) is it optimal or possible to go back to paid work after motherhood?

This thesis focuses on these two questions. On the one hand, it investigates how the labour markets conditions and employment status matter for deciding when partnering or having children (Chapter 3). On the other hand, it analyses the employment trajectories after birth for those women who became mothers (Chapters 4 and 5).

Couples decide both their fertility and employment on a simultaneous basis. Because of the difficulty of the interrelationship, this research concentrates on the two questions independently. Nevertheless, each decision process is studied extensively to take into account this mutual link and the results offer a reliable picture of the relevant factors for these choices.

The thesis contemplates the effect of individual characteristics, family and work policies, labour markets and social aspects on these two issues. For this reason, European country comparison is important since individuals face rather different settings surrounding their decisions.

This thesis offers some suggestions on the type of instruments that may facilitate combining family and work. The overall contribution to this subject can be summarised as follows:

Theoretical considerations on combining family and work
First, this thesis describes some theoretical thoughts on how to reconcile women's curriculum vitae and motherhood. There is evidence that female labour supply rises with wages. If fertility reacts also positively to increases in wages, then we would expect that female employment and fertility are positively correlated. Bu contrast, if fertility responds negatively to wages, we anticipate a negative correlation between the two.

Chapter 2 points to the policies that make it more likely that rises in female wages increase fertility (or at least, reduce it less), which facilitates a positive (or weaker negative) correlation between female labour supply and number of children. These are: higher subsidies for bought-in childcare, separate taxation, provision of free childcare time and more flexible working hours. The model also suggests that a positive correlation between female wages and fertility is more likely to occur, the smaller the gap between female and male wages.

The timing of cohabitation and births
Chapter 3 aims to provide more information about what matters in the decision process of family formation. The exercise is undertaken in Belgium, West-Germany, Italy, Spain and Sweden.

These countries have in common that precarious labour markets (i.e. high female unemployment rates) result in postponing cohabitation and motherhood. If governments are interested in increasing fertility, they must tackle female unemployment.

We find universal evidence that being at work accelerates cohabitation (or marriage), except for Spanish women born between 1945 and 1960. The latter is an indication of their previously traditional society.

Results also show that, excluding Sweden, being employed delays maternity. This means that, in general, women in paid work wait longer since they perceive a higher opportunity cost of childbearing. Family-friendly policies in Sweden (i.e. soft eligibility conditions for maternity leave and public childcare) have managed to reverse this effect and females at work are actually speeding up their motherhood.

How are women's employment trajectories after motherhood?
Chapters 4 and 5 address female employment trajectories after motherhood in six European countries.

Women choose to be in paid work or remain at home after a birth depending on the net benefits of selecting one alternative or the other. Chapter 4 empirically investigates labour force transitions in connection with a birth in Belgium, West-Germany, Italy, Spain and Sweden. Chapter 5 explores the growth in employment of women with newborns in Britain. Both chapters relate mothers' employment to those factors (i.e. family-friendly policies and labour markets) that influence their decision.

From Chapter 4 we learn that higher education significantly raises the probability of staying-on employed after motherhood, except for Sweden. Chapter 5 also finds that the big increase in post-birth employment in Britain only occurs amongst well-educated women. Thus, unless the state offers more public childcare facilities, as in Sweden, being at work after childbearing only pays off for mothers with higher potential earnings.

The Spanish analysis suggests that holding a fixed-term contract reduces the likelihood of staying at work after motherhood. Moreover, data show a significant number of transitions to unemployment around birth in this country.

This thesis also shows that moving from a joint to a separate taxation system has led to a general increase in post-birth employment. One lesson is that West-Germany (the only country under analysis which still has a joint taxation system) would probably experience a rise in mothers' employment if it adopted an individual taxation rule.

Chapter 5 determines the importance of the right of reinstatement for the rise in employment of mothers with children under schooling age in Britain. Interestingly, evidence in Chapter 4 suggests that, once women are entitled to reasonable maternity leave, further increases in its generosity do not lead to more mothers working, but the opposite.

Furthermore, Chapters 4 and 5 examine the aggregate growth in employment rates and find that, amongst all female population characteristics, the rise in education levels plays the most fundamental role.

Both chapters provide evidence that removing barriers to part-time work are extremely helpful for raising employment after motherhood. First, Chapter 4 shows that post-birth employment rates are higher in those countries with higher transitions to part-time jobs after childbearing. Second, Chapter 5 emphasises that the increase in mothers' employment in Britain is mainly through part-time jobs.

Concluding Remarks

In the analysis of the employment trajectories after motherhood, we find significant evidence that precarious labour markets (e.g. fixed-term contracts) have a negative impact on the probability of staying-on employed after motherhood. Since anticipated post-birth employment behaviour conditions family formation decisions, countries with high instability in the labour markets will be more likely to postpone the fertility process.

Similarly, results show that facilitating part-time work may increase post-birth employment in those countries with low employment rates. This is because more mothers would move from full-time employment before birth to part-time employment after birth, instead of shifting to non-employment. If potential mothers expect the prospect of part-time employment after birth, this may also encourage them to have children in the first place.

Finally, this thesis reveals that educational differences are less relevant in both the decision of fertility and post-birth employment in those countries with more generous family-friendly policies (i.e. Sweden). That is, on the one hand, these policies manage to relax female opportunity cost of childbearing. On the other hand, they provide childcare to mothers with any sort of qualifications, which enable them to be employed after birth.

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