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# The dynamics of female employment around childbirth

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## Abstract

There is a strong effect of childbirth on female labour supply. This effect is expected to be influenced, among others, by the institutional context. This paper uses panel data on the last two decades on three European countries (The Netherlands, Germany, United Kingdom) to link changes in female labour force behaviour around childbirth to changes in the national institutional context. We conclude that institutions that make the costs of combining work and family lower relative to being a full-time mother will increase female participation rates. Therefore, it is important for both women and policymakers to be aware of the possible patterns, the 'ideal pattern' (from an economic point of view), and the ways the preferred patterns can be supported by the institutional context.

**JEL-Code:** J22

**Keywords:** female labour supply, transitions, institutions

## 1 Introduction

In existing literature on both fertility and female labour supply it has been shown that there is a strong interdependency between the presence of children in the household and female labour supply. Women having children tend to work less than those without children. In many of these studies a cross-sectional approach has been used to show the differences in labour supply behaviour. In this paper we will explicitly study the dynamics of labour supply around childbirth. Labour supply and motherhood should be studied in a life-cycle context. Decisions taken early in life will have effects over a longer period. Interruptions, especially longer ones, affect women's potential earnings in future life (Dankmeyer, 1996; Joshi, Macran and Dex, 1996; Mertens, Van Doorne-Huiskes, Schippers and Siegers, 1998).

After childbirth, women can choose to remain full-time working, they can lower their number of working hours in order to facilitate the combination of work and family, and finally, they can completely leave the labour market. The choice between these three intensities of participation is highly influenced by individual preferences and by the restrictions women (or households) are faced with. In turn, these restrictions are influenced by the institutional context that is relevant for the household. Especially the level and costs of childcare are important, as well as the leave arrangements and the job protection. Mertens showed that over the total life cycle these decisions lead to three 'dominant' patterns (Mertens, 1998). The first pattern is that women leave the labour market after the birth of the first child, have more children and do not return to work. The second pattern is women having only one child and working both before and after childbirth. The third – less common – pattern is the one in which women have two children, work before the first birth, return to work after the birth of the second child – with an interruption between the first and the last child.

As no complete life-cycle data are available for our research, this paper focuses on the individual transitions from labour to care-activities around childbirth and tries to answer the question to what extent women succeed to maintain a tie with the labour market during different stages of family formation. Several studies have shown that losing this tie is detrimental for women's human capital and, as a consequence, for

women's future earnings and career possibilities. Even a small tie (e.g. through part-time work) diminishes the depreciation of human capital and thereby reducing the risk of poverty and social exclusion. We present results on three European countries, for The Netherlands and (West) Germany over the period 1985 to 2000, and for the United Kingdom, over the period 1991 to 2000. Dutch women have a much higher tendency to keep working around childbirth, while almost all German women leave the labour market for a shorter or longer period in order to care for the children. The United Kingdom takes an intermediate position, both before and after birth. This difference, which already exists in the early eighties, did not vanish to the end of the nineties. On the contrary, in The Netherlands the percentage women that do not leave the labour market increases over the period studied, while it decreases in Germany and the UK. We try to identify the effect of major institutional changes on female labour supply by relating the within-country changes in labour supply over time to the changes in the national institutions. Although we do so for three European countries, we do not go very far in analyzing the differences between countries. We also do not go into the decision with respect to the occurrence or timing of birth.

This paper is organised as follows. In Section 2, we show the patterns around childbirth. In Section 3, we discuss the factors that may explain these patterns. In Section 4, we discuss the changes in institutions over the last decade that may have caused changes in the patterns chosen. In Section 5 we present the estimation results of a multinomial logit model explaining the choices made. Finally in Section 6, we conclude.

## **2 Patterns in labour supply around childbirth**

In this Section, we show the participation patterns of women around birth for the three countries under investigation. It is generally known that there is a strong interdependence between individual characteristics and the level of participation. The presence of children is one of the main determinants. In this paper it will be shown that the birth of a child is a strong incentive to change labour market behaviour for almost all women. We do so by showing the -average- pattern of participation around childbirth, which proved to be useful in comparable studies (see a.o. Wetzels, 1999).

In Table 1 we illustrate this process of change in labour supply, by showing average

participation rates in a period around childbirth, starting two years before, and ending two years after childbirth. In this and the following Tables we distinguish two categories of mothers: those who have eventually one child, and those who have eventually two children. We do so, because earlier research for The Netherlands has shown that there is a clear distinction in labour market behaviour between women with one and women with more children. This is generally attributed to lacking childcare facilities, which forces working women to restrict the number of children to one, or women with more children to stop working. The current comparison gives us the possibility to compare this finding for the Netherlands to other European countries. The category of mothers with eventually three or more children is left out of the analyses because of small numbers. We use individual panel data for each country: the OSA-database for The Netherlands, covering the period 1983 to 1998, the GSOEP covering the period 1984 to 2000 for (West-)Germany and the BHPS for the United Kingdom, covering the period 1991 to 2001.

[ Table 1 about here ]

The first to notice from the Table is that before first birth participation rates are far from 100%. This holds for all three countries, although the rates in the FRG seem to be slightly higher. Partly, this is to be explained by women still in education. But it can also be the result of the fact that non-participating women will have more time available for children, or the other way round, women planning to have children do have lower participation rates. Also, women without children (and usually with high participation rates) are not included in this Table. Interesting to see is the fact that women in The Netherlands and the UK lower their participation rates before birth, even in their 'pre-pregnancy period': there is clearly an anticipation effect. In The Netherlands the participation rates are decreasing from 81% to 78% at twelve months before, further declining to 66% in the month of birth. In Germany the decrease seems to be starting at a later stage, somewhere around the start of the pregnancy. Also, the size of the drop in participation rates is much larger than in the Netherlands and the UK. After childbirth the patterns in the countries differ markedly. In The Netherlands, participation rates keep falling: in the six months after birth, the average rate in The Netherlands falls by another 10 percentage points to 56%. In Germany on the other hand, there is a gradual increase in participation rates after birth: it rises from 11% shortly after birth to 44% two years

after childbirth. There is also an increase in the UK relatively soon after childbirth, from 31% to 57% two years after first birth.

For the women with (eventually) two children, the observed patterns around first birth are comparable to the patterns found for women with one child. Again, there is an anticipation effect before birth while after birth there is a catching up in all three countries. There are some differences: the fall in participation rates before the first birth is larger for women that plan to have more children. Here, two observations may be relevant. The first one is that women opting for a relatively large family will withdraw from the labour market. As soon as the first child is born she chooses to specialize on household activities. When this tendency for specialization increases with the preferred number of children, the fall in participation rates will be larger for women with more children. The second observation is that women who do not return to the labour market shortly after the first birth may have problems in returning at a later moment in time. These increasing problems can be explained by diminishing human capital, increasing search costs and also that employers may interpret the interruption as a signal that the children are more important than work. When return is not possible, the opportunity costs of another child are relatively low. In that case, the career interruption is the explanation for the relatively large number of children. The causality of this correlation can only be studied in a true dynamic setting (e.g. Kalwij, 1999).

Participation is one dimension of labour supply, working hours is a second one. Although a number of women keep working after childbirth, they may reduce working hours in order to combine work and family. A closer look at hours worked reveals that in the Netherlands a large number of women is working part-time, both before and after birth. A different pattern of labour supply arises in Germany. Before birth all women work full time, after birth they all work part time. This difference can be explained from the institutional context. In The Netherlands a reduction of working hours is often possible without a change of job, and part-time work is well protected and not necessarily in the secondary labour market (Hendrickx, Bernasco and De Graaf, 2001). As a result, part-time work seems to provide a relatively stable labour market situation in the Netherlands (Anxo, Stancanelli and Storrie, 2000). In Germany and the UK the situation is different. There does not exist a legal right for part-time work in these countries. As a result of this, a transition from full-time to part-time work is in many

cases only possible when a woman has a change of job. This implies that women who want to work part time have to change jobs, which implies that they cannot keep working in their current job. This results in loss of tenure, the necessity to build up new job specific human capital, and probably a wage rate reduction. Also, as Bothfeld and O'Reilly (2000) show, part-time work is not providing as stable a job situation in Germany and the UK as it does in The Netherlands. The average duration of a part-time job is relatively short, while the most observed transition from part-time work is into unemployment or inactivity. Both the difficulties in obtaining a part-time job and the fact that this job is likely to be in the secondary labour market, will of course increase the number of women that stop working.

The results from this Section seem to indicate that only few women have a labour market career that is unaffected by childbirth. Our goal in the remainder of this paper is to describe how the pattern chosen by a woman is related to her background (c.f. Wetzels, 1999) and also, what role institutions can play in this decision.

### **3 Labour market transitions and the role of institutions**

There exists an extensive literature on individual and household decision making with respect to labour supply. Starting with Becker's "New Home Economics", part of this literature also goes into the issue of decision making within the household (Becker, 1965). Households that face the decision on labour market participation decisions of its members will make a trade off between the costs and the benefits of participation. On the one hand, labour market participation of the household members will generate an income, income needed to maintain a standard of living for the household. On the other hand, participation of the household members will also result in costs. As soon as household members are working in the labour market, they will have less time to do household work, such as cleaning, daily shopping, caring for the children, cooking, etc. Part of these activities will have to be outsourced, which is costly. The need for outsourcing will become smaller when both partners (or at least one of them) spend some time at home doing these activities.

When a child is born, new duties and tasks emerge and most households have to reconsider their division of activities. The potential earnings of both partners will not



change. But the level of household work will increase considerably. The household size increases, which will result in more time needed for cooking, shopping, cleaning. Also, the time needed for childcare increases. This therefore will result in an increase in the opportunity costs of working. It is therefore expected that a number of households that are two-earner households before the birth of the first child, will turn into one-earner households at the birth of the first child. As soon as children become older, usually the time needed for the children will diminish, while the amount of money needed will increase. As a result of that, it may be desirable at the household level to reduce time spend on care and to increase the hours spend on paid labour. In that case, both partners will take up their labour market career.

Also, the recognition at the moment of birth of the first child that total withdrawal from the labour market will prohibit future entrance may result in two-earner households, even though the current benefits may not outweigh the current costs. This may result in a (part-time) return to work soon after birth of a child.

The benefits of working are related to the human capital of the woman. The higher her educational level and the more labour market experience she has, the higher her (potential) income will be. On the other hand, the costs of working are more or less fixed. Of course, individuals with higher human capital may require childcare of higher standards, which is more expensive. But, roughly speaking, costs are more related to the provider of the services than to the buyer of these services. This implies that the opportunity costs for women with high human capital are high, while they have relatively low costs. For women with little human capital, the opposite holds. Therefore, we expect that stopping at childbirth is more common for low-educated women, while high-educated women continue work. At a second birth, the same holds. However, there are probably women who will stop working because staying in the labour market will not compensate for the increased costs of children. This may hold for low or medium-educated women, who decided to keep working around first birth. Women that have had their last child know that time costs of children in the household will not increase, but money costs will. This may result in a higher tendency to return to work for women with completed fertility. Of course, this return needs not take place shortly after birth, but only when children get older and go to (compulsory) school. Our data span is however, not sufficient to study this return at later age.

The pattern chosen by a woman is also very dependent on her preferences towards working for pay (Hakim, 2000). Women can explicitly choose for the “mummy track”. In that case she will perhaps work before birth, and marry and have children early. After birth they show little attachment to the labour force. The other choice is the “market career track”. Women that opt for this track will first make a career and afterwards eventually try to combine this with children. These women have children at a higher age and do not – or only for a very short period – interrupt their career around birth. As the expected timing of first birth differs between these two ‘types’, we can use age at first birth as an indicator for the track women have chosen. We therefore expect that women having their first child at low age will not return to work, while women having their first birth at a higher age will not interrupt. The spacing between two subsequent children may also influence the pattern: women having their children within a short spell of time, will be having combination problems that may be more severe, but tend to last shorter. We expect career-oriented women to have their children close together and women having children shortly after each other to have a larger probability of not interrupting.

The presence of a spouse at birth will influence the choice. Marriage used to act as an insurance against income loss. Therefore, women that are single or non-married at birth are expected to have a higher tendency to keep working, while married women have a higher tendency to choose for the interruption and become a one-earner household. In some countries, especially the Scandinavian countries, the difference between cohabiting and married couples is small. In those countries, the relevant difference is with or without partner. As cohabitation is more and more accepted in other countries (Blossfeld and Nazio, 2002), giving the same or comparable insurance against income loss, this will also become the case in countries as the Netherlands, the UK and – to a lesser extent – Germany. The acceptance of cohabitation, and its changing effect on participation is also caused by the fact that twenty years ago, cohabitation was seen as a rather loose bond, while nowadays it is regarded more and more a form of a structural partnership.

The decisions made with respect to work and family also have some social aspects. Households will not come to a full division of tasks when both partners acquire social approval from caring tasks. In that case, even when the level of human capital between household members differs, the partner with the lowest level will do some work outside

the household, while the partner with the highest level will do some household work (Radke, 2000). This closely relates to the social approval of working in the labour market and outsourcing of the household work. In the past, working mothers were not widely accepted, while since the early eighties this acceptance has increased. When households gain utility from social approval, the acceptance of their behaviour within their social context may influence the household decision. Even when on economic grounds participation is worthwhile, a strong disapproval of e.g. family or friends will prohibit female participation. However, as more and more households will become two-earner households the acceptance will increase, which in turn will again increase the number of households that become two-earner households. On theoretical grounds it can be shown that this interdependence leads to patterns often observed: first a small group will enter the labour market, which induces the change of norms, which will result in almost all of the group enter the labour market except for a small minority that holds on to the old norms (Vendrik, 1993, 1998).

So far, we discussed factors women can influence – to a certain extent – by their own choice. However, women may be restricted in realizing their preferences by outside restrictions. One of these is the economic situation in a given period. When unemployment rates are high, it may be unwise to leave a paid job. This may result in a larger number of women that keep working in times of high unemployment. Also, the institutional context may pose strong incentives on a woman to choose for a given pattern. When taxes are such that one-earner households are favoured, women may choose for non-participation. Also, when they want to work but there is no affordable childcare available or leave schemes are insufficient, they are forced to leave the labour market. Differences between countries in return patterns and return speed can be related to institutions (Wetzels, 1999). The most important of these are taxes, maternity leave and childcare because these three directly affect time and money costs of children.

It is tempting to undertake a cross-country comparison to relate differences in female labour supply between countries to differences in the institutional context. However, the institutional context and the labour market behaviour of women may be both influenced by the same underlying social norms. Also, countries have their own socio-economic and historic background. In that case, there is not necessarily a direct causal relation between institutions and labour supply. One of the empirical problems that may arise is

that systems are constructed as a system, and the methods that are used to obtain certain goals may differ: subsidised childcare and a low child-related tax allowance in country X, or high tax allowance and non-subsidised childcare in country Z may – as a package – both result in affordable childcare. However, including only indicators for one of these measures into an analysis may lead to the wrong conclusion. Also, this kind of indicators may pick up the "general differences" between the countries. When the effects of institutions are studied in a longitudinal way, part of these problems is circumvented.

In the next Section we describe the main institutions in the countries under investigation that influence labour supply of women, and we focus on the major changes in these institutions over the last two decades. As will be seen, there have been only few, but major changes over this period. In our empirical analysis, we include year of birth of the child to see whether any changes in choices over time took place. By relating these estimates to the choice pattern, we can get an indication of the effect of institutional changes on labour supply. In this way, we do not 'prove' whether or not there is an effect of the changes, and we certainly do not measure the effect. But, in this way we show that the effect is likely to be present.

#### **4 Institutional changes in The Netherlands, Germany and the United Kingdom**

For our analysis we need some information on the changes over the last twenty years in the relevant institutions in the countries under study. We will discuss the main institutions and the changes therein below.

##### *Taxes*

In many studies the effect of taxes on female labour supply are studied. The most important feature of the tax system is the fact whether or not the system is household based or individual. Estimations of the effect of an individual versus a household based system widely differ between studies. Some simulation studies report large increases in female participation rates of about 20 percentage points when a household based system is replaced by an individual system (Gustafsson, 1992), while others find only a small difference of 2 percentage points (Vlasblom, De Gijssel and Siegers, 2001). The Dutch system has been changed into an individual system in 1972. However, in this individual

system, allowances were made transferable, and thus still partly computed on a household base. In 1990 a major reform took place, in which the transferability of allowances was reduced. Before this transform it was predicted that this change would reduce female participation rates, although evaluation studies suggest only very small effects of this change (Grift, 1998). The level of progressiveness of the system also affects labour supply, although this merely affects the number of hours worked, and not the decision to participate or not. There is no general child allowance in the Dutch system, but in recent years expenses that are made with respect to childcare are deductible (within certain boundaries).

The household based taxation system in Germany did not change in nature, although in the period 1980 to 2000 some major changes of the tariffs took place. These changes were directed at a lowering of the marginal tariffs and thus increasing labour supply. Again, simulation did not show very large effects of these changes on female labour supply, mainly because most changes only affected the top brackets (Vlasblom, 1998). A far more important change in the German system concerned the child allowances. The German tax system highly favours households with children compared to households without children. In other words, the tax system gives a large reduction in taxes paid by households with children. In this way, the tax system lessens the need for a second income in the household and thus increases the opportunities for a household to be a one-earner household. This tax reduction for households is large and has also largely increased in Germany over the period 1985 to 1996 (See also e.g. Sainsbury, 1999). In 1983 there existed a standard yearly deduction per child of DM 432, and a childrearing allowance of DM 480 (only to use by one-parent families or families with special expenses). Next to that existed a monthly child benefit of about DM 70. Due to court cases, these amounts had to be increased in order to make sure that the system of child allowances and benefits would cover the minimum existence level. Therefore, there now exists a general child allowance of DM 6,912 and a general childrearing allowance of DM 3,024 both at the household level. Also, child benefits are increased up to a monthly amount of about DM 300. However, in 1984 parents received both the allowance and the benefit. Currently they can only use one of them, depending on which results in the highest net (household) income.

The UK taxation system was changed into an individual system in 1991, including the

introduction of individual non-transferable allowances. The UK system has no general child allowance. The nature of the system is such that it favours individuals working small working hours (due to the non-transferable allowances), and it does – in principle – not favour parents by means of child allowances. Also, Sainsbury (1999) shows that over the last decade, the family subsidy in the tax system slightly decreased, resulting in higher costs of children.

### *Maternity and parental leave*

Taxes affect mainly the money costs of children. The leave schemes affect the time costs of children. The more ‘generous’ the schemes are, the easier it becomes to combine work and family. The system of statutory maternity leave does not differ too much between the three countries. All three countries have a paid leave period of about 15 weeks (Germany 14, The Netherlands 16 and UK 18 weeks around birth). The levels of payment differ slightly, but not too much. The system of parental leave during the period under study, however, differs greatly. Until 1991 in The Netherlands there existed no right to parental leave. From 1991 onwards, an individual right to leave existed for both parents (13 weeks maximum, unpaid). This legal right was seen as a minimum provision, and extensions were possible by collective agreement (Den Dulk, 1999). From 1997 onwards, the leave could also be taken in a more flexible part-time way, in which the same amount of leave hours can be used over a period of 15 months maximum. The UK also introduced the system of parental leave only in 1998. From then on, it had a system in which both parents have an individual right to unpaid leave, also for a period of 13 weeks. Parents in the UK have no possibility to take the leave in a flexible way. As both the Dutch and the English system were only introduced in the late nineties, the nature of these systems can not help explaining changing patterns in transitions over the nineties.

The German system of parental leave differs greatly from the systems in the other two countries. The first difference is that the right is not individual but on a household level. Also, Germany has a relatively generous system of parental leave. In this system some major changes took place during the last two decades. In 1986 a so-called period of *Mutterschutz* (Mother protection) was introduced of 10 months. In 1992 the period of *Mutterschutz* was extended to 24 months, in 1993 it was again extended to 36 months. There is a tendency for German women to use the full extend of *Mutterschutz*. In

other words, the period they are out of the labour market increases with the extension of the job-protection period. Also, the percentage of women that eventually returns to the labour market becomes lower when the period of *Mutterschutz* increases (Ondrich, Spiess and Yang, 1996; Ondrich, Spiess, Yang and Wagner, 2003). Although in principle also the father was able to use (part of) the right to parental leave, in practice only women take the leave. Only very recently the system tries to induce fathers to take (part of) the leave.

### *Childcare*

For those parents who have to earn a living or want to have a career the regulations with respect to childcare are important. The more provisions there are, and the easier accessible they are, the easier it will be for women to combine children and work for pay. Also the costs of childcare are important: as soon as the costs of childcare are large compared to net earnings, women will be inclined to stop work, and care for their own children at home. Therefore, three aspects are of importance: accessibility, availability and costs (including the question whether it is subsidised or not). It is not easy to get reliable and international comparable figures on the number of childcare places, the actual need and the usage of those places. In the United Kingdom childcare is mostly provided by the market, and has reached a coverage of 20% of the children aged 0-3 and 60% of the children aged 3- compulsory school age by the year 2000. In Germany, the coverage for young children is lower, only 10%, while the coverage of the older children is higher: 78%. In the Netherlands, in 1998 the coverage is 19% for the youngest group and up to 98% of the older category (mainly because of the fact that almost all children aged 4 go to school). The problem with these coverage numbers is that it is not clear whether they resemble the supplied number of places or the demand for childcare.

The number of available places in Germany and the United Kingdom remained rather stable; but large changes took place in The Netherlands over the last decade. As shown in Table 2, in 1991 almost no (professional) childcare existed. In the ten years following, the number of childcare places increased rapidly. The number of daycare places (intended for children 0-4) more than doubled, while the number of places for children in the age of primary school (5-12) grew even faster from 4,300 in 1990 to 30,700 in 1999. As in the Netherlands part-time work is rather common, virtually no household uses daycare for 5 days a week. This implies that several children can share the same place.

The actual coverage is therefore higher than the Table suggests.

In Germany most women tend to stop working when the first child is born; at least most of them take a period of maternity leave. Thus, childcare, especially for young children, is far less needed than in The Netherlands. It is therefore not a major issue in Germany and no large changes in availability or costs took place over the last decades. In the UK, childcare is mainly left to the market. Therefore, it is very difficult to show whether or not major changes took place.

[ Table 2 about here ]

#### *Expected effects on female labour supply*

In The Netherlands, we saw little changes in the tax system and no changes in the system of maternity leave. There have been large changes in the availability of professional childcare. As the lack of availability of this care is a major problem in combining work and family, we expect that the increase in availability over the last ten years will result in the fact that for more recent births the number of women that do not interrupt their career will increase. In Germany, on the other hand, we saw changes in the tax system, which reduced the costs of children. Also, there have been increases in the period of maternity leave in the same period. Both changes, which are substantial, provide a signal to households that the one-earner household is the preferred type. As a result of this, it is to be expected that for recent births a larger percentage of women decides to leave the labour market and choose for full-time motherhood. In the UK, the main change that took place during the period under study was a reform of the tax system. This change increased the incentive for non-participating women to start working for pay. However, there is no specific reason to expect that the effect of this change shows up predominantly around childbirth.

## **5 Choosing different participation patters**

In the previous Sections we discussed the factors that will influence the woman's decisions with respect to participation when a child is born. Using our data we can estimate the magnitude of the effects of these factors on transitions around childbirth. To do so we define a transition by comparing the labour market status 6 months before birth



to the status 12 months afterwards. This results in four possible transitions around childbirth: work before and after birth (YY), work before, but not after birth (YN), not working before, but working after birth (NY) and not working before and after birth (NN). In Table 3 the frequencies of this transitions are presented.

[ Table 3 about here ]

In this Section we use a multinomial logit model to analyse the effects of the various factors that may explain women's participation patterns around childbirth. In the multinomial model we assume a simultaneous decision on the total life cycle, in which pre and post birth participation is decided upon simultaneously. We could also have estimated a set of binary logit models, explaining the choice before childbirth and the choice after childbirth given the situation before childbirth. This would be valid when choices are made at various points in time. However, in the second empirical set-up, it is more difficult to show which women end up in a given pattern. A third option would be to estimate duration models of the timing of return to work after childbirth. The problem in these models is the fact that there is a clustering of women who do not interrupt (spell length 0) and women who never return (spell length infinity).

As discussed in Section 3, we include the *educational level* as indicator for the human capital, *age at first birth* as indicator for the career orientedness of the woman. We also include a dummy variable indicating that the observed birth is the *last birth observed*. Because we do not have data on the completed life cycle, we interpret this as an indicator of completed fertility. For the second birth we also include the *spacing between children*. *Marital status* is included as it is expected to be an indicator of social norms: non-married couples tend to have more equal sharing of task in and outside the home, while married couples more tend to specialize. Finally, *national unemployment rate* is included as an indicator of the economic circumstances.

As extensively discussed in the previous sections, we cannot identify the exact effect of changes in the institutions on the choices made. We include *year of birth* to see whether or not there tend to be any systematic changes in the probabilities over time. These changes over time, in turn, than can be related to changes in the institutional context. We have shown that the institutional changes in The Netherlands are expected to induce a

larger number of women to choose not to interrupt, while in Germany an increasing number of women will interrupt their labour market career. We do not expect large changes in observed transition behaviour in the UK.

The estimated parameters of the logit model can be found in Table 4 for the first birth and in Table 5 for the second birth. As can be seen, there are a number of similarities between the countries and between the birth orders. However, it should also be noticed that the model does not perform as well for the UK as it does for the other two countries.

[ Tables 4 and 5 about here ]

The effect of human capital is in all cases as expected. For all countries and birth orders it can be seen that compared to medium-educated women, low-educated women more often decide for the YN or the NN pattern, while high-educated women more often decide for the YY pattern and less often for the YN pattern and the NN pattern. The only exception is the group of high-educated women in Germany at first birth. They also decide more often for a pattern of NY compared to medium-educated women. Apparently there is a group of high-educated women who choose to become mother before entering the labour market. This effect is absent at second birth. Compared to The Netherlands and Germany, educational level has only little effect on the dynamics around childbirth in the UK.

Age at first birth, interpreted as a measure for the degree of career orientation of the woman, also has the expected sign. Both at first and second birth, women that have had their first child at a relatively high age choose more often for the YY pattern. A child being the last child does not affect the transition patterns very much. Dutch and English women have a slightly lower probability to stop working when their first child is also the last child. In other words, women that have only one child tend to stop less often. In the Netherlands, the second child being the last child slightly increases the probability of return to the labour market after the second birth.

The spacing between two children has little effect in the Netherlands. In Germany and the UK the effect is larger. In both countries, a larger space between the first and the second child results in a larger probability for the YY- pattern, and less for the other

patterns. Here our hypothesis is not confirmed: we expected a shorter space to result in a larger probability of YY. Apparently, women who keep working after the first child can manage to combine work and family. When the first child grows older, it is possible to combine a second one with work and family. We expected the duration of the period with small children to be the most important factor; our estimation results point in the direction of the ‘intensity’ of this period.

We expected the decision on participation to differ according to the marital status. This only holds at first birth. The effects differ somewhat between the countries. In The Netherlands the results are as expected: non-married women tend to choose more often for the YY and less often for the YN-strategy. In Germany, the pattern is slightly different: There the unmarried women seem to decide more often for the NN-pattern, and less for the YN pattern. This points in the direction of a difference in labour supply in the pre-birth period: married women tend to work more often before birth than unmarried women. We have no explanation for that finding. In the UK, mothers without a partner tend to stop work relatively often, which is perhaps a result of lacking childcare facilities for lone mothers. The effect of being unmarried is not present at second birth, which is also due to the fact that the percentage mothers still unmarried at second birth is very small.

The economic situation in the year of birth has only a small effect on a woman’s decision around first birth. We find no effect in The Netherlands. In Germany the results show that participating women – as expected – have a lower tendency to stop at birth when unemployment rates are high. This can be explained either by an added worker effect (larger probability of unemployed husband), or by the fact that women expect that finding a new job will be difficult. In the UK, the estimations show an opposite effect: when unemployment rates are higher, the probability of uninterrupted career becomes smaller relatively to both the YN- and the NY-pattern. Job mobility around childbirth seems to increase during periods of high unemployment. This may be due to a labour demand effect: combining work and family is difficult, and in times of high unemployment this can result in a pressure to leave your job: the employer can easily find replacement. This mechanism is stronger in the UK, as most workers are dependent on their employer for the leave and childcare arrangements. Employers will in periods of high unemployment decrease the level of arrangements to increase the pressure on

women to leave. The increase in the NY-pattern, however, is not explained by such a demand effect. Perhaps a higher unemployment rate increases the pressure on non-participating women to increase job search activities, which, in turn, will increase their participation level.

Finally, we come to the major point of our empirical analysis. We discussed that any changes in the institutional context that had effect on the decisions made will show up as a systematic change in choice probabilities over time. The estimated parameters show that around first birth in The Netherlands more recent births have a lower probability of the YN and the NN pattern, and thus a higher of the YY pattern. In Germany, it is the other way round, the more recent the birth, the higher the probability that the woman decides for the YN pattern, and thus the smaller the probability she chooses for the YY-pattern. In the UK, we see a higher probability for the NY pattern: more and more women tend to enter the labour market shortly after childbirth.

Around the second birth, again in The Netherlands we see a shift towards YY, and in Germany a shift towards YN. For Germany, this last one looks a bit surprising. As more women choose for the YN at first birth we expect a larger number to be in the NN-category at second birth. However, in our data second births are observed for women who have had their first child before the start of our period of analysis. In other words, they were in the type YY after the first birth, and did decide at the second birth that it was worthwhile to stop. In the UK, again, the shift to entering the labour market is seen.

In the Netherlands the time effect points in the direction of higher participation after childbirth, while in Germany it points in the direction of lowering participation around childbirth. Recall from Section 4, that there have been major changes in childcare facilities in The Netherlands. These changes enlarged the amount of childcare available. It is therefore highly probable that these changes are at least part of the explanation of the observed changes over time. In Germany, on the other hand, in this period the maternity leave became more generous towards non-working mothers. Also, the child-related deductions in the tax system were increased. These changes made it relatively cheaper for households to become one-earner households. Therefore, again, it is not unlikely that these changes have had influence on the labour market outcomes. For the UK, there is no large shift over time in the transition patterns observed, but as there have

been relatively little changes in the system during the last fifteen years this is not surprising: no large changes in the system aimed at equal opportunities were introduced. The increasing number of women that start after childbirth is perhaps explained by the change in the tax system.

## **6 Conclusions**

Numerous studies have pointed out that there are relations between female labour market participation and family career. In this paper we show – using data for The Netherlands, Germany and the United Kingdom over the last 20 years – that these interdependencies are strong. Women having children tend to work less than those without children. But also, women who plan to have children show different behaviour on the labour market, even before the birth of the first child. A number of patterns in labour supply can be seen. However, most patterns can be described by the fact that women tend to lower participation, both in participation and in hours, at every child born. Only few of them return to the labour market after a relatively short period, many women do not return within a few years after childbirth. Also, women who keep working decrease their working hours after childbirth.

We have shown in this paper that these patterns differ between women, depending on their human capital. Women with more human capital tend to have higher participation rates at all stages of their life cycle than women with little. Based on this finding, and on the finding of others that choices made with respect to timing and number of children have large effects on female economic independency, it is concluded that policies should be aimed not at general measures, but should be more targeted on 'subgroups' of women, for which the combination of work and children is now almost impossible.

Comparing the three countries under investigation, we show that the differences in patterns chosen between women of various educational backgrounds are roughly comparable. One of the major differences seem to be that over the period we take into account – which is 1980 to 2000 – in The Netherlands there is a trend towards an uninterrupted career, while in the same period in Germany there seems to be a trend towards leaving the labour market at childbirth. In the UK, there seems to be no large shift. These differences may very well be attributed to changes in the institutional

context in the countries. In The Netherlands the system was aimed at an increase in female participation rates. Based on the idea that women ought to be economically independent, a number of changes were made, one of which is the huge increase in the availability and affordability of daycare. This – together with a change in social norms – resulted in an increase in female participation rates and a reduction in 'drop-out' rates at childbirth. In the same period in Germany, we discussed in Section 4 that there have been several reforms and adjustments in the tax deductions with respect to children and in the system of maternity leave. All of these changes made being a full-time mother relatively cheaper compared to a situation of combining work and family. Therefore, we are not surprised to find that the number of women that does not leave the labour market or do not return to work shortly after birth has declined during this period. In the UK, no large changes in the system aimed at equal opportunities were introduced. The change in the tax system might have induced an increasing number of mothers to start working after childbirth.

Although the number of countries under study is too small to make a formal test of the effect of institutional changes, our results do not contradict a large effect of these institutions on choices made by households and – more specifically – women with respect to fertility and labour market behaviour.

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*Table 1*  
Patterns of average female participation rates around childbirth<sup>a)</sup>

	Months before birth				Month of birth	Months after birth			
	24	12	6	3		3	6	12	24
Netherlands									
1 child	81	78	74	72	66	61	57	58	56
2 children, first child	83	79	75	68	54	41	38	39	37
second child	47	34	37	35	33	33	35	37	38
Germany									
1 child	80	84	79	69	16	11	15	28	44
2 children, first child	86	86	83	74	15	11	11	25	34
second child	42	41	41	37	12	12	13	23	33
United Kingdom									
1 child	83	75	55	50	31	40	46	53	57
2 children, first child	85	75	58	50	31	35	45	46	48
second child	55	51	40	34	26	33	39	48	54

<sup>a)</sup> Children born after 1980 in The Netherlands, after 1983 in Germany and 1990 in the UK. The average spacing in the Netherlands between the two children is 38 months, in Germany it is 48 months, and in the UK it is 44 months.

Source: OSA 1985-1998/GSOEP 1984-2000/BHPS 1991-2001

*Table 2*  
Number of childcare places in The Netherlands, 1990-1996

	Places in daycare (x 1,000)	# children aged 0-4 (x 1,000)	Places in 'after school'-care (x 1,000)	# children aged 5-14 (x 1,000)	Women aged 20-64 (x1,000)	Gross female participation rate
1991	32.9	947	4.3	1,791	4,576	45
1993	47.5	972	10.6	1,819	4,679	47
1995	53.2	988	12.0	1,850	4,740	49
1997	59.9	973	18.4	1,889	4,777	52
1999	69.1	976	30.7	1,940	4,826	54

Source: Source: (SZW/CBS, 1999) and CBS-statline.

*Table 3*  
Patterns around childbirth, 6 months before -12 months after birth, in %<sup>a)</sup>

	The Netherlands		Germany		United Kingdom	
	Around first birth	Around 2nd birth	Around first birth	Around 2nd birth	Around first birth	Around 2nd birth
YY	40	29	25	17	32	27
YN	33	6	55	22	24	10
NY	3	5	2	5	17	19
NN	24	56	18	57	27	44
# observations	543	520	649	506	668	592

<sup>a)</sup> Children born after 1980 in the Netherlands, after 1983 in Germany and after 1990 in the UK.  
Source: OSA 1985-1998 / GSOEP 1984-2000/ BHPS 1991-2001

Table 4

Estimated parameters of the multinomial logit model explaining participation patterns around first birth, The Netherlands, Germany and the United Kingdom

Variable	The Netherlands			Germany			United Kingdom		
	YN	NY	NN	YN	NY	NN	YN	NY	NN
Constant	15.814** (5.49)	3.199 (0.37)	17.647** (5.69)	-12.275** (5.07)	7.219 (1.00)	-3.041 (1.01)	-3.169 (0.53)	-28.551** (2.93)	1.396 (0.23)
Age at first birth	-0.074* (2.30)	-0.094 (1.28)	-0.166** (4.73)	0.003 (0.11)	-0.292** (2.86)	-0.076* (2.22)	-0.052* (2.43)	-0.043 (1.85)	-0.139** (6.04)
Low educated	0.815** (2.86)	-1.003 (0.92)	1.224** (4.09)	-0.028 (0.06)	1.325 (1.45)	1.125* (2.41)	0.505 (1.46)	0.419 (1.00)	0.904** (2.77)
High educated	-1.278** (3.96)	0.051 (0.08)	-0.719* (2.01)	-0.712** (3.11)	1.567* (2.02)	0.100 (0.34)	-0.235 (0.97)	0.434 (1.69)	-0.127 (0.50)
Last child	-0.503 (1.80)	0.731 (1.16)	0.173 (0.59)	-0.126 (0.60)	1.026 (1.51)	-0.078 (-0.29)	-0.488* (2.02)	0.033 (0.13)	0.045 (0.19)
Birth year of child	-0.151** (5.22)	-0.065 (0.76)	-0.155** (4.95)	0.177** (5.55)	-0.071 (0.72)	0.056 (1.39)	0.026 (0.45)	0.262** (2.86)	0.007 (0.12)
Non-married	-2.348** (3.63)	0.564 (0.84)	-0.766 (1.81)	-0.157 (0.63)	1.081 (1.60)	0.876** (3.06)	0.331 (1.35)	-0.177 (0.64)	0.411 (1.69)
Unemployment rate	-0.019 (0.27)	0.274 (1.46)	-0.005 (0.07)	-0.295** (3.35)	0.244 (0.79)	-0.069 (0.61)	0.244* (2.32)	0.497** (3.31)	0.146 (1.38)
Log likelihood	-526.7			-623.4			-840.0		
# observations	543			649			668		

t-values in parenthesis: \*: significant at 5%, \*\* significant at 1%.

Source: OSA 1985-1998/ GSOEP 1984-2000/BHPS 1991-2001

Table 5

Estimated parameters of the multinomial logit model explaining participation patterns around second birth, The Netherlands, Germany and the United Kingdom

Variable	The Netherlands			Germany			United Kingdom		
	YN	NY	NN	YN	NY	NN	YN	NY	NN
Constant	9.645 (1.80)	17.536** (3.26)	20.338** (6.40)	-8.352* (2.20)	-2.869 (0.46)	3.310 (1.10)	2.285 (0.28)	-12.937 (1.54)	2.34 (0.40)
Age at first birth	-0.073 (1.21)	-0.158* (2.31)	-0.062 (1.87)	-0.066 (1.56)	-0.153* (2.17)	-0.043 (1.19)	-0.019 (0.54)	-0.051 (1.79)	-0.061* (2.54)
Low educated	0.261 (0.50)	0.656 (1.31)	0.922** (3.16)	-0.291 (0.50)	-0.130 (0.16)	0.057 (0.12)	-0.903 (1.53)	-0.509 (1.14)	0.823** (2.71)
High educated	-0.649 (1.24)	-1.263 (1.80)	-1.289** (4.39)	-0.818* (2.42)	-1.141 (1.79)	-1.133** (3.89)	-0.487 (1.40)	0.018 (0.06)	-0.357 (1.46)
Last child	0.23 (0.48)	1.290* (2.10)	0.291 (1.07)	0.274 (0.74)	0.266 (0.46)	0.028 (0.09)	-0.477 (1.27)	0.154 (0.45)	-0.501 (1.89)
Birth year of child	-0.099 (1.84)	-0.163** (3.02)	-0.196** (6.21)	0.145** (2.90)	0.093 (1.13)	0.016 (0.41)	-0.013 (0.17)	0.136 (1.72)	-0.001 (0.02)
Non-married	0.385 (0.46)	-0.202 (0.18)	-0.065 (0.12)	-0.483 (0.89)	-1.261 (1.08)	-0.498 (1.04)	0.240 (0.61)	-0.102 (0.30)	0.327 (1.21)
Unemployment rate	-0.039 (0.28)	-0.095 (0.68)	-0.041 (0.51)	-0.292* (2.32)	-0.099 (0.48)	-0.155 (1.41)	-0.067 (0.45)	0.133 (0.94)	0.059 (0.57)
Spacing	-0.044 (0.55)	-0.233 (1.63)	-0.092 (1.81)	0.005 (0.10)	-0.580** (3.25)	-0.148** (2.99)	-0.121 (1.68)	-0.024 (0.51)	-0.099* (2.35)
Log likelihood	-442.6			-517.0			-702.8		
# observations	520			506			592		

t-values in parenthesis: \*: significant at 5%, \*\* significant at 1%.

Source: OSA 1985-1998/ GSOEP 1984-2000/BHPS 1991-2001