ECONSTOR

WWW.ECONSTOR.EU

Der Open-Access-Publikationsserver der ZBW – Leibniz-Informationszentrum Wirtschaft
The Open Access Publication Server of the ZBW – Leibniz Information Centre for Economics

Weber, Andrea Maria; Lauer, Charlotte

Working Paper

Employment of Mothers After Childbirth: French-German Comparison

ZEW Discussion Papers, No. 03-50

Provided in cooperation with:
Zentrum für Europäische Wirtschaftsforschung (ZEW)

ZBW Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Mitglied der Leibniz-Gemeinschaft

Discussion Paper No. 03-50

Employment of Mothers After Childbirth: A French-German Comparison

Charlotte Lauer and Andrea Maria Weber

ZEW

Zentrum für Europäische
Wirtschaftsforschung GmbH

Centre for European
Economic Research

Discussion Paper No. 03-50

Employment of Mothers After Childbirth: French-German Comparison

Charlotte Lauer and Andrea Maria Weber

Non technical summary

Recently, the French and the German environments in terms of family policy have experienced dramatic changes. Two central objectives are mentioned in this area. First of all, there is the intention to raise the incentives to give birth and secondly, the compatibility of having children and participating in the labour market is to be fostered, particularly for mothers. In most industrialised countries, the labour force participation of women has increased markedly over the past few decades. At the same time, fertility rates have declined rapidly. However, when observing a cross-section of countries, it appears that in developed countries, the correlation between fertility and participation rate has reversed its sign and has turned positive since the late 1980s. One explanation for the apparent paradox of a higher fertility coinciding with a higher labour market participation could be related to the different frameworks with respect to family policy.

A comparison of France and Germany provides a good example of this positive relationship between fertility and female employment, since both the fertility and the labour force participation rates are higher in France than in Germany. This paper aims at comparing the labour force participation of young mothers in France and Germany. It complements the existing literature in several ways. This is, to our knowledge, the first study that compares the labour market participation of French and German young mothers. Moreover, we examine the work attachment of all young mothers, rather than of those who were employed prior to childbirth, thereby differentiating between part-time and full-time employment, and we take into account the selection of women into motherhood. Indeed, the results show that it proved essential to consider the selectivity of women into motherhood, and to distinguish between full-time and part-time employment.

The estimation results confirm the hypothesis that more labour market oriented women delay their childbirth to a later point in time, and (after childbirth) return to the labour market soon. For Germany the results suggest that the parental leave regulations might have an impact on the decision to give birth. Higher education appears to have a strong effect on the full-time employment probability of French women, while it reduces their propensity to work part-time. By contrast, in Germany, higher education rather affects the part-time employment propensity, but the effect is small. The effects of regional characteristics differ between both countries as well. While mothers living in large cities are less likely to work full-time or part-time than those living in rural areas in Germany, this is not the case in France. This could be related to the poor availability of child care institutions in Germany that force women to rely more on social networks that are typically more developed in rural areas. All in all, negative trends observed in both the birth and the post-birth employment propensity of women seem to indicate that the goals of family policy both to increase the fertility rate and to foster the employment of mothers have not been attained yet, even though they are some hints that the recent attempts of policy-makers do affect women's decisions.

Employment of Mothers after Childbirth:
A French-German Comparison

Charlotte Lauer and Andrea Maria Weber*

Centre for European Economic Research
Zentrum für Europäische Wirtschaftsforschung (ZEW)
Mannheim

Abstract: This paper compares the work attachment of French and German women after childbirth. Both fertility and employment of mothers are higher in France than in Germany. Since the sample of mothers deciding on employment after a child is born might not be representative for all women, we take account of selectivity by explicitly modelling the childbirth decision of women. Furthermore, it proved essential to distinguish between part-time and full-time employment. Background characteristics appear to affect both the birth and the employment decisions in a different way in France and Germany. Some of the impacts can be related to different family policy regulations.

JEL classification: D1, J2
Keywords: fertility, labour supply

1 Introduction

Recently, dramatic changes have been introduced in the French system of family policy regulations. In 2004, the French government will implement completely new, generous child benefit regulations (the *PAJE* or *Prestation d'accueil du jeune enfant*). At the same time, the French neighbour Germany announces its intention to raise the child care coverage for children younger than three up to 20 percent by 2007, and four billion Euro shall be provided in order to increase the provision of full-day schools. Two central objectives are mentioned in connection with these efforts to revolutionise the family political environment. First of all, there is the intention to raise the incentives to give birth, and secondly, the compatibility of having children and participating in the labour market is to be fostered, especially for mothers.

In most industrialised countries, the labour force participation of women has increased markedly over the past few decades. At the same time, fertility rates have declined rapidly. These developments seem to underpin the view that there is a negative correlation between fertility level and labour market participation of women. And in fact, many empirical studies find at the micro-level that female labour supply and wages are negatively related to the number of children, on the one hand, and positively related to the age of the children, on the other hand (e.g. Heckman and Walker, 1990; Calhoun, 1994; Gangadharan and Rosenbloom, 1996). Some models were developed to explain this inverse association between labour force participation and fertility. Mincer (1963), Becker (1965) and Willis (1973), for instance, emphasise the role of the opportunity costs of women's time. Childrearing is intensive in mother's time and the opportunity costs of the childrearing time are the higher the higher the female wages. Therefore increasing female wages could have a negative effect on the demand for children.

However, when observing a cross-section of countries, rather than time developments within a country, it appears that in developed countries, the correlation between fertility and participation rate has reversed its sign and has turned positive since the late 1980s. Thus, countries with a high rate of female labour force participation are also those countries with the highest fertility rates. Ahn and Mira (2002), following Ermisch (1989) and Hotz, Klerman and Willis (1997), attribute this positive relationship to the increase in female wages, the greater flexibility of working hours, the greater possibility of purchasing child care and the increased unemployment. A comparison of France and Germany provides a good example of this positive relationship between fertility and female employment, since both the fertility and the labour force participation rates are higher in France than in Germany (see section 2).

The primary objective of this paper is therefore to compare the behaviour of French and German women after childbirth with respect to labour force participation as well as its determinants and to relate these to the contextual factors in these countries. Women's return to work decision after childbirth has been the topic of

several studies (e.g Bender, Kohlmann and Lang, 2003; Ondrich, Spiess, Yang and Wagner, 1999; Lauterbach and Klein, 1995 or Joesch, 1997 for Germany, and Laroque and Salanié, 2003; Bonnet and Labbé, 1999; Fagnani, 1996 or Desplanques, 1993 for France). As argued by Ronsen and Sundström (2002), a limitation of such studies is that they focus exclusively on women who were employed before childbirth. However, the proportion of mothers who were not employed before childbirth is far from being negligible and leaving them out only highlights one side of the coin, beside the fact that it might introduce some selection bias. This is all the more problematic for the present analysis since this selection might differ between France and Germany. This is why we decided not to exclude women who were not employed before childbirth from our sample of analysis and to analyse the employment pattern of all young mothers in both countries.

Furthermore, many studies on female labour supply, and in particular those mentioned here for France and Germany, consider motherhood as an exogenous factor. Here again, selectivity effects might be at work, since, for example, women who have, for some reason unobserved to the scientist, a stronger labour force attachment might be less prone to give birth than those who are less keen on making career. One solution to this selectivity issue is to model explicitly the selection into motherhood and estimate the determinants of childbirth simultaneously with the determinants of labour supply, following the approach of Hotz and Miller (1988). Finally, most studies (though not that of Ondrich et al., 1999) look at employment patterns without distinguishing between full-time and part-time employment. This distinction seems important when comparing France and Germany, where female attitudes towards part-time work differ strongly (see section 2).

Therefore, this article complements the literature in several ways. First, this is, to our knowledge, the first study that compares the work attachment of French and German young mothers. Moreover, we examine the behaviour of all young mothers, not only those who were employed prior to childbirth, we differentiate between part-time and full-time employment, and we take into account the selection of women into motherhood. The outline of the paper is as follows. First, we present some stylised facts on the pattern of employment and on the institutional features in both countries (section 2). Then, we present the modelling framework (section 3). The data and the construction of the variables are explained in section 4, and the estimation results presented in section 5. Finally, we summarise the main results and draw some conclusions in section 6.

2 Stylised facts

2.1 Employment patterns

Table 1 provides first insights into the work attachment of French and German women. The figures are computed on the basis of comparable samples drawn from the GSOEP data for Germany and the Labour Force Survey (*Enquête Emploi*) for

France for the year 2000 (see description in section 4).

Table 1: Employment rates of women aged between 17 and 55 (%)

		All women	Number of children				Women with children	
			0	1	2	3+	≤3	≤6
Total empl. rate	Germany	63.7	68.4	62.7	52.8	44.1	26.5	35.9
	West	62.8	69.8	60.1	51.4	45.8	25.7	35.3
	East	63.9	68.9	62.3	60.7	33.0	31.7	39.7
	France	71.4	75.9	75.6	68.0	48.9	52.9	59.1
Full-time empl. rate	Germany	37.4	49.0	27.6	13.4	6.2	4.4	7.5
	West	35.5	49.1	21.3	9.7	4.7	3.3	5.8
	East	46.2	49.5	48.7	34.8	16.2	11.1	18.8
	France	46.0	53.8	48.6	39.3	19.5	30.0	32.6
Part-time share *	Germany	41.3	28.4	55.6	74.6	86.0	83.6	79.2
	West	44.5	29.7	64.5	81.1	89.8	87.0	83.5
	East	26.5	21.8	28.2	42.7	50.8	65.1	54.2
	France	35.6	28.9	36.0	42.2	60.2	44.8	43.4

Source: GSOEP, *Enquête Emploi*, wave 2000, own computations.
* The part-time share is the proportion of employed women in the considered age group who work part-time (including minor employment) as opposed to full-time.

The total labour market participation rate reported here is calculated as the proportion of women aged between 17 and 55 who are working at the time of the interview, either on a full-time or on a part-time basis.[1] As can be seen, considering all women in this age group, the overall employment rate is higher in France than in Germany (71 percent for France against 64 percent for Germany). The overall female employment rate is slightly higher in East Germany than in West Germany but the order of magnitude is similar.

Looking at the employment rate by number of children[2], however, reveals further elements of comparison between France and Germany. Whether they have children or not, French women always have a higher propensity to work than their German counterparts, but the gap depends on the number of children. In both countries, the employment rate diminishes with the number of children. However, whereas in Germany the first child already causes the mothers' labour market participation to drop significantly, this only happens from the second child onwards in France, and to a lesser extent. The presence of a third child (or even more children), however, causes a dramatic decline in the employment propensity of French mothers. As a result, the gap between the participation rate of French and German women is highest among

---

1 The lower age limit was set at 17 years of age because of data limitations, the upper age limit was set at 55 years of age in order to avoid questions related to early retirement.
2 Only children below 18 years of age and living in the household are considered here.

mothers of one or two children. Looking at differences within Germany, it appears that West German females without children have a slightly higher propensity to work than their Eastern counterparts but the gap is minor. The presence of one child causes the employment rate to decline somewhat more strongly in the Western part of the country, so that the employment rate there falls slightly below the East German one. But the gap between East and West turns really large among mothers of two children, whereas it reduces again in large families.

In both countries, women with young children tend to have a low propensity to work. However, considering only women with young children, it appears that the gap between France and Germany with respect to the employment rate is very large. About 36 percent of women with children below the age of six are employed in Germany versus 59 percent in France. Mothers of children below three years of age even appear to work almost twice as often in France than in Germany. This is true in both East and West Germany, even if the employment rate of women with young children is somewhat higher in the Eastern part than in the Western part of Germany.

The differences between France and Germany are even more striking if we distinguish full-time and part-time employment. The full-time employment rate reported in table 1 indicates the proportion of women aged between 17 and 55 who work full-time. The overall full-time employment rate turns out to be somewhat higher in France than in Germany (about 46 percent of the age group considered in France against 37 percent in Germany). A closer look reveals that the full-time employment rate of West German women is significantly lower than that of French women, whereas East German women exhibit a similar rate of full-time employment to that of French women. Here again, France and Germany differ strongly if one examines the labour market behaviour of women with or without children. Women with no children are only slightly more often in full-time employment in France than in Germany, and among childless women, the difference between East and West Germany is not worth mentioning. As soon as there are children in the household, however, French mothers are markedly more often in full-time employment than German mothers. Interestingly, this is solely due to the labour market behaviour of West German mothers, whereas East German mothers have a similar rate of full-time employment to French mothers. The gap between West German mothers and French or East German mothers increases with the number of children. Thus, more than four times as many mothers of at least three children work full-time in France compared to West Germany.

The gap becomes amazingly large if we consider only mothers of young children. As a matter of fact, less than eight percent of German mothers of children below six years of age work full-time, against one third of their French counterparts. The gap is even stronger among mothers of children aged three or less: less than five percent of such mothers work full-time in Germany, where 30 percent of the corresponding French mothers do so. Here again, there is a strong difference between East and West Germany, but even East German mothers of young children work significantly

less often full-time than French mothers of young children.

The part-time share reported in Table 1 is defined as the proportion of employed women in the considered age group who work part-time (including minor employment) as opposed to full-time. On the whole, the share of part-time work is higher in Germany than in France, with about 41 percent of employed German women against 36 percent of employed French women working part-time in the age group considered. Thus, not only do French women work more often than German women, but if they do so, they also work more often on a full-time basis, which explains the large gap observed in the full-time employment rate. The overall German figure hides strong differences between the Western and the Eastern part of the country. Whereas the incidence of part-time work in West Germany is significantly higher than in France, in the East, a significantly smaller proportion of working women are employed on a part-time basis than in France.

Among childless women, part-time work is similar in scope in Germany and in France. Here again, this is the combined effect of a comparatively higher part-time work propensity among West German women, and a significantly lower incidence of part-time work among childless East German women compared to their French counterparts. Thus, the gap in the overall proportion of employed women working part-time mainly stems from women with children. In both countries, the share of part-time work rises with the number of children. However, in West Germany, the presence of one child in the household already causes the share of part-time work to jump to about 65 percent, whereas in France and in East Germany, the presence of one child causes the share of female part-time work to rise only moderately. In large families, i.e. with three children or more, the proportion of women working part-time reaches 90 percent in West Germany, against 60 percent in France and about 51 percent in East Germany. The incidence of part-time work is particularly high when there are young children in the household. This is true in both countries but particularly pronounced in Germany. In West Germany 87 percent of working mothers with children below the age of three work part-time, but it is worth noticing that also in the East, the share of part-time work is very much higher than average when there are young children in the household. As a result, the share of part-time work is significantly higher than in France also in the Eastern part of Germany if we consider only the mothers of young children.

Table 2 shows that significantly more German women than French women in the age group 17-55 have no children below the age of 18 (60 percent in Germany compared to about 45 percent in France). There is little difference between East and West Germany in the overall proportion of childless women, but looking more in detail, East German women tend to have more often one single child and less often two or more children. Compared to German women, French women have more children. In particular, many more have two children (for example 22 percent of French women have two children compared to 14 percent of German women), and large families (with at least three children) are also significantly more frequent in France than in Germany. Looking at the percentage of women with young children

Table 2: Number of children of women aged between 17 and 55 (%)

| | | Germany | | | France |
		West	East	Total	
Number of children	0	60.2	59.7	60.1	44.9
below 18 and living in the household	1	20.0	25.3	20.9	23.5
	2	14.9	11.7	14.3	21.7
	3+	5.0	3.3	4.7	10.0
Women with children	≤3 years	9.0	6.1	8.4	12.8
	≤6 years	17.2	11.8	16.2	19.9

Source: GSOEP, *Emploi* survey, wave 2000, own computations.

highlights the recent situation with respect to fertility. Almost 20 percent of the women in the French sample have children below six years of age, against only 16 percent of German women. The difference is stronger if we consider the proportion of women having children below three years of age, since the proportion of French women with children below the age of three is one third higher in France than in Germany. Distinguishing between East and West Germany reveals that, judging from the proportions of women with young children, the fertility of West German women is higher than that of East German women, though not as high as in France.[3]

To summarize these descriptive results, a close overall employment rate for French and German women hides considerable differences in the labour market participation, particularly in the presence of children. In both countries, the labour market participation diminishes as the number of children grows. However, French mothers tend to work more often than German mothers when they have children, at least compared to West German mothers, and when they work, it is more often on a full-time basis. Looking at indicators of fertility, it turns out that in 2000, French women had more children compared to German women, particularly East German women. Thus, both the labour market participation and the fertility are higher in France than in Germany. The results indicate that the labour market behaviour of women differs a lot in the presence of children, but also point to significant differences between the Western and the Eastern part of Germany. The remainder of the analysis aims at explaining the factors driving the labour market patterns observed.

3   Methodological approach

The primary objective of this paper is to analyse the work attachment of French and German women after childbirth. By definition, the employment decision after childbirth is observed for mothers only. A problem which arises is that the sample

---

3 The differences between France and Germany may also be due to different age structures in both countries and a higher duration of school education in Germany.

of mothers might not be a random sample of the whole female population. Thus, mothers could differ systematically from non-mothers in factors unobserved to the scientist. If these factors also influence the post-birth employment decision, ignoring the selection process underlying the childbirth decision will bias the estimates of the impact of certain variables on the employment decision. Some effect might be wrongly attributed to a variable whereas it is in fact a consequence of some unobserved factors affecting both the motherhood and the employment decisions. Consequently, we do not want to assume *a priori* the absence of selectivity with respect to childbirth but rather want to test its presence. To this end, we model explicitly the selection into motherhood and allow for a possible correlation of the error terms of a childbirth function and a post-birth employment function. We then test whether this correlation is significant or not.

The decision to give birth may be expressed as:

$$B_i^* = \beta^B X_i^B + \varepsilon_i^B, \tag{1}$$

where B_i^* is a latent utility index for giving birth for woman i, $i \in \{1...n\}$. To put it differently, B_i^* measures the inclination to motherhood. β^B is a vector of parameters which express the impact of observed variables associated with woman i and contained in the vector X_i^B. ε_i^B measures the impact of factors unobserved to the scientist that affect the childbirth decision of woman i. One cannot observe the continuous latent propensity B_i^* to give birth, but only the dichotomous event B_i whether the women gave birth ($B_i = 0$) or did not give birth ($B_i = 1$).[4] The actual birth decision is related to the latent utility index in the following way:

$$B_i = \begin{cases} 0 & \text{if } B_i^* > 0, \\ 1 & \text{if } B_i^* \leq 0. \end{cases} \tag{2}$$

In a similar way, the utility from employment E_i^*, i.e. the propensity to work at a given point in time - say one year - after childbirth, can be written as:

$$E_i^* = \beta^E X_i^E + \varepsilon_i^E, \tag{3}$$

where X_i^E is a vector of explanatory variables associated with woman i, β^E is the corresponding vector of parameters and ε_i^E expresses the impact of unobserved factors that affect the employment decision of woman i.[5]

Here again, the latent utility index E_i^* cannot be observed but rather the actual employment state occupied E_i. As observed in section 2, it seems particularly useful in the context of a French-German comparison to distinguish between full-time

---

4 Note that for technical reasons, i.e. in order to simplify the expression of the likelihood function, the categorisation of the binary variable is unusual. In the presentation of the results, however, we have reversed the sign of the estimates for ease of interpretation, so that a positively signed coefficient means a positive impact on the probability of birth.

5 Note that X_i^B contains a constant whereas X_i^E does not.

and part-time employment. Therefore, we consider three employment states: non-employment ($E_i = 0$), part-time employment ($E_i = 1$) and full-time employment ($E_i = 2$). These categories may be considered as ordered in so far as they represent the labour supply in terms of hours. E_i is related to E_i^* in the following way:

$$
E_i = \begin{cases} 0 & \text{if } \mu_0 < E_i^* \leq \mu_1, \\ 1 & \text{if } \mu_1 < E_i^* \leq \mu_2, \\ 2 & \text{if } \mu_2 < E_i^* \leq \mu_3, \end{cases} \tag{4}
$$

or equivalently:

$$
E_i = k \text{ if } \mu_k < E_i^* \leq \mu_{k+1}, \ k \in \{0...2\}, \tag{5}
$$

where $\mu_0 = -\infty$ and $\mu_3 = +\infty$, and for all $k \in \{0...2\}$, $\mu_k < \mu_{k+1}$.

It is assumed that the error terms ε^B and ε^E follow a bivariate standard normal distribution where the correlation parameter ϱ is to be estimated along with the other parameters instead of being *a priori* assumed to be zero:

$$
\begin{pmatrix} ln\varepsilon^B \\ ln\varepsilon^E \end{pmatrix} \sim \mathcal{N}\left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \varrho \\ \varrho & 1 \end{pmatrix} \right). \tag{6}
$$

The coefficients of the birth and employment equations as well as the thresholds and the correlation parameter can be obtained by maximizing the following likelihood function:

$$
\ln \mathcal{L} = \sum_{i=1}^{n} \sum_{j=0}^{1} \sum_{k=0}^{2} I_{ijk} \ln \left[Pr(B_i = j, E_i = k) \right], \tag{7}
$$

where I_{ijk} is an indicator variable taking the value 1 if $B_i = j$ and $E_i = k$ for individual i, and 0 otherwise.

This is equivalent to:

$$
\ln \mathcal{L} = \sum_{i=1}^{n} I_{i0.} \ln \left[Pr(B_i = 0) \right] + \sum_{i=1}^{n} \sum_{k=0}^{2} I_{i1k} \ln \left[Pr(B_i = 1, E_i = k) \right], \tag{8}
$$

or

$$
\begin{aligned}
\ln \mathcal{L} = \ & \sum_{i=1}^{n} I_{i0.} \ln \left[\Phi(\beta^B X_i^B) \right] \\
& + \sum_{i=1}^{n} I_{i10} \ln \left[\Phi_2(-\beta^B X_i^B, \gamma_{i1}^E, \varrho) \right] \\
& + \sum_{i=1}^{n} I_{i11} \ln \left[\Phi_2(-\beta^B X_i^B, \gamma_{i2}^E, \varrho) - \Phi_2(-\beta^B X_i^B, \gamma_{i1}^E, \varrho) \right] \\
& + \sum_{i=1}^{n} I_{i12} \ln \left[\Phi(-\beta^B X_i^B) - \Phi_2(-\beta^B X_i^B, \gamma_{i2}^E, \varrho) \right],
\end{aligned} \tag{9}
$$

where $\gamma_{ik}^E = \mu_k - \beta^E X_i^E$, Φ is the standard normal distribution function and Φ_2 the bivariate standard normal distribution function. We can recover the parameters β^B, β^E, the μ's and the correlation ϱ by maximising this log-likelihood function and therefore assess the empirical impact of certain variables on both the birth and the employment decisions.

4   Data and variables

The data used for the analysis are drawn from the German Socio-Economic Panel (GSOEP) for Germany and from the Labour Force Survey (*Enquête Emploi*) for France. The GSOEP is a longitudinal household survey conducted on an annual basis since 1984. In the first wave, some 12,000 individuals older than 16, and distributed across roughly 6,000 households, were interviewed. Due to panel attrition, sample size reduces somewhat each year. Following reunification, a new sample of about 4,500 individuals in 2,200 households was collected in the East of Germany. In 1998, a refreshment sample of about 2,000 persons has been added to the data base and in 2000, another sample of about 11,000 new individuals has been included[6]. The *Enquête Emploi* is an annual household survey. In the 1982-89 series, the survey covers about 150,000 individuals aged 15 and above, distributed across approximately 80,000 households. From 1990 onwards, sample size has been somewhat reduced and since then, the sample covers some 135,000 individuals distributed across roughly 65,000 households. To avoid sample size reduction due to panel attrition, one third of the sample is renewed each year. This means that it is possible to track one third of the sample over time for a period of three years[7].

4.1   Construction of the sample

Our analysis covers the time period from 1991 to 2000, because no data on East Germany is available before 1991. In order to analyze the decision to give birth, we focus on women in childbearing age, taking into account the biological restrictions for fertility. The age-span includes individuals aged between 17 and 48 years. This leaves us with a sample of 31,189 observations for Germany and 107,143 observations for France.

We seek to analyse the labour market participation of women after childbirth, while controlling for the factors affecting the decision to give birth itself. In the French data, individuals are interviewed three times at most, i.e. we can exploit the information from three consecutive waves and not more. Given this restriction imposed by the data, the approach we opted for is illustrated in figure 1. We use the information, available - though in a different form - in both data sets, on the month

---

6 For further information on the GSOEP, see Haisken-DeNew and Frick (2000).

7 For further information on the *Emploi* survey, consult the online information available under http://www.iresco.fr/labos/lasmas/enqempl.htm.

Figure 1: Construction of the estimation samples

France (Enquête Emploi): Month from which employment information is drawn is I$_{t+1}$
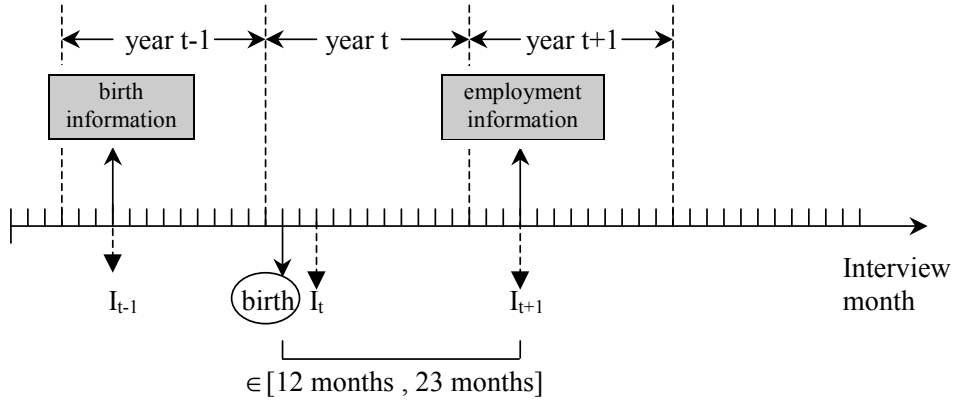
Germany (SOEP): Case (1): Month from which employment information is drawn is I$_{t+1}$
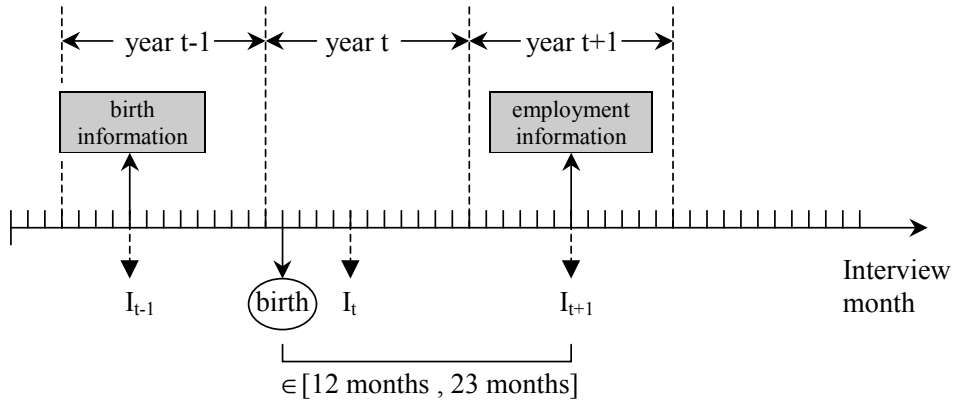
Germany (SOEP): Case (2): Month from which employment information is drawn is I$_{t+2}$
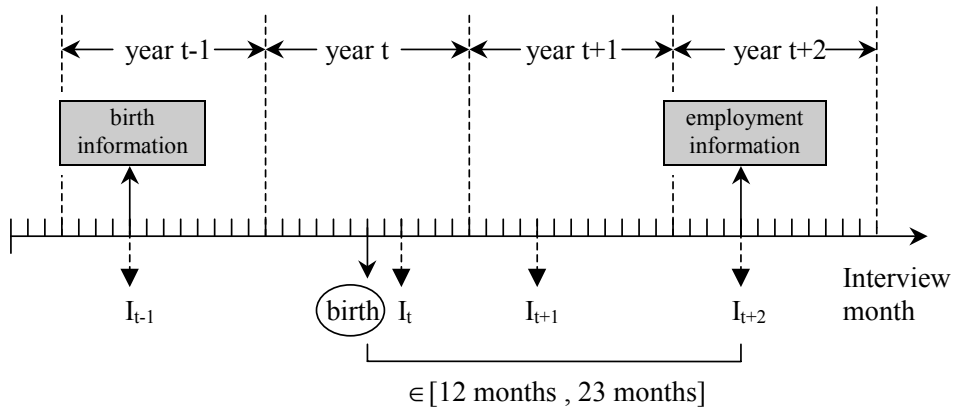
in which a child was born.[8] The information used to explain the birth decision is drawn from the wave preceding the month of childbirth (wave $t-1$). Then, we want to observe whether and to what extent mothers work some time after childbirth. Ideally, we would like to look at the employment situation of mothers after a given time span following birth, say 12 months, 18 months or 24 months. However, because the month of childbirth may occur at any time, whereas the interviews - on which we have to rely for the employment information - are conducted only once a year in a specific month, it is not possible to observe the employment situation of mothers after an identical period following childbirth for all women. Therefore, we decided to look at the employment situation in the second year after childbirth, at a point in time when the child is aged one, i.e. is aged between 12 and 23 months.[9] This means that we chose the interview for which we observe the employment status and its determinants in such a way that the interview month is comprised between 12 and 23 months after childbirth. In the French data, the interviews are conducted in March every year. Therefore, taking the employment information from the wave $t+1$ ensures that the child is aged between 12 and 23 months at the month of the interview I_{t+1}, since the month of birth, by construction, is comprised between I_{t-1} and I_t (see figure 1). In the GSOEP data, however, the interview month varies from year to year.[10] Thus, the gap between two successive interviews is not necessarily 12 months in the German data. In order to avoid losing precious observations, we use the employment information of the wave $t+2$ in case the child, given the timing of birth and of the interviews, is aged between 12 and 23 months only at that interview time.[11] In the end, if a birth occurred between I_{t-1} and I_t, we merge the data from I_{t-1} as information for the birth equation with the data from I_{t+1} (or in a few cases for Germany I_{t+2}) from which we draw the information on the employment situation and its determinants.

A special feature of the way the data are merged is that, even if one used the same set of variables to explain the birth and the employment decisions, the equations would be identified since the variables can take different values due to the observation at different points in time.

4.2   Variables for the birth equation

Concerning the birth equation, the dependent variable is binary and indicates whether a child was born or not since the previous interview. Many of the variables affecting a mother's employment decision (i.e. her decision to spend more time in the labour force as compared to household production) are also potential explanatory

---

8 In the French data, the month of birth is asked directly. In the German data, the respondents are asked whether a child has been born in the previous calendar year or in the current year until the interview month.

9 Choosing an older age, e.g. two, is not feasible because we observe only three consecutive years for France, see figure 1.

10 Generally, the interviews rather take place at the beginning of the calendar year, often in March.

11 This only concerns 2.5 percent of our observations.

variables for the birth decision.[12] The relationship between fertility and household income or household wealth, for instance, has been discussed amply in the literature. The earlier economic literature has been influenced by *sociological* theories (see the summary in Leibenstein, 1974). An *economic* approach to the theory of fertility has been introduced by Leibenstein (see Leibenstein, 1957). Leibenstein analyzed the decrease of births connected with a rising income. Families perform a cost-benefit analysis when deciding for or against the birth of an additional child.[13] Similarly, according to (Becker, 1960), households decide on the birth of a child in the same way as they decide on the consumption of commodities.[14] Considering these theories induces us to include income, a proxy for household wealth, and education in the birth regression.[15]

The effect of education has been discussed in Bratti, 2003. According to him, the educational level might play an indirect role through the postponement of marriage and the risk of marriage dissolution, but might also be associated with a stronger preference to devote time to market work, which might affect fertility decisions. Education is measured by three categories corresponding to no vocational degree, basic vocational education and higher level education. Additionally, we include the woman's employment status prior to a possible pregnancy. According to the theory of time allocation in households one would expect that less labour market oriented women, i.e. women not working or only part-time working are more likely to give birth than full-time employed women (see Becker, 1994).

Moreover, we take into account whether a woman is married or living with a partner. One would expect that women not living with a partner or not being married are less likely to have children. In addition, the child bearing behaviour might depend on differences in the cultural background, which is the reason why we include a dummy variable for being a foreigner. The age of the woman is also likely to be determinant. For Germany, age is captured by a set of dummies (below 25, between 26 and 30 and above 30), whereas a second degree polynomial (age and age squared) proved to fit the French data better.

Further control variables included in the birth equation are categorical variables indicating the number, age and sex of children already living in the household. One would expect that a mother is less likely to have a further child the more children she already has. In France, family policies in the beginning of the 1990s especially aimed at inducing families to have a third child (*policy of the third child*). Furthermore,

---

12 These variables will be described in more detail in the next subsection of this paper.

13 It is assumed that the benefit of childbirth is decreasing with income (e.g. because the importance of children as a provision for one's old age loses importance). The costs of having a child consist of *direct* costs for child care and *indirect* costs caused by the fact that the parent who cares for the child loses potential labour market income (opportunity costs).

14 One special feature is that the price for children is not fixed, i.e. higher income families demand (more expensive) children of higher quality. If this price effects exceeds the income effect the household demands *fewer* children when income is rising.

15 Income is given by the (deflated) partners' gross monthly income measured in Euro/Ecu. The proxy for wealth, again, is an indicator of homeownership.

including age groups of the children might be interesting in order to find an indication for the time span between births.

In addition, we control for regional characteristics. City size might be important, because the provision of (public) child care is better in urban areas, especially in Germany. A further regional variable, included in the birth equation, but not in the employment equation, is the regional birth rate. One might assume that women are the more likely to become mothers the higher the proportion of persons having children in their region. We do not use the variables describing the (local) labour market situation, since there is no a priori reason to assume that they might affect birth decisions.[16]

As concerns Germany it seems appropriate to distinguish between East and West Germany. The birth behaviour in East Germany declined dramatically after the German reunification. In particular, it seems essential to consider the different developments over time in East and West Germany. We therefore allow for an interaction between the trend and an East German dummy. We test in a systematic way whether the impact of the other variables on the birth decision differs between East and West Germany. Summary statistics on the explanatory variables are presented in table 8.

4.3   Variables for the employment equation

As described in section 3, the employment situation distinguishes among three states indicating whether a mother does not work, works part-time or works full-time. Part-time employment includes minor employment, i.e. mothers possibly working only one or two days a week. The choice of the explanatory variables is restricted by the fact that they need to be available in both data sets if their effects are to be compared.

Possible explanatory variables for the employment decision include alternative income resources available to the household. We do not only control for the partner's real gross monthly income but also include a dummy variable indicating whether the mother lives with a partner or not. Additionally, we include a dummy variable for the family's home-ownership as a proxy for further household wealth.

Beside financial resources, the degree of labour-market orientation influences the mother's employment decision after childbirth. Indicators for the labour-market orientation taken into account are the mother's age and education. One hypothesis connected to this is that more "career-oriented" (as compared to family-oriented) mothers tend to delay their childbirths to a later point in time (see Wetzels, 2002). If so, one could expect that older mothers return to the labour market soon after childbirth. Moreover, the higher the education level of the women is, the higher will also be her foregone income when she refrains from participating in the labour market. Therefore, education is expected to influence employment decisions of mothers.

---

16 And indeed, significance tests showed that these variables exert no significant influence on the probability to give birth.

We include a set of educational dummy variables indicating whether the mother has no vocational degree, or completed some kind of basic vocational education, or holds an advanced qualification (defined as an advanced vocational qualification and/or the maturity certificate but also a tertiary level degree).

Additional variables depict the mother's family background and the institutional context. Family background variables include indicators of the number, age and sex of the children living in the household. Especially, we take into consideration that the French family policy has been dominated by the *policy of the third child* for a long time. Additionally, it might be important whether further children in the household are below three or six years of age, since these are typical "thresholds" for pre-school attendance and elementary school enrolment respectively in both countries.

Furthermore, we control for regional characteristics. We distinguish between cities having less than 20,000 inhabitant, having between 20,000 and 100,000 inhabitants and having more than 100,000 inhabitants. The city size might be of importance, since the provision of child care facilities is generally better in larger cities compared to rural areas. Since family policies and living conditions have changed over time, we additionally include a time trend.

Whether a mother works or not is surely influenced by features of the local labour market. Therefore, we control for the regional unemployment rate. Additionally, since we observe the employment status one year after childbirth ranging from 12 to 23 months after childbirth, one should consider that women are probably more likely to work if they are observed at the end of their child's second year of age rather than at the beginning. This is why we additionally control for the time-span between the month of childbirth and the interview month in which the employment situation is observed.

5 Estimation results

5.1 Specification tests

Some overall statistics and test results are reported in table 3 and table 4. Considering the results of the Wald tests, it appears that the hypothesis that the slope coefficients of the equations taken separately are zero is strongly rejected for both France and Germany. Additionally, the Wald test on the hypothesis that all slope coefficients of the simultaneous equations in France are jointly insignificantly different from zero is rejected. The further χ^2-tests run on the coefficients of selected groups of variables are used to determine which variables should be included in the finally retained specification. A significance level of 20 percent at least has been taken as a criterion for the group of variables to be retained in the final specification.

Even if this article does not primarily focus on the differences between East and West Germany, but rather aims at comparing the whole of Germany with France, it seemed essential to us to allow the coefficients to differ for East and West Germany

Table 3: Overall statistics and test results for birth equation

Null hypothesis	Germany χ^2	Germany $\mathbf{p}>\chi^2$	France χ^2	France $\mathbf{p}>\chi^2$
Tests on coefficients				
Wald test for birth equation	14,915.74	0.00	311.17	0.00
Overall Wald test*			40,307.62	0.00
Prev. employment status	25.44	0.00	3.66	0.16
Own previous earnings	0.20	0.65	0.08	0.78
Previous earnings partner	1.57	0.21	0.47	0.49
Home ownership of household	11.68	0.00	10.53	0.00
No partner	86.79	0.00	197.07	0.00
Married	88.83	0.00	48.93	0.00
Foreigner	0.76	0.10	2.33	0.13
Own age (categorical variables in German case)	159.19	0.00	577.03	0.00
Education and higher education age interaction	169.41	0.00	700.85	0.00
Gender of first child (male)	0.40	0.53	2.85	0.09
Gender of second child (male)	1.76	0.18	0.10	0.76
Age and number of children	191.24	0.00	525.33	0.00
City size	3.57	0.17	9.11	0.01
Regional birth rate	9.06	0.00	0.65	0.42
Trend and trend squared	2.35	0.31	50.19	0.00
Tests on interaction terms for East Germany				
Prev. employment status	3.32	0.19		
Own previous earnings	3.06	0.08		
Previous earnings partner	6.04	0.01		
Home ownership of household	0.38	0.53		
No partner	0.27	0.60		
Married	31.44	0.00		
Foreigner	0.00	0.99		
Own age (categorical variables in German case)	3.60	0.17		
Education	13.36	0.04		
Age and number of children	13.51	0.14		
Gender of first child (male)	0.00	0.99		
Gender of second child (male)	0.00	0.99		
City size	2.33	0.31		
Regional birth rate	0.07	0.79		
Trend and trend squared	5.14	0.08		
Test on intercept				
East = West	64.06	0.00		
Observations	31,189		107,143	
Log-likelihood	-5,155.96		-13,556.06	

Source: GSOEP, *Emploi* survey, waves 1991-2000, own computations.
* Not reported for Germany since the equations have been estimated separately.

Table 4: Test results for employment equation

Null hypothesis	Germany		France	
	χ^2	$\mathbf{p}> \chi^2$	χ^2	$\mathbf{p}> \chi^2$
Tests on coefficients				
Wald test for employment equation	74.78	0.00	1,286.47	0.00
Months since childbirth	2.35	0.13	3.08	0.08
Previous earnings partner	3.07	0.08	0.10	0.75
No partner	1.56	0.21	8.22	0.00
Married	6.08	0.01	2.93	0.09
Foreigner	0.13	0.71	32.06	0.00
Own age	5.55	0.06	34.82	0.00
Education	41.27	0.00	101.11	0.00
Number of children	16.71	0.00	205.91	0.00
Gender of first child (male)	1.30	0.25	0.30	0.59
Gender of second child (male)	0.97	0.33	1.78	0.18
City size	5.37	0.07	9.81	0.01
Regional unemployment rate	2.16	0.14	24.20	0.00
Trend and trend square	8.91	0.01	13.75	0.00
Tests on thresholds				
μ_1^E: East = West	2.18	0.14		
μ_2^E: East = West	0.33	0.57		
East - West = constant	15.40	0.00		
Tests on correlation				
ϱ: East = West	1.11	0.29		
$\varrho = 0$	2.34	0.13	8656.07	0.00

Source: GSOEP, *Emploi* survey, waves 1991-2000, own computations.

and test whether they are equal rather than assume them equal *a priori*. Thus, we tested the significance of the differences between East and West Germany in the slope coefficients, but also in the level coefficients.

The differences between East and West Germany in the slope coefficients are tested by interacting the explanatory variables with an East German dummy and testing for the significance of these interaction terms. Unfortunately, this proves only feasible in the German birth equation, whereas we could not include interaction terms for East Germany in the employment equation due to a very limited number of observations. Only the significant interaction terms at the 20 percent level have been retained.

The level effect is captured by the intercept in the birth equation while it is captured by the threshold values in the employment equation.[17] For the birth equation, allowing the intercept to differ for East and West Germany boils down to

---

17 The intercept estimated in a probit equation is nothing else than the opposite of a threshold, would the equation be estimated by ordered probit.

including dummy variables for East and West and estimating the equation without a constant.[18] In fact, the test reported in table 3 show that the intercept does vary significantly between East and West Germany (at the one percent significance level). Consequently, we will account for such a variation and include East and West dummies in the estimations of the birth equation for Germany below.

For the employment equation, we estimate two thresholds. Including an East dummy variable as an additional explanatory variable would imply that the East effect is similar for both thresholds, i.e. for the threshold from non-employment to part-time employment and for that from part-time to full-time employment. Since there is no *a priori* reason to assume that this should be the case, we run a regression including the significant variables and interaction terms and allow the thresholds to vary in a non-systematic way between East and West Germany. The first series of tests reported in table 4 test whether the thresholds vary between East and West Germany. If the thresholds are found not to vary, then, for efficiency reasons, a single threshold should be estimated for East and West Germany. If they do vary, a further test indicates whether this difference is the same for both thresholds. In that case, it would be more efficient to estimate common thresholds for East and West Germany but include an East dummy variable as an additional regressor to account for the systematic level difference between East and West. As can be seen in table 4 there are significantly different first thresholds (at a 15 percent level of significance) while one cannot reject the hypothesis that the effects for East and West are identical for the second threshold. Therefore, we will estimate separate first thresholds and a common second threshold.

Furthermore, we test whether correcting for selectivity into motherhood is necessary to estimate the determinants of the employment decision of young mothers. Here again, the correlation between the birth and the employment equations is allowed to differ between East and West Germany. As the results reported in table 4 show, the decisions to give birth and to be employed between one and two years after childbirth are significantly correlated for France, but, surprisingly, not for Germany. The correlation between the selection into motherhood and the labour force participation decision is found to be significant at any conventionally used level of significance in France. Therefore, selectivity is found to be at work in France only. Here, it would be inappropriate to estimate the labour supply of young mothers independently of their propensity to give birth. For the German case however, the presented results suggest that both equations can and should be estimated independently.

---

18 Alternatively, one could use a single dummy, say for East, together with a constant term.

5.2   Estimation results

5.3   Determinants of the childbirth decision of women

The estimated coefficients for the birth equation are given in table 5. Only the explanatory variables that proved to be significant in the full specification above have been included (see section 5.1). As one would expect, at least from what the theory of time allocation in households tells us (see Becker, 1994), the mother's employment status before possible pregnancy significantly influences the decision to give birth. If a women worked, she is less likely to give birth compared to a woman who did not work. Surprisingly, in Germany, women who worked full-time are *more* likely to have a pregnancy than those who worked part-time.[19] Probably, part-time employed mothers in Germany are more often in jobs where they are in danger to be replaced once they interrupt their working career (see Ondrich, Spiess, Yang and Wagner, 1998). In France, however, women who worked full-time are *less* likely to give birth compared to those who worked part-time. This result might also be driven by the fact that German mothers benefit from the parental leave regulations from their very first child. French mothers benefited only for the third child on until 1994, and after this date from the second child onwards. Consequently, the relatively generous parental leave regulations in Germany facilitate the decision of German full-time working women to interrupt their work career and give birth.

As documented in table 3, even though one would expect that the mothers' earnings prior to potential birth influence the decision to give birth, this variable does not prove to be significant in either country. In other words, the opportunity costs of work interruption around the time of childbirth (i.e. the lost earnings) do not seem to be relevant for women's decisions in France or (West) Germany. Similarly, the partners' earnings, which represent an alternative source of household income during the time when the mother can not work due to her pregnancy, are found not to influence the probability to give birth. Despite this, household wealth seems to matter for the German birth decision judging from the significant influence of the fact that a family is a homeowner. A glance at the interaction variables for East Germany shows that the effects are somewhat different there. The probability to give birth is lower the higher a woman's earnings are. At the same time, women are also less likely to become mothers the *higher* the partner's earnings are. This result could be explained by the economic analysis of fertility (Becker, 1960), according to which the demand for children might decrease with household income, because a higher income implies higher costs of the potential children through higher child quality demanded (see section 4.2).

Considering the individual characteristics in table 5, it appears that, as one would expect, women not living with a partner are less likely to give birth than those living with a partner, and married women are more likely to have children compared to

---

19   Conducting the χ^2 test on equality of the coefficients of the full and part-time variable, equality is rejected at the one percent level of significance.

Table 5: Determinants of birth decision

Variable	Germany coef.	(s.e)	France coef.	(s.e)
Previous employment situation				
Not working (ref.)				
Part time	-0.29**	(0.05)	-0.24**	(0.02)
Full time	-0.15**	(0.05)	-0.34**	(0.02)
Household Income and Wealth				
Home ownership of household	-0.12**	(0.03)	-0.01	(0.02)
Individual Characteristics				
No partner	-0.56**	(0.05)	-0.57**	(0.04)
Married	0.47**	(0.05)	0.12**	(0.02)
Foreigner	0.00	(0.04)	0.17**	(0.03)
Own Age and Education				
Own age			0.29**	(0.02)
Own age squared			-0.01**	(0.00)
Own age: ≤25 (ref.)				
Own age: 26-30	0.03	(0.05)		
Own age: >30	-0.51**	(0.05)		
Age * high education			0.02**	(0.00)
Age 26-30 * high education	-0.04	(0.10)		
Age 31-45 * high education	0.33**	(0.09)		
No or basic voc. education (ref.)				
Intermediate education	0.05	(0.04)	0.02	(0.02)
High education	-0.03	(0.08)	-0.42**	(0.10)
Children's Characteristics				
First child is a male			-0.03†	(0.02)
Second child is a male	-0.08	(0.06)		
No child (ref.)				
One child aged 6-17	-0.37**	(0.07)	-0.13**	(0.03)
One child aged 3-5	0.36**	(0.06)	0.15**	(0.03)
One child aged 0-2	0.02	(0.06)	-0.11**	(0.03)
Two children, youngest 6-17	-0.54**	(0.09)	-0.48**	(0.04)
Two children, youngest 3-5	-0.30**	(0.08)	-0.37**	(0.04)
Two children, youngest 0-2	-0.41**	(0.08)	-0.58**	(0.04)
More children, youngest 6-17	-0.27*	(0.12	-0.50**	(0.05)
More children, youngest 3-5	-0.43**	(0.12)	-0.47**	(0.05)
More children, youngest 0-2	-0.30**	(0.11)	-0.59**	(0.05)
Regional Characteristics				
City size: <20,000 (ref.)				
City size: 20,000-100,000	-0.05	(0.04)	-0.06*	(0.03)
City size: ≥100,000	-0.05	(0.04)	0.02	(0.02)
Regional birth rate	22.06**	(4.92)		

to be continued...

...table 5 continued

Variable	Germany		France	
	coef.	(s.e)	coef.	(s.e)
Trend				
Trend			-0.04*	(0.02)
Trend squared / 100			-0.03	(0.91)
Interactions for East Germany				
Own earnings/1000	-0.22*	(0.00)		
Partner's earnings/1000	-0.06**	(0.00)		
Part time	0.25†	(0.15)		
Full time	0.02	(0.15)		
Married	-0.60**	(0.10)		
Own age: 26-30	-0.04	(0.13)		
Own age: > 30	-0.19	(0.14)		
Age 26-30*high education	0.25	(0.21)		
Age > 30*high education	-0.08	(0.21)		
Intermediate education	0.11	(0.12)		
High education	0.04	(0.17)		
One child aged 6-17	0.03	(0.14)		
One child aged 3-5	-0.28*	(0.14)		
One child aged 0-2	-0.11	(0.14)		
Two children, youngest 6-17	0.21	(0.17)		
Two children, youngest 3-5	-0.05	(0.18)		
Two children, youngest 0-2	-0.17	(0.22)		
More children, youngest 6-17	0.53*	(0.23)		
More children, youngest 3-5	0.34	(0.28)		
More children, youngest 0-2	-0.38	(0.40)		
Trend	0.21**	(0.06)		
Trend squared /10	-0.02**	(0.01)		
Intercept				
West Germany	-2.01**	(0.14)		
East Germany	-1.96**	(0.18)		
France			-4.73**	(0.29)

Significance level :   † : 10%   * : 5%   ** : 1%

Source: GSOEP, *Emploi* survey, waves 1991-2000, own computations.

women who are not married. These effects prove to be significant in both countries. Furthermore, the results indicate that foreign women are more likely to become mothers than native women, where cultural differences surely influence the differences in the birth behaviour. However, the estimated effect turns out to be significant in statistical terms only for France.

The women we observe are aged between 17 and 45 at the time when we examine their birth decision. In France, as shows the quadratic specification in age, getting older first increases the probability to give birth, then decreases it, whereby the maximum is attained at age 26. In Germany, with a quadratic specification in

age, the estimated coefficients proved to be jointly significant, but not individually. Therefore, we opted for a specification with age group dummies. Compared to women below 25, German women between 26 and 30 prove not to have a significantly lower probability to give birth, contrary to France. The probability to give birth only declines significantly for German women beyond 30 years of age.

As far as education is concerned, the effect differs somewhat in France and Germany. As indicated by the positive signs of the interactions between age and education, in both countries, more highly educated women (meaning an advanced technical or a tertiary level degree) tend to postpone their child births to a later point in their lives. However, whereas in France, women with a tertiary level degree are less likely to give birth than more poorly educated women, no significant effect of education as such is found for Germany, except for the timing effect. The latter result corroborates previous findings reported for other countries, e.g. Bloemen and Kalwij (2001) for the Netherlands or Bratti (2003) for Italy. These papers both focus on the role of education for fertility and labour force participation of married women, and both find that education has no effect on completed fertility but only on the timing of births.

Looking at the effects of the children's characteristics in table 5, it appears that French mothers are more likely to have a further child if the first child is a girl rather than a boy. A similar effect is found for Germany too, but concerning the second child, and the effect is more weakly significant (significant at the 15 percent level). Considering the number and age of the children already present in the household, one finds that, as expected, the probability to have a further child tends to decrease with the number of children already present. Moreover, it also tends to decrease as the age of the youngest child already present in the household increases. This most probably reflects the fact that parents typically prefer not to have a strong age distance between their children. Interestingly, in both countries, the probability to have a (further) child is highest if a woman already has one child aged 3-5. This probably reflects the preferred time span parents leave before their first and their second child, but the effect seems to be stronger in Germany. The latter point might be an effect of the German parental leave regulation, which allows to take parental leave up to three years. This implies that it is possible to connect two three-year parental leave periods if a second child is born at the end of the first parental leave period. East German mothers seem to make use of this possibility to a much smaller extent: looking at the interaction variables for East Germany shows that the probability to give birth 3-5 years after a first child has been born is lower in the East.

Women living in smaller cities or rural areas in Germany are more likely to give birth than those living in larger cities. This is surprising if one remembers the fact that the provision of child care institutions is generally better in larger cities. One explanation for the observed phenomenon might be that the provision of public child care in Germany remains insufficient even in large cities (see section 2) and therefore acts as a negative incentive with respect to childbirth. By contrast, the insufficient

provision of child care is less problematic in the country side, since social networks are typically more developed in rural areas, so that women can be supported by their family (or other mothers) in their child rearing task. This interpretation is consistent with the situation observed in France, where the propensity to give birth is lowest in cities of intermediate size and higher in small or in large cities. This could be an indication that the benefits of social networks in terms of child rearing is more than compensated by the wide availability of public child care provision in French large cities. Thus, it seems that German women are more dependent on family support if they are to have children, due to the comparatively poorer endowment in other child care opportunities. However, another explanation for the fact that there is a relatively high probability to give birth when living in rural areas in Germany might be that families more often move to suburbs and prefer raising there children in these areas.

Additionally, French women's decisions seem to be influenced by the regional environment: the higher the regional birth rate, the higher the probability that a mother gives birth. This might be due to unobserved characteristics: women residing in the same communities are likely to have similar unobserved characteristics. No such effect is found for West German mothers since the regional birth rate does not seem to be of significant importance.

While no time trend is found for the birth decision in West Germany, a negative trend is observed in France in the considered time span. Ceteris paribus women were more likely to give birth in the beginning of the 1990s compared to the end of the 1990s. Additionally, there is some indication of a time pattern in East Germany, where the quadratic specification in time is found to be significant. While (ceteris paribus) the probability to give birth increased in the beginning of the 1990s, after the year 1996 the trend becomes negative, i.e. the probability decreases over the years. It seems that family policy in Germany in the late 1990s could not raise fertility in (East) Germany as well as in France. A glance at the intercept shows that the West German intercept is more strongly negative than the East German one. This means that for given background factors, East German women have been more likely to give birth than West German women on average over the period. This might be due to the better provision of child caring institutions in East Germany: In West Germany the public provision of child care is little developed (especially as compared to France) and is rather designed to provide care for children whose mothers cannot fulfil their upbringing duty rather than to foster the compatibility of the mother and worker roles (Hank and Kreyenfeld, 2002; Gottschall and Hagemann, 2002). The supply of slots in day-care centres (*Krippen*) for infants does not meet the demand. The supply of nursery schools (*Kindergarten*) is extensive, but these have so restrictive opening hours that mothers often have difficulties to even engage in part-time work. The context is somewhat different in the Eastern part of Germany. In the former German Democratic Republic, the central government strongly supported and heavily subsidised institutional daycare for children of all ages and female employment was the rule. After German unification in 1990, the

Western political, legal and economic system was extended to the East. Although many day care facilities were shut-down, children's day care is still readily available (Hank and Kreyenfeld, 2002).

5.4 Determinants of the employment decisions of young mothers

Table 6 shows the estimated effects of the considered determinants on the employment propensity in the second year after childbirth, i.e. on the latent variable E_i^*. In addition, in table 7 we report the effects of the variables on the probability of being part-time and full-time employed, i.e. on $Pr(E_i = 1|B_i = 1)$ and $Pr(E_i = 2|B_i = 1)$, respectively. These marginal effects have been computed in the following way. We consider a reference person with average characteristics for the explanatory variables that are continuous and with the characteristics of the respective reference groups for the categorical variables and calculate for this person the probabilities of part-time and full-time employment.[20] Then, we recalculate these probabilities if the value of the variable the marginal effect of which we want to measure changes, i.e. if the characteristic is not that of the reference group for instance but another one.[21] The marginal effect of the variable is then measured as the difference between the new and the reference probabilities. In table 7, we report the effects in both absolute and relative terms.

Since we observe mothers at different points of time, a control variable is introduced, indicating the time span since childbirth ranging from 12 to 23 months. As one would expect, the estimation results show that the probability to be employed part-time or even full-time is the higher the more time has passed. This is intuitive because mothers intending to work typically wait to make sure their child is old enough to be looked after by someone else. They also need time to recover from birth but also to look for child care institutions or to find a job etc.

The partner's earnings prove to affect the employment decision of German women only. In Germany, women are more likely to work part or full-time the lower the partners' income. One explanation could be that in the case of lower earnings of the partner, the males' income is not sufficient in order to "finance" the household. However, the marginal effect is small when measured at the mean. At the same time, the fact that a mother is living with a partner increases the mother's probability to work. This might be due to the fact that the partner contributes to child care and therefore facilitates the employment of the mother. Interestingly, however, in Germany, having a partner increases more heavily the probability that mothers work part-time rather than full-time, whereas in France, having a partner increases more significantly the probability to work full-time, especially if the mother is married.

---

20 For Germany, the reference person is assumed to live in the Western part of the country, i.e. the thresholds applying for West Germany are used.

21 For continuous variables, like the income variables, we examine the impact on the probabilities of a 10 percent increase.

Table 6: Determinants of employment decision

Variable	Germany coef.	(s.e)	France coef.	(s.e)
Months since childbirth				
Months since childbirth	0.02	(0.01)	0.01**	(0.00)
Household Income				
Partner's earnings/1000	-0.05*	(0.00)		
Individual Characteristics				
No partner			-0.59**	(0.07)
Married	0.39*	(0.15)	0.15**	(0.03)
Foreigner			-0.11†	(0.06)
Age and Education				
Own age			0.39**	(0.03)
Own age squared			-0.01**	(0.00)
Own age: $\leq$25 (ref.)				
Own age: 26-30	0.24*	(0.12)		
Own age: > 30	0.10	(0.17)		
Age 26-30*high education	0.14	(0.21)		
Age > 30*high education	0.48*	(0.23)		
No or basic voc. education (ref.)				
Intermediate education	0.06	(0.11)	0.11**	(0.04)
High education	0.17	(0.17)	0.34**	(0.03)
Children's Characteristics				
Second child is male			-0.05†	(0.03)
Exactly two kids	-0.32**	(0.10)	-0.23**	(0.04)
Three kids or more	-0.69**	(0.13)	-0.84**	(0.05)
Regional Characteristics				
City size: <20,000 (ref.)				
City size: 20,000-100,000	-0.06	(0.10)	-0.14**	(0.04)
City size: $\geq$100,000	-0.22*	(0.10)	0.03	(0.03)
Unemployment rate	0.03†	(0.01)	-0.01**	(0.00)
Trend				
Trend	-0.34**	(0.12)	-0.04	(0.04)
Trend squared	0.02**	(0.01)	-0.03	(0.00)
Thresholds and Correlation				
μ_1^S West Germany	1.60**	(0.42)		
East Germany	1.96**	(0.44)		
France			7.20**	(0.54)
μ_2^S Overall	2.41**	(0.41)	7.49**	(0.54)
ρ Correlation	0.23†	(0.14)	0.95**	(0.01)

Significance level : $\dagger$: 10% $*$: 5% $**$: 1%

Source: GSOEP, *Emploi* survey, waves 1991-2000, own computations.

Table 7: Determinants of employment decision, marginal effects on full-time and part-time employment probability

Variable	Germany		France	
	part-time abs. (in %)	full-time abs. (in %)	part-time abs. (in %)	full-time abs. (in %)
Reference probabilities	*0.12*	*0.03*	*0.27*	*0.42*
Months since childbirth				
Months since childbirth	0.01 (4.53)	0.00 (7.54)	0.00 (0.07)	0.02 (4.14)
Household Income				
Partner's earnings/1000	-0.00 (-1.45)	-0.00 (-2.35)		
Individual Characteristics				
No partner			-0.15 (-57.24)	-0.33 (-78.26)
Married	0.07 (61.03)	0.04 (129.53)	-0.01 (-5.54)	0.14 (32.70)
Foreigner			-0.01 (-4.42)	-0.09 (-21.46)
Age and Education				
Own age			-0.27 (-99.71)	0.58 (138.25)
Own age squared			-0.26 (-95.83)	-0.41 (-98.55)
Own age: 26-30	0.04 (36.14)	0.02 (68.78)		
Own age: > 30	0.02 (15.50)	0.01 (27.03)		
Age 26-30*high education	0.02 (20.78)	0.01 (37.04)		
Age > 30*high education	0.09 (76.36)	0.05 (173.87)		
No or basic voc. education (ref.)				
Intermediate education	0.01 (9.02)	0.00 (15.31)	-0.01 (-2.87)	0.10 (24.37)
High education	0.03 (25.50)	0.01 (46.38)	-0.08 (-29.06)	0.31 (73.14)
Children's Characteristics				
Second child is male			-0.00 (-1.20)	-0.04 (-10.12)
Exactly two kids	-0.05 (-39.78)	-0.02 (-54.75)	-0.04 (-15.26)	-0.17 (-41.17)
Three kids or more	-0.08 (-70.22)	-0.02 (-83.74)	-0.21 (-77.20)	-0.38 (-89.82)
Regional Characteristics				
City size: <20,000 (ref.)				
City size: 20,000-100,000	-0.01 (-8.52)	-0.00 (-13.42)	-0.02 (-6.34)	-0.11 (-26.08)
City size: ≥100,000	-0.03 (-29.09)	-0.01 (-41.96)	-0.00 (-0.02)	0.03 (6.88)
Unemployment rate	0.00 (3.95)	0.00 (6.56)	-0.00 (-0.24)	-0.01 (-3.48)
Trend				
Trend	-0.02 (-20.55)	-0.01 (-30.75)	-0.00 (-0.46)	-0.02 (-5.44)
Trend squared	0.04 (37.41)	0.02 (71.59)	-0.00 (-0.03)	-0.00 (-0.58)
East Germany				
East Germany	-0.07 (-58.69)	0.00 (0.00)		

Source: GSOEP, *Emploi* survey, waves 1991-2000, own computations.

In Germany, the positive effect of having a partner is only significant if the partners are married. Furthermore, foreign mothers living in France are less likely to be employed, in particular full-time. Again, this might be due to cultural differences in the behaviour of groups of different nationalities.

Age appears to have a different effect for France and Germany. In Germany, mothers aged between 26 and 30 years are most likely to work in the second year after childbirth. In France, however, a concave profile is observed: age first increases the employment propensity of French mothers, but when the mother attains the age of 30, the effect reverses. Again, in Germany the age effect has a stronger influence on the probability to be part-time employed than on the probability to be full-time employed, while the reverse is true in France.

Furthermore, more educated mothers have a higher probability to work in both countries. Whereas in France, the positive impact of education (especially of a tertiary level degree) on the employment propensity of young mothers is significant as such, in Germany, the impact of a higher education is only noticeable for young mothers older than 30. This can most probably be explained by the comparatively longer study duration in Germany than in France. Thus, this confirms the hypothesis that more labour market oriented women (who invested relatively more in their human capital, as indicated by education) delay their child births to a later time in life and return to the labour market sooner after childbirth. Whereas in Germany education affects the probability to work part-time almost as weakly as that of working full-time, in France the effect of education is stronger and differs depending on whether one considers the full-time or the part-time employment probability. Indeed, there, a higher level of education increases quite strongly the probability that young mothers work full-time, but it *decreases* the probability that they work part-time.

As concerns the children's characteristics, the gender of the children does not have any significant impact in Germany. In France however, mothers of two children are less likely to work (full-time) if the second child is a son. As one would expect, in both countries mothers are significantly less likely to work in the second year after childbirth the more children they have. Interestingly, as indicated in Table 7, the number of children has a stronger negative impact on the probability to work part-time than on the probability to work full-time in Germany. Those women who decide to work while having two or even more children are probably underlying financial restrictions implying the necessity to work full-time. However, in France the reverse is true: Working mothers with more than one child are more likely to work part-time than full-time. This finding somewhat differs from the impression given by the descriptive statistics. It seems that the lower part-time share of mothers of several children in France as compared to Germany is due to further background characteristics of those mothers. But ceteris paribus the fact of having additional children results in a higher probability to be part-time employed than to be full-time employed in France.

Looking at the regional characteristics, again (as in the birth equation) the ef-

fects differ between France and Germany. While mothers are less likely to work, and especially to work part-time, in Germany if they live in larger urban areas, in France the employment propensity of young mothers is highest in large cities and in very small cities. Again, the reason might be that in Germany the presence of social networks is more important to the mothers' decisions while in France they do also play a role in small cities, but in large cities, the wide provision of child care compensates the lack of family support. One further regional aspect is that while the regional unemployment rate exerts a negative impact on the probability that mothers work, it has a *positive* impact on the mother's work decision in Germany. This is a puzzle, since one would expect, as in the French case, that a rather difficult situation on the labour market would prevent mothers from seeking work. An explanation for the significant positive effect might be that the labour market of mothers differs from the overall regional labour market since females and especially mothers are segregated in different kind of jobs than males. Furthermore, a tough labour market situation might induce women to get employed for two reasons. First, if they are on maternity leave, they are more likely to return to work soon after childbirth (because jobs are rare). Secondly, if their partner fears to lose his job, mothers might help to insure the status quo of the family income by accepting a job.

Looking at the trend variables one finds negative trends in both countries. Even if the family policy of the 1990s aimed to facilitate the compatibility of labour market participation and motherhood, ceteris paribus mothers participated less in the labour market at the end of the 1990s compared to the beginning of the 1990s.

While the inclusion of interaction terms for East Germany is not possible due to the limited number of observations, it is possible to allow the thresholds to differ for East and West Germany. As in the birth equation the first threshold is higher for East German mothers compared to West German mothers, i.e. ceteris paribus East German mothers are less likely to be employed part-time in the second year after childbirth than West German mothers. The second threshold does not differ between East and West. The conditional probability to be employed full-time seems to be equal for East and West German mothers.

6   Conclusion

This paper aimed at comparing the labour force participation of young mothers in France and Germany. The determinants of the mothers' participation were analysed and related to theoretical explanations as well as to contextual (political) factors of the two countries.

Looking at some descriptive statistics gave first insights concerning fertility and labour market participation in both countries. A similar overall employment rate for women in both countries hides significant differences in the labour market participation, particularly of mothers. French mothers generally work more often than

German mothers and when they work, it is is more often full-time. At the same time, it turns out that French women have more children compared to German (and particularly East German) women. Thus, both the labour market participation and fertility are higher in France than in Germany. One possible explanation for the seemingly paradox of a higher labour market participation coexisting with a higher fertility could be seen in the different context with respect to family policy in either country. While the primary goal of the French family policy in the past has been to improve the compatibility of work and motherhood while rising the birth rate, the German policy focused more on providing (financial) recognitions of the child-rearing activities of mothers.

In a next step, we aimed to analyse the factors driving the work attachment of young mothers in more detail. To this end, we set up an econometric model in order to analyse the employment decision of mothers in the second year after childbirth, thereby distinguishing between part-time and full-time employment. In addition to modelling the employment decision as such, we also examined the birth decision itself. Both the birth and the employment equations are estimated simultaneously. Indeed, considering the birth decision as exogenous might introduce a selection bias if e.g. women having (for some reasons unobserved to the scientist) a stronger labour force attachment were less prone to give birth.

The estimation results reveal some differences between both countries. In Germany, women who worked full-time are more likely to have a pregnancy than those who worked part-time, while in France the opposite holds. As discussed above, this result might be driven by a larger danger of replacement for part-time workers in Germany, but also it might be caused by the generous parental leave regulations in Germany. Another central finding is that education seems to have an influence on the probability to give birth mainly insofar as it delays childbirth. The probability to have a further child generally decreases by the number of children. Interestingly, in Germany, the probability to have a (further) child is highest if a woman already has one child aged 3-5. As has been discussed, this might be connected to the parental leave regulations and the possibility to take two parental leave periods consecutively. Different effects of regional characteristics are found for France and Germany. In France, the propensity to give birth is lowest in medium sized cities, while in Germany it is lowest in larger cities. A negative time effect in the birth decisions is observed in France, as well as in East Germany in the recent years. This leads us to the speculation that family policy did not manage to reach the overall goal of inducing women to have more children.

As concerns the employment of mothers in the second year after childbirth, one central finding is that the effects of age and education confirm the hypothesis that more labour market oriented women delay their childbirth to a later point in time and return to the labour market soon after childbirth. Higher education has a strong effect on the full-time employment probability of French women, while it reduces their propensity to work part-time. By contrast, in Germany, higher education rather affects the part-time employment propensity, but the effect is small. The effects for

the regional characteristics differ between both countries as well. While mothers in rural areas are more likely to work (especially to work part-time) in Germany, in France mothers are more likely to work if they live in small but also in large cities. The reason might be that in Germany the poor availability of child care institutions forces women to rely on social networks that are typically more developed in rural areas, while in France, the good provision of public child care institutions in large cities facilitates the employment of women even if they do not have family support. Also, East German mothers are less likely to be employed part-time in the second year after childbirth compared to West German mothers. Furthermore, we find negative trends to work after childbirth in both countries, anything else equal. All in all, the negative trends in the birth as well as in the employment propensities seem to indicate that the goals of family policy to both increase the fertility rate and to foster the employment of mothers have not been attained yet.

References

Ahn, N. and Mira, P. (2002). A note on the changing relationship between fertility and female employment rates in developed countries. *Journal of Population Economics*, *15*(4), 667-682.

Becker, G. S. (1960). An Economic Analysis of Fertility. *National Bureau of Economic Research: Demographic and economic changes in developed countries, Princeton University Press*, 209-240.

Becker, G. S. (1965). A theory of the allocation of time. *Economic Journal*, *75*, 493-517.

Becker, G. S. (1994). A Treatise on the Family. (Enlarged Edition, Cambridge, Harvard, University Press).

Bender, S., Kohlmann, A. and Lang, S. (2003). Women, Work, and Motherhood: Changing Employment Penalties for Motherhood in West Germany after 1945 - A Comparative Analysis of Cohorts Born in 1934-1971. *Discussion Paper 309, SBF 386, http://www.stat.uni-muenchen.de/ lang/skript/paper309.pdf*.

Bloemen, H. and Kalwij, A. S. (2001). Female labor market transitions and the timing of births: a simultaneous analysis of the effect of schooling. *Labour Economics*, *8*, 593-620.

Bonnet, C. and Labbé, M. (1999). L'activité professionnelle des femmes après la naissance de leurs deux premiers enfants. *Études et Résultats*, *37*.

Bratti, M. (2003). Labour force participation and marital fertility of Italian women: the role of education. *Journal of Population Economics, forthcoming*.

Calhoun, C. A. (1994). The impact of Children on the Labour Supply of Married Women: Comparative estimates from European and US Data. *European Journal of Population*, *10*, 293-318.

Desplanques, G. (1993). Activité féminine et vie familiale. *Économie et Statistique*, *261*(1993-1), 23-32.

Ermisch, J. F. (1989). Purchased child care, optimal family size and mother's employment: theory and econometric analysis. *Journal of Population Economics*, *2*, 79-102.

Fagnani, J. (1996). Retravailler après une longue interruption. *Revue francaise des affaires sociales*, *3*, 129-152.

Gangadharan, J. and Rosenbloom, J. L. (1996). *The effects of child-bearing on married women's labor supply and earnings: using twin births as a natural experiment* (Working Paper No. 5647). National Bureau of Economic Research.

Gottschall, K. and Hagemann, K. (2002). Die Halbtagsschule in Deutschland: ein Sonderfall in Europa? *Aus Politik und Zeitgeschichte, B41*, 12-22.

Haisken-DeNew, J. and Frick, J. (2000). *Desktop Companion to the German Socio-Economic Panel (GSOEP) Study.* Berlin.

Hank, K. and Kreyenfeld, M. (2002). *A multilevel analysis of Child Care and the Transition to Motherhood in Western Germany* (Discussion Paper No. 290). Deutsches Institut für Wirtschaftsforschung.

Heckman, J. J. and Walker, J. R. (1990). The relationship between wages and income and the timing of births: Evidence from Swedish longitudinal data. *Journal of Political Economy, 82*(2), 136-169.

Hotz, V. J., Klerman, J. A. and Willis, R. J. (1997). The economics of fertility in developed countries. In M. Rosenzweig and O. Stark (Eds.), *Handbook of Population and Family Economics* (p. 275-347).

Hotz, V. J. and Miller, K. I. (1988). An empirical analysis of life-cycle fertility and female labour supply. *Econometrica, 56.*

Joesch, J. M. (1997). Paid leave and the timing of women's employment before and after childbirth. *Journal of Marriage and the Family, 59*, 1008-1021.

Laroque, G. and Salanié, B. (2003). Fertility and Financial Incentives in France. *http://www.econ.nyu.edu/cvstarr/conferences/ESPE/papers/laroqueg.pdfpresented, presented at the ESPE Conference, Friday, June 13, New York.*

Lauterbach, W. and Klein, T. (1995). Erwerbsunterbrechungen von Müttern. In B. Nauck and H. Betram (Eds.), *Kinder in Deutschland: Lebensverhältnisse von Kindern im Regionalvergleich.* Opladen: Leske + Budrich.

Leibenstein, H. (1957). Economic backwardness and economic growth. *Wiley.*

Leibenstein, H. (1974). An Interpretation of the Economic Theory of Fertility: Promising Path or Blind Alley. *Journal of Economic Literature, 12*(2), 457-479.

Mincer, J. (1963). Market prices, opportunity costs and income effects. In C. e. a. Christ (Ed.), *Measurement in Economics: studies in mathematical economics.* Stanford: Stanford University Press.

Ondrich, J., Spiess, C. K., Yang, Q. and Wagner, G. (1998). The Liberalization of Maternity Leave Policy and the Return to Work after Childbirth in Germany. *IZA Discussion Paper, 21.*

Ondrich, J., Spiess, C. K., Yang, Q. and Wagner, G. (1999). Full time or part time? German parental leave policy and the return to work after childbirth in Germany. *Research in Labor Economics, 18*, 41-74.

Ronsen, M. and Sundström, M. (2002). Family Policy and After-Birth Employment Among New Mothers - A Comparison of Finland, Norway and Sweden. *European Journal of Population, 18*, 121-152.

Wetzels, C. (2002). Dutch Women's Wages: Is There A Double Selection Into Motherhood And Type of Jobs? *Draft version, presented at the IZA, Bonn, May 2002.*

Willis, R. J. (1973). A new approach to the economic theory of fertility behavior. *Journal of Political Economy, 81*(2), 14-64.

Appendix

Table 8: Descriptive statistics for the explanatory variables (sample of the simultaneous estimation)

	Variable	Germany (%)	France (%)
Months Since Childbirth	Months since childbirth	17.78	17.95
Previous employment situation	Not working	44.38	32.06
	Part time	17.31	19.92
	Full time	38.31	48.01
Household Wealth	Home owner	35.11	49.22
Individual Characteristics	Foreigner	16.98	6.25
	Married	61.89	70.94
	No partner	29.12	15.40
Education	No vocational degree	27.42	38.93
	Basic vocational degree	41.64	27.20
	Higher education	16.99	33.87
Age Categories	Own age: 17-25	26.44	6.82
	Own age: 26-30	19.53	16.40
	Own age: 31-45	54.03	76.78
Children's Characteristics	No child	45.61	25.54
	One child aged 6-17	16.29	18.06
	One child aged 3-5	4.82	5.14
	One child aged 0-2	5.37	5.15
	Two children, youngest 6-17	11.35	17.87
	Two children, youngest 3-5	5.12	7.15
	Two children, youngest 0-2	4.28	5.49
	More children, youngest 6-17	2.80	6.77
	More children, youngest 3-5	2.38	4.83
	More children, youngest 0-2	1.97	4.00
	Gender of first child (male)	27.66	37.91
	Gender of second child (male)	14.53	23.43
Regional Characteristics	City size <20,000	46.71	46.12
	City size: 20,000-100,000	26.21	12.75
	City size ≥100,000	27.08	41.13
	Regional birth rate	2.05	1.71
	Regional unemployment rate	10.91	12.74
	Living in East Germany	27.90	

to be continued...

...table 8 continued

	Variable	**East Germany** (%)
Previous employment situation	Not working	38.54
	Part time	11.71
	Full time	49.75
Household Wealth	Home owner	34.88
Individual Characteristics	Foreigner	0.24
	Married	61.59
	No partner	27.65
Education	No vocational degree	3.79
	Basic vocational degree	14.26
	Higher education	10.15
Age Categories	Own age: 17-25	25.33
	Own age: 26-30	16.54
	Own age: 31-45	58.13
Children's Characteristics	No child	38.81
	One child aged 6-17	23.81
	One child aged 3-5	4.27
	One child aged 0-2	3.40
	Two children, youngest 6-17	15.97
	Two children, youngest 3-5	5.37
	Two children, youngest 0-2	2.89
	More children, youngest 6-17	2.59
	More children, youngest 3-5	1.79
	More children, youngest 0-2	1.08
	Gender of first child (male)	31.40
	Gender of second child (male)	16.52
Regional Characteristics	City size $< 20,000$	53.46
	City size: 20,000-100,000	20.58
	City size $\geq 100,000$	25.97
	Regional birth rate	1.35
	Regional unemployment rate	16.11

Emploi survey and GSOEP, waves 1991-2000, own computations; birth year information.