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Parental leave take up and return to work of mothers in Luxembourg: An application of the model of nested dichotomies

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Parental Leave Take Up and Return to Work of Mothers in Luxembourg
An application of the model of nested dichotomies

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Abstract

This paper analyses the use of parental leave after birth of a child for working mothers. Even though employment rates of women in industrialized countries are rising, women continue to assume the primary responsibility for caring for young children after they are born. Therefore it is interesting and important to understand what factors account for women's decision to use or not use parental leave. The behaviour of mothers is conceptualized as a series of three decisions taking place after the compulsory period of maternity leave. The first decision is to retain a relationship with the pre-birth employment or to leave the labour force. Women who do not quit their employment, make a second choice: to return to work immediately or to take parental leave for a fixed period of time, which guarantees them the right to return to work. Finally at the end of parental leave, women decide whether to return to work or to quit their job. The empirical analysis is performed on administrative data provided by the Grand Duchy of Luxembourg. In order to account for the sequential nature of the decisions, the model for nested dichotomies (Fox, 1997) has been used. The result lend partial evidence to economic reasoning about women's decision making. Salary-related opportunity cost seems to be particularly important in the first and third decision, but not in the second. There are also interesting differences based on the nationality of the women.

1 Introduction

Parental leave in the European Union is a policy provision allowing parents to take time off from work in order to take care of young children at home. Typically, the leave is available after the period of maternity leave[1], thus it is a period of time specifically designated for providing care. Parental leave legislation guarantees parents the right to return to the same or equivalent job at the end of the leave period. In addition, in most countries, governments provide financial support for parents during the leave period. In the European Union, parental leave is a gender-neutral provision: both mothers and fathers are eligible to use parental leave.

Parental leave policies can be generally said to serve three main goals. To begin with they allow children to receive care at home in the first months of their development, which has been linked to a number of positive outcomes in terms of infant health (Berger et al., 2005; Ruhm, 2000). Second, parental leave serves as a work-family reconciliation tool as the job guarantee enables women to return to their pre-birth employment position without loss of job-specific human capital (Klerman and Leibowitz, 1999). Finally, as the leave is gender-neutral and can be used also by men it contributes to gender equality in the distribution of paid and unpaid work, as men have the opportunity to participate in the upbring of their children (see for example Tanaka and Waldfogel, 2007) and women are not the sole bearers of the negative consequences associated with an absence from the labour market, such as the "motherhood wage penalty"(see for example Anderson et al., 2014).

Most studies on parental leave use of parents have been concerned with evaluations of the extent to which leave legislation has actually affected behavioral changes and contributed to higher rates of leave-taking and/or subsequent returns to work of mothers. A number of studies have used changes in policy provisions in order to compare the behaviour of parents under the old and the new policy in a 'natural experiment' setting and thus establish causality with more certainty than in a cross-sectional design. Such studies have shown that the duration of time mothers spend taking care of their infant at home closely follows the duration of provided parental leave, especially for the duration that it is also accompanied by a financial ben-

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[1]Maternity leave is provided for women around the time of giving birth in order to accommodate the need for their physical recovery.

efit (Bergemann and Riphahn, 2011; Kluve and Tamm, 2012; Lalive and Zweimüller, 2009). In addition, evaluations of recent policy reforms earmarking parts of the paid parental leave for fathers have demonstrated that men are also likely to be involved in stay-at-home caring activities given the correct policy incentives (Ekberg et al., 2013; Kluve and Tamm, 2012; Duvander and Johansson, 2012). Econometric analysis of women's employment status around the time of child-birth has also demonstrated that leave provisions available for mothers are significant predictors of being outside the labour force during the job-protected leave period and an increased probability to return to the labour market after the end of the leave (Han et al., 2009; Ondrich et al., 1996)

Although policy evaluation studies have established that on average parents' behaviour is consistent with the design of parental leave policy, it is also clear that not all parents respond to policy changes in the same way. Parents differ in the extent to which they can actually afford to take leave (if they are at all eligible), especially in cases where the leave is unpaid or paid on a flat-rate basis[2]. In the USA, where only unpaid leave is available Han et al. (2009) finds that married women are more likely to use leave, which is possibly due to the additional income support they can receive from their partners. In European countries with generous paid parental leave schemes where take up is generally high, however return to work has been shown to differ between mothers. For example, higher educated mothers are more likely to return to work than their lower-educated counterparts (Ondrich et al., 1996; Bergemann and Riphahn, 2011).

Diversity in access to parental leave and its use, however, has received surprisingly little attention in the literature. Failing to focus on the needs of groups in society whose behaviour deviates from the norm, leads to a lack of systematic understanding on the special needs of families who may be facing disadvantages on multiple dimensions: lone parents, ethnic minorities, workers with non-standard employment contracts (Rostgaard, 2005). It is also important to be aware of parents who may unable to use a provision due to lack of eligibility rights or due to constraints such as lack of awareness about their rights or a precarious position on the labour market (Moss and Deven, 2006). On a related note O'Brien (2009) discusses the question of un-

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[2]Flat-rate basis means that all parents on parental leave receive the same monthly benefit. An alternative compensation scheme is income replacement where the benefit for each parent is calculated as a percentage of previous earnings.

equal access to leave policies from the point of view of children, highlighting that idea that in countries where governments fail to provide leave policies accessible for all parents, inequality between children will be deepened, as the ones born into more economically secure homes will also be the ones to receive more parental care in the early years of their development.

The study on anticipated labour market strategies of women after birth in Luxembourg by Valentova (2011) demonstrates that it is important to analyse not only whether or not women are using parental leave, but what they do instead. Valentova (2011) points out that women who do not plan to use parental leave are a very heterogenous group. On the one hand side there are the women who do not want to take parental leave because they want to remain outside the labour force for a longer period of time. On the other hand, a group of women are not taking leave because they want to resume working immediately after the leave. Therefore it is important to distinguish between these two groups in order to better understand women's labour market participation decisions around birth.

Another problem in the literature seems to be a tendency to analyse take up of parental leave and return to work separately, with only few studies examining both of these steps together. Where return to work after leave is analysed, there seems to often be a lack of distinction between maternity leave, parental leave and a period of labour market inactivity close to the birth. This makes it difficult to understand how exactly parental leave policies are playing out in the work trajectories of parents. Do we see increased rates of female employment after the introduction of parental leave because women who have children take leave and return to work or is it because women who would otherwise not enter the labour force are more likely to participate if they know they can use parental leave?

The present study aims at contributing to filling these gaps in the literature. It uses individual-level data from the Grand Duchy of Luxembourg, a country where parental leave has been introduced since 1999. The availability of administrative data for the study makes it possible to analyse the actual behaviour of women (rather than intentions, or self-reported information) around the event of a birth of a child. Further it is possible to trace out the eligibility, working and leave status of parents in the analysis whereas the transitions from one state to another can be clearly modelled. Although the analysis cannot explain to what extent the presence of a parental leave statute is altering women's behaviour (due to lack of data in the period prior

to the introduction of the parental leave policy in Luxembourg), the study can provide important insights into which parents are using the policy. The paper can highlight some important differences between women, which can translate into broader level inequalities later in the life-course. In addition, as parental leave is an opportunity for investment in the human capital of children, differences in present-time behaviour can have consequences with implications going as far as the next generation.

2   Theoretical Framework

The present study is based on the theoretical model developed by Klerman and Leibowitz (1997). Klerman and Leibowitz (1997) develop their model for a simplified situation where women only make a decision to work or not (without distinguishing the number of hours) and women have only one child. As the child grows older, the value of women's time at home decreases. For each woman the salary she was receiving before birth (w_0) is higher than the potential salary she could receive if she quits work and searches for another position after the birth(w_a). The latter salary is lower due to the loss of the job-specific human capital accumulated prior to the birth. In the presented theoretical model each woman returns to work when her reservation wage (the value of her time at home) is equal to the pre-birth wage offered by her employer. Essentially each woman has an "optimal" amount of time she would like to remain at home, which differs according to how steep the value of her time at home is decreasing and how high was her pre-birth wage.

The theoretical model presented by Klerman and Leibowitz (1997) explores how the decisions of women will be affected by a fixed-duration parental leave mandate. This mandate will provide women the right to return to their pre-birth job and wage (w_0), however there is no compensation during the parental leave. The introduction of a fixed-term parental leave changes the decision situation of the woman depending on whether the available leave duration is longer or shorter than the "optimal" amount of time she would like to stay at home. Women who, in the absence of a leave provision, would like to take a leave shorter than the leave made available through the mandate are likely to extend the duration of the time they spend at home to the full duration of the provided leave especially if they can afford to fund

the period themselves. On the other hand, women who would like to take more leave than the leave period offered will have to compare the difference between the initial wage(w_0), which they can maintain if they shorten the duration of their leave and the potential wage(w_a) they could earn if they change jobs combined with the utility of remaining at home for a longer period of time.

The theoretical model of Klerman and Leibowitz (1997) has been developed with the US context in mind, therefore it needs to be applied to the Luxembourg context with a few explanations. Table 1 provides an overview of the main differences between the theoretical model developed by Klerman and Leibowitz (1997) and the situation in Luxembourg as of 2003. In Luxembourg every pregnant women is required to take a minimum of two months maternity leave before the birth of her child and a minimum of two months afterwards. The post-birth period can be extended with an additional month in the case of breast-feeding. Maternity leave is considered a health-related benefit. It is fully funded (replacement level is 100 per cent of previous earnings) and paid out by the National Health Fund of Luxembourg. In view of this leave structure, it can be safely assumed that all (eligible) female employees take maternity leave. This assumption, however, cannot be made regarding parental leave. In Luxembourg parents are entitled to a fixed-term period of parental leave, which can last either six months (full-time leave) or twelve months (part-time leave). As the duration of the leave is fixed and the leave cannot be shortened or extended, the model of Klerman and Leibowitz (1997) is suitable to be applied in the analysis. Based on this model, it is expected that women with very high pre-birth wages would return to work immediately after maternity leave, whereas women lower pre-birth wages, which are not substantially higher than an alternative job after a job search would quit their jobs and not use parental leave.

As the theoretical framework by Klerman and Leibowitz (1997) has been developed in view of only unpaid leave being available, the question whether parents can actually afford to take leave must also be considered (Han et al., 2009). In Luxembourg the leave is paid, however, only on a flat-rate basis. This means that all parents receive the same monthly benefit regardless of the level of their previous earnings. This arrangement has some similarities and differences with the situation when the leave is unpaid. The similarity is in that workers differ in the levels of the opportunity costs they face when taking leave - higher earning women have higher costs of being on parental leave. However, in the Luxembourgish system, unlike the US system, the

Klerman and Leibowitz (1997)	Situation in Luxembourg as of 2003
Initial state	

- No legal provision concerning leave
- Employers likely to provide leave
- Duration: likely to be short-term
- Compensation: not specified

- Maternity leave provision
- All workers eligible if under social security scheme for 6 months
- Duration: four to five months
- Compensation: paid at 100 % wages

Fixed-term leave mandate	

- Maternity leave statute
- Duration: 12 weeks
- Compensation: unpaid

- Parental leave
- Duration: 6 months
- Compensation: paid at 1651.38 €[3]

Employment after birth/leave	

- Assumed that women want to return to work after birth/leave
- The question is when and what wage they will be offered

- Data suggest that leaving the labour force upon birth may be long-term
- Less than half of women who leave labour force after maternity leave were employed after five years.

Table 1: A summary of the elements in the theoretical model developed by Klerman and Leibowitz (1997) and their counterparts in the leave system in Luxembourg.

workers in the lowest earning bracket do not face a risk of negative or below-subsistence income for the duration of the parental leave. In fact they may even be in a situation where the monthly benefit is higher than their previous earnings.

It is possible to derive the opportunity costs of each worker for taking parental leave and/or for leaving the labour force by using the available information on their salary-related earnings and the amounts of the parental leave benefit. In Luxembourg parental leave is paid on a flat-rate basis, whereby each parent is entitled to a monthly compensation. In 2013 the compensation was equal to 1778 €for the full-time leave, which is reduced in half for the part-time leave. Women who quit their work in order to take care of a child at home are eligible to receive a monthly child raising allowance (l'allocation d'éducation), which is equal to 485.01 €per month for a duration of about two years. The compensation and durations of parental leave and the child raising allowance are calculated in such a way that the total amount received at the end is the same in both cases. The two provisions cannot be combined. Only parental leave guarantees the right to return to the same position as before the birth.

Although the theoretical framework presented by Klerman and Leibowitz (1997) is very useful in making predictions about how women would make decisions regarding taking a fixed-term leave, the framework makes the important assumption that all women who take parental leave return to their previous employment, which is not necessarily in line with the situation in most European countries. For example Plantenga and Remery (2005) report that in 2001 return rates of around 80 per cent (such as in Austria or the UK) could already be considered high. However, other countries had much lower return rates, such as 50 per cent in Germany and 45 per cent in Hungary. Some recent policy evaluation studies have demonstrated that changes in the design of parental leave regulations can have a significant and noticeable impact on return rates of leave takers (Lalive and Zweimüller, 2009; Kluve and Tamm, 2012). However, systematic information on why some women return to work after parental leave whereas other don't is relatively scarce in the literature.

The present study extends the analysis from parental leave take up to return to work conditional on parental leave take up in order to bring the analysis closer to the actual situation in most European countries. At the same time, the analysis extends the conceptual understanding of decisions related

to parental leave is by taking into consideration the sequential nature of the decisions made by women: to remain employed, take leave and return to work. This is achieved by first breaking down the decisions into sets of binary choices and then applying a sequential logit model, which can account for the fact that each subsequent choice is conditional on a previous one.

3   Conceptual Model

The present analysis assumes that women make decisions about taking parental leave and subsequently returning to work in stages rather than at a single point in time. Figure 1 displays a simplified model of how the decision stages can be represented as a three-step decision process, where each decision consists of a set of binary choices.

The analysis focuses on women who are working prior to the birth of a child and who qualify for parental leave. It is beyond the scope of this paper to deal with the problems arising from the selection into such a sample, however, it must be mentioned that at the very minimum results need to be interpreted with caution and cannot be generalized to the whole population of women.

At the beginning all women in the analysis are on maternity leave. This is in line with the legal regulations in all EU-countries where Council Directive 92/85/EEC of 19 October 1992 guarantees all pregnant workers the right of at least 14 continuous weeks of maternity leave. The second decision is conceptualized as the choice between leaving the labour force (at least for a period longer than the duration of parental leave) or remaining in the labour force. Remaining in the labour force is in itself a choice further reduced to two subsequent choices: to resume working immediately after the maternity leave period or to take a fixed-term period of parental leave. Finally, at the end of parental leave women make a choice whether to return to work or to remain outside the labour force for an additional period of time.

The presented conceptual framework makes several simplifications of reality. To begin with parental leave is reduced to a single choice of parental leave, ignoring the fact that it can be taken full-time or part-time. Second, this conceptual model, as in the theoretical framework proposed by (Klerman
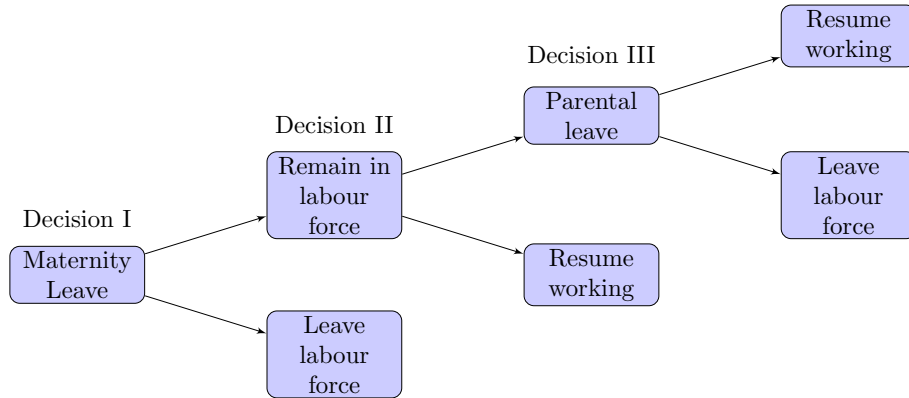
Figure 1: Decisions Diagram

and Leibowitz, 1997), does not make a distinction between the amount of hours worked. Finally, the model disregards the possibility that the father is on parental leave as well as the potential effect of additional children being born during the parental leave period.

4   Variables in the Decision Process

This section explores the variables that from a theoretical perspective or based on previous literature are important in each of the three decision phases. The literature review in this section tries to integrate the findings from studies addressing different phases in the decision process as presented in Figure 1. This has not been an easy task, as an integrated approach has not been very common in the literature. Furthermore academic studies differ in the ways they deal with leave provisions sometimes treating them as periods of employment or non-employment.

4.1   Decision I

At the end of the compulsory period of maternity leave mothers make a decision whether to stay in the labour force or to leave it. In Luxembourg,

this decision must, in fact, be made a bit earlier, as employees must register an application for parental leave at least six months prior to the projected start of the leave[4]. However, the end of the maternity leave is the first time when it is possible to observe the results of this decision. At this stage staying in labour force entails either returning to work immediately or taking parental leave, whereas leaving the labour force is conceptualized as leaving one's job for a longer term (at least longer than the duration of the leave).

As the distinction between leave takers and employees who return to work immediately after maternity leave is made at the next phase of the analysis, at this stage the important question is to consider which employees are likely to leave the labour force. In the theoretical model presented by Klerman and Leibowitz (1997) those would be the employees at the lowest levels of earnings relative to other women in the same situation who have a preference to remain at home for a period of time longer than the offered parental leave and who will not face a considerably lower wage offer if they potentially want to re-enter the labour market after a longer period of time. In the model of Klerman and Leibowitz (1997) these women represent the lower-earning part of the group of women who would leave the labour force in the absence of a parental leave provision.

Therefore to analyse this decision, it is reasonable to consider what factors would lower the opportunity cost of not working, the difference between the pre-birth salary and a potential future salary and at the same time what factors would increase the value of women's time at home and contribute to women's preference to remain outside paid work for a longer period than the one provided by the leave. In terms of variables represented in the analysis, on one side one could position the level of pre-birth earnings (relative to other women), the years of experience with the same job (as an indicator of job-specific labour capital which will be lost if a new job is to be searched upon return to the labour market). Marital status can also be seen as an important factor as the availability of husband's income also contributes to making the period of a longer leave financially feasible. On the other side, variables that would contribute to an increase in the value of a mother's time at home would be the presence of more children in the household and especially if they are younger than school age.

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[4]In this study job-related covariates are measured until the last deadline by which parental leave must have been applied for.

This line of reasoning seems to be supported by empirical research. In the study of Joesch (1994) women's labour market exit decisions at birth are analysed as a result of a comparison of the opportunity cost of not working with the opportunity cost of working. The first concept consists of the potential wage a woman could be working on the labour market and, in addition, the potential depreciation of future earnings due to erosion of human capital and foregone possibilities to accumulate more human capital during the period of absence from the labour force. The second concept uses variables, which increase the reservation wage (for example additional sources of income, such as husband's income or non-wage income) and variables which increase the value of the mother's time at home (number and ages of children, etc.)[5].

In a study analysing mothers' decisions to exit the labour force after birth Hotchkiss et al. (2011) in Georgia, the US, found that variables increasing the opportunity cost of not working, such as higher wages and education, longer working experience and working for larger employers decreases the possibility of a labour market exit after birth. On the other hand, variables increasing the reservation wage or the value of mothers' time at home, such as being married or the presence of other children increase the probability of exit. The study of Hynes and Clarkberg (2005) comparing the characteristics of women whose trajectory followed the pattern of continuous employment even around birth to women exiting the labour force after birth also found that women who are younger, with lower levels of education and who have a non-wage source of income are more likely to exit the labour force after birth. In Spain, the study of Gutiérrez-Domènech (2005) analysed the factors contributing to women leaving the labour force permanently after the use of the compulsory job-protected and paid maternity leave period. The findings suggest that more educated women who also earn higher wages are more likely to remain in the labour force. Furthermore, the analysis highlights the importance of the job characteristics, as women working full-time and with permanent contracts are less likely to exit the labour force.

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[5]See Joesch (1994) for a detailed overview of this theoretical framework.

4.2 Decision II

At this stage of the conceptual model women who have not left the labour force are making the decision about whether to return to work immediately or to take the fixed-term period of parental leave. In the theoretical framework provided by Klerman and Leibowitz (1997) women in the highest earning bracket and whose value of time at home is relatively low should be expected to return to the labour market after the minimum provision of the maternity leave regardless of whether leave is offered or not. Parental leave should be taken by women whose pre-birth wages are lower than the highest earning group, however, also higher than the wages of the women who choose to leave the labour market for an indefinite duration.

Therefore, the hypothesis to be tested here is whether, given that women have remained in the labour market after the end of their maternity leave, women with higher earnings are more likely to return directly to work. It would also be expected that married women are more likely to use parental leave (especially if their pre-birth wage is higher than the parental leave benefit per month) as the potential income of the husband would be helpful in accommodating the period of parental leave with lower income. Finally women who take parental leave are expected to have more children (and or more children under five years old).

It is difficult to find studies in the literature which could be used as foundations for these hypotheses, as very few studies analyse women's labour force participation around the time of birth in relation to parental leave. Most studies focus on employment rates and assume parental leave was used at times when women were not employed.

The study of Han et al. (2009) shows that the introduction of parental leave legislation increased the probability of taking parental leave for women with higher education. Assuming a positive relationship between education and earnings one could expect that these findings can lend partial support to the hypothesis that higher earners are more likely to take parental leave. Additionally the same study found that married women are more likely to use leave than single women.

4.3 Decision III

The third decision analysed in this paper is made by women who have taken parental leave. The decision they make is whether to return to work immediately at the end of the parental leave period or to leave the labour force[6]. It is difficult to find previous literature on this particular decision, as the majority of studies are concerned with the effect of parental leave legislation on return rates and focus on international comparisons (see Pronzato, 2009) or before-after comparisons'(see Ondrich et al., 1996; Lalive and Zweimüller, 2009; Hofferth and Curtin, 2006) whereby it is difficult to know whether leave is actually used or not. Nevertheless, these studies typically find that women's employment rates seem to be lower during the period of paid, job-protected leave available and to increase afterwards, suggesting that the majority of women use the available paid leave and return to work afterwards. Socio-economic characteristics analysed in such studies consistently find that women with higher levels of education (reflecting higher levels of human capital) return to the labour force sooner (Ondrich et al., 1996; Hofferth and Curtin, 2006; Pronzato, 2009). Other variables that might play a role here are the number of children in the household and the general availability of income in the household.

5 Method

5.1 Estimation Strategy

The model used for the empirical estimation in this paper is the model for nested dichotomies presented in Fox (1997). This approach belongs to the general family of dealing with polytomous data and to the specific case where the categories of the dependent variable represent a set of hierarchical

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[6]The idea to analyse this decision comes from a paper using the same data source to analyse the work-family trajectories of men and women in Luxembourg. The empirical evidence in (Zhelyazkova, 2013) suggests that a small fraction of full-time parental leave users do not return to work at the end of the leave period. In the present analysis, I am making the assumption that women are making this decision. However, it is difficult to say whether this is the case. The data show only that women do not return to work. The reasons for this may also be that employers are not respecting the right to return after parental leave. With the data available, however, it is not possible to know.

binary partitions. Fox (1997) provides an example of a situation where this model is applicable by considering employment of women as an outcome variable with three levels: not working, working part-time or working full-time. In this example the latter two categories are in fact divisions of a larger category: "working". Therefore, we can see the decision represented by the outcome variable as two-step process. In the first step the woman decides to work and in the second step, only after on deciding to work, she can choose whether to work full-time or part-time. Therefore the dichotomy of working full time or part time is nested within the working category.

Another example of a situation which can be modelled in the same way is the movement of individuals through different levels of the educational system (Buis, 2010). Each individual can be conceptualized to be making a binary choice (to continue or to stop) at the beginning of each level of education: primary, high school, university level. However, only these individuals who have chosen to continue at the first two levels are making the choice of whether to continue to university or not; this choice is not relevant for the others[7]. Fox (1997) notes that models for nested dichotomies present results similar to the more general models for polytomous data (multinomial logistic regression). Still, the results are not equivalent, as the fitted probabilities based on models for nested dichotomies are computed differently depending on how the binary splits in the dependent variable are conceptualized.

Nested dichotomies were chosen for the analysis in this paper, because the conceptual model of decision-making presented in Figure 1 in fact represents a movement through the successive stages of a process. In the beginning all women are on maternity leave. The first choice they make is whether to keep their relationship with their pre-birth job or to quit it altogether for a period of time longer than the provided parental leave. Women who make the choice to keep the employment relationship make a second choice: to return to work immediately or only after taking leave. Finally women who take the parental leave make a third choice: to return to their work or not.

Following Fox (2002) and Fox and Weisberg (2011), the estimation consists of re-coding the dependent variable, so as to capture the dichotomies at each level. Next an independent binary logit is fit to each subset of the observations for whom a dichotomy is relevant. This means that the de-

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[7]Interested readers are referred to the work of Buis (2010), who applies the same strategy for the analysis of transitions through educational stages in the Netherlands.

pendent variable for the first stage consists of two categories: keep work relationship or leave after maternity leave. The dependent variable for the second stage has two categories: take parental leave or return to work after maternity leave. Women who have already left their employment are not included in this model. The third dependent variable also has two levels: return to work after parental leave or not. Only women who have taken parental leave are included in the estimation of the final model. At each "higher" level the estimated predicted probabilities are multiplied with the probability of "passing" the preceding transition.

The estimation for this paper has been performed with the Free Statistical and Programming Environment R (R Core Team, 2012). The binary logistic regression models have been estimated using the *glm* functions from the Stats packages, which is included with the installation of R (R Core Team, 2012). Results have been prepared for export to LaTeXusing the Xtable package (Dahl, 2012). It is also worth mentioning that a STATA package for the estimation of a sequential logit model has also been developed by Buis (2007).

5.2 Data

Data for the analysis are extracted from anonymous social security records by the *Inspection générale de la sécurité sociale (IGSS)* Luxembourg. In Luxembourg, a social security record is maintained for all employed persons in the country except for these working in the structures of the European Commission or the European Court of Justice. Non-Luxembourgish nationals working in Luxembourg (cross-border workers) also have social security records and are included in the analysis. For the analysis, I selected all records where there was a child born in the fiscal household[8] in 2003 and where the worker would be eligible for parental leave [9]. The final data set used for the analysis contains the employment histories of 5827 men and

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[8]The fiscal households are artificially reconstructed households based on tax-related documents. In rare cases it is possible that children in the fiscal household are not biological children, but children from a prior marriage of a spouse, grandchildren, nieces or nephews.

[9]Eligibility for the leave was defined according to the parental leave eligibility rules of Luxembourg. Mothers who worked for the same employer for a minimum of one year and for over 20 hour per week were considered eligible for taking parental leave.

4481 women, who all had a child born in their household in 2003[10].

Three variables presented a problem for the analysis due to a large number of missing cases. These were the variables measuring the number of children in the household as of 2003, the presence of a spouse and the size of the organization in 2003. These values were missing somewhat systematically due to a lack of administrative record of these individuals for 2003. To deal with this problem without excluding the missing cases from the analysis, missing values were substituted with values for the first available record after 2003. For about half of the observations this was as soon as 2004, however, some records were used from as late as 2007. The variable describing the size of the organization where a person works had an additional large number of missing values, which were not missing due to a lack of record but information was simply not made available in the file. These values were included in the analysis as a separate category of the variable, however, the models I and III did not converge. Finally the missing values were dropped from the analysis. The distribution of the variables used for the analysis (including the values imputed from subsequent records) is displayed in Appendix B.

In addition, the records of women who were predominantly self-employment in 2003 were excluded from the analysis as for them hours of employment were not recorded. In addition the records of these people are somewhat ambiguous as many of them are only in part-time self-employment, which means that covariates may reflect their other position.

5.3   Construction of Dependent Variables

Following the conceptual model presented in Figure 1, I estimate three binary logistic regressions, with three different dependent variables reflecting the outcomes of each decision. The first one models the decision to stay in the labour force or to leave it. Second, conditional on women deciding to not leave the labour force, I analyse the decision to go directly back to work or to take a parental leave. Finally, conditional on women taking the leave, I analyse whether afterwards they return to employment or they leave the labour force.

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[10]The total number of fathers exceeds the number of children born in Luxembourg in 2003 because the data set contains also the career trajectories of cross-border workers.

For analysing decisions one and three, it was important to identify women who leave the labour force. For the analysis women were considered to leave the labour force if they had no administrative record for the major amount of time in the six-month period following the end of their maternity leave. For women who took parental leave, leaving the labour market after the leave was computed in the same way. In addition women who were predominantly unemployed were also considered to be leaving the labour force. This is somewhat ambiguous as unemployed benefits could indicate also part-time unemployment: for example if women were unemployed from one out of two or more jobs. However, the decision was made to include these women among the group who leaves the labour force in order to emphasize the employment discontinuity in their career. The main idea of parental leave is that women can return to their pre-birth employment and it is important to analyse all cases where this is not happening.

It must also be noted that a lack of administrative record could indicate that a woman is performing work in another country. For about half of the records labour market inactivity could be assumed with somewhat greater certainty as they could be matched to a record of co-insurance. A record of co-insurance indicates that a person is insured as the dependent of someone else, meaning most likely that he or she is in the country but not working. For about half of the cases such records were not found. This could mean that the woman is in another country. Again, the decision was made to consider these women as leaving the labour force in order to emphasize the fact that they interrupt their pre-birth employment.

5.3.1   Decision I

The dependent variable in the first regression equation takes that value 0 if women leave their pre-birth employment in the six-month period following maternity leave. Women were assumed to be returning to the same employment as before, although it is not possible to find out exactly whether this is the case. Women were considered to be leaving their pre-birth employment if they had a record of unemployment benefits or had no administrative record (meaning no work performed in Luxembourg) for the larger part of the six-month period following maternity leave. The distribution of the decisions after maternity leave is displayed in Table 2.

	Count	Percentage
Remain in labour force	4050	90.4
Leave labour force	431	9.6
Total	4481	100.0

Table 2: Distribution of mothers' decisions after maternity leave in used in 2003

5.3.2 Decision II

The second decision concerns the use of parental leave, given a decision to not interrupt the pre-birth employment relationship. Subsequently women were assumed to decide whether to resume working immediately or to spend the time allowed by parental leave at home. The dependent variable in this case was computed based on the activity recorded for women in the first month after maternity leave. For simplicity full time and part time parental leave were grouped together. Only women who have decided to remain in the labour force make this decision. The distribution of the decisions is displayed in Table 3

	Count	Percentage
Resume working	1094	27.0
Parental leave	2956	73.0
Total	4050	100.0

Table 3: Distribution of decisions of mothers who remain in the labour force after maternity leave in used in 2003

5.3.3 Decision III

Women who take parental leave make a third decision. At the end of the parental leave, the majority of them return to work[11], however, a small fraction leave the labour force at this point. To determine who leaves the

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[11]The model could be further elaborated by considering whether these women return to work full time or part time, however, this is beyond the scope of this paper.

labour force, the same search algorithm was applied as in Decision I. The final distribution is displayed in Table 4.

	Count	Percentage
Leave labour force after parental leave	394	13.3
Resume working after parental leave	2562	86.7
Total	2956	100.0

Table 4: Distribution of decisions of mothers who take parental leave after maternity leave in used in 2003

For classifying the decisions of women the administrative records for a twelve-month period after the end of the parental leave were used. Women were assumed to leave their pre-birth employment after parental leave, if for this period their predominant status was unemployment (n = 44) or there were no administrative records with or without a record of co-insurance (n = 176, 174).

5.3.4 Are these decisions long term?

Table 5 shows the predominant status of women at the end of the observation period (around 5 years after the birth of the child in 2003) in the analysis across the outcomes of decisions I, II and III described in this section. For simplicity the activities recorded in the administrative records of women have been coded as either in or out of the labour force. All records where the predominant status in the last six months of the observation period have been marked by an absence of a social security record (with or without a record of co-insurance) have been counted as out of the labour force, while all other states have been counted as in the labour force, including unemployment. The results displayed in Table 5 suggest that the majority of women who leave the labour force either after maternity or after parental leave do not return to it in the course of five years. However, a substantial portion of women (over one third) do return to the labour force at a later period of time. At the same time the results show that a small fraction of women who return to their work after these leaves leave the labour force later on. It is beyond the scope of this paper to analyse these subsequent and more complex decisions.

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	Outside labour force (%)	Inside labour force (%)	Total (%)	Total
Leave labour force after maternity leave	54	46	100	431
Resume working after maternity leave	11	89	100	1094
Leave labour force after parental leave	66	34	100	394
Resume working after parental leave	12	88	100	2562

Table 5: The predominant status of women according to Decisions I, II and III (in rows) and during the last six months of the five-year observation period(in columns).

6 Results

The results of running the three binary logit models are displayed in Table 7. The results yield partial support to the proposed hypotheses. The main hypotheses for each decision based on the theoretical framework have and on previous literature have been summarized in Table 6.

6.1 Decision I

Opportunity cost of not-working seems to play an important role in the first decision, as higher earning women are more likely to keep the relationship with their pre-birth employment. As education is missing in the data, it is also possible that to the extent that higher earnings reflect a higher educational attainment these variables also present the effect of education. Women who had more months of uninterrupted employment prior to the start of their maternity leave are also more likely to retain their pre-birth employment relationship. Regarding the value of women's time at work, women who already have two children in 2003 are more likely to leave the labour force than women for whom this is the first birth. These results are in line with the expectation that higher-earning women would be more willing to remain employed after having a child. Another result in line with previous findings is the fact that women employed in larger organizations

Variable	Decision	Hypothesis	Result
Opportunity cost of not working			
Monthly salary before maternity leave	I	Lowest earners most likely to quit, as the have least difference between their pre-birth wage and potentially lower wage offer at return (Klerman and Leibowitz, 1997)	Supported
	II	Highest earners less likely to use leave and more likely to resume working immediately	Partially supported
	III	Same as decision I	Supported
Job-specific human capital			
Years since labour market entry in Luxembourg	I	Women with less experience are more likely to quit, as they have less firm-specific human capital to lose (Klerman and Leibowitz, 1997)	Not supported
	II		
	III	Same as decision I	Supported
Work during pregnancy			
Months of uninterrupted employment in year before maternity leave	I	Women with more interruptions are expected to be more likely to quit work, as more interruptions could signal a lower preference for paid work or the presence of other impairment factors, such as lack of alternative care arrangements for children, health problems, physically demanding work, etc.	Supported
	II		
	III	Same as decision I	Not supported
Value of mothers' time at home/Reservation wage			
Other children in the household	I	More children increase the value of mothers' time at home therefore women with more children should be more likely to quit (Joesch, 1994)	Not supported
	II	Women with more children more likely to need leave	Not supported
	III	Same as decision I	Not supported
Multiple births	I	Same as for other children in household	Not supported
	II	Women with more children more likely to need leave	Supported
	III	Same as for other children in household	Not supported
Married	I	Presence of spouse makes it more likely that women can afford to stop working (Joesch, 1994)	Not supported
	II	Presence of spouse makes it more likely that women can afford to take leave (Han et al., 2009)	Not supported
	III	Same as decision I	Not supported

Table 6: Summary of main hypotheses and results

were more likely to retain their employment relationship. This is often the result in previous studies and the explanation is that larger employers have more flexibility to offer leave or alternative working arrangements to working parents.

Interestingly some other variables were surprisingly not significant. The dummies for the salary growth levels and the variable measuring the years of participation were expected to have a positive effect on retaining the work relationship at this stage, as they reflect the level of work commitment. Another variable, which was expected to be significant based on previous literature was the marital status of the women. It was expected that married women would be more likely to leave their employment due to the income support of their husbands. However, it must be noted that it is not exactly clear what the variable married measures in this case. Luxembourg provides a legal alternative to marriage, known as a *Partenariat (PACS)*, which provides the same tax, civil and social security rights as marriage. However, in the administrative data co-habiting couples are coded as "not married" and it is not possible to find the difference between single and cohabiting fathers. In addition, Luxembourg does not recognize registered partnerships in other countries. Therefore co-habiting couples from other countries are also considered as single persons.

Other interesting results appeared in the dummies controlling for nationality. It seems like workers with Luxembourgish and German nationality have lower probability of keeping their employment relationship relative to workers with other nationalities. Unfortunately it was not possible to control for the cross-border status of the workers or to include their place of residence as virtually all Luxembourg nationals in the data set were also living in Luxembourg, which created a perfect collinearity. However, alternative specifications of the model including only residence showed similar results with women living in France and Belgium having a higher probability to remain in the labour force at this stage and no difference between women living in Luxembourg and Germany.

6.2   Decision II

For the second decision stage, it was expected that women in the highest earning category who have not quit their pre-birth employment, would be

less likely to use parental leave, while women with lower earnings would be more likely to use it. In addition, it was expected that married women would be more likely to use leave, as the potential income of a husband could be helpful in buffering the lower monthly income during the period of leave for women whose earnings exceed the leave benefit. The income-related hypothesis was only partially confirmed, as the odds ratios of the coefficients do get lower for the highest earning groups relative to the lowest earning group (the reference category). However, the variable coefficients are not significant. The variable married is also not significant, however, as explained earlier this variable does not include cohabitation.

Regarding the importance of the value of the time of the mother at home mixed results were obtained. Contrary to what was expected women were more likely to use parental leave for the first child. This is contradicting the idea that women would be more likely to want to use leave if they have more children (higher demand for their time at home). One possible explanation for this result is that the women in this stage of the analysis are not a random sample, but a very select group. These are women who have remained in the labour force despite already having one or two children. This means that they already have access to the necessary resources to deal with caring for another child (for example child-care provided by relatives, stay at home partners, etc.). At the same time, however, the effect of the variable "multiple" births, indicating that either twins or triplets were born is significant and it shows a higher probability of using parental leave. This result could be seen as supporting the idea that the value of a mother's time at home is important in making the decision to use leave, especially given that multiple births can be considered a somewhat random event.

Some interesting results at this stage concern the nationalities: German women have almost six times higher odds than Luxembourgish women to use parental leave, while Portuguese women are more likely to return directly to work without using parental leave.

	Decision I		Decision II		Decision III	
Intercept	0.25	.	3.96	**	3.6	.
Salary: 1000-2000	2.41	**	1.38		1.99	.
Salary: 2000-3000	5.29	***	1.49		2.47	*
Salary: 3000-4000	17.19	***	1.26		5.54	***
Salary: 4000-5000	9.66	***	0.79		5.04	***
Salary: 5000+	13.49	***	0.55	.	3.88	**
Salary growth: Quintile 2	1.21		1.25		0.8	
Salary growth: Quintile 3	1.13		1.01		0.99	
Salary growth: Quintile 4	1.39		1.16		0.98	
Salary growth: Quintile 5	1.04		0.94		1.06	
Hours: Full time	0.93		1.11		1.31	.
Hours: Overtime	1.61	.	0.96		1.09	
Years participation in LU	1.02		1.02		1.05	**
Uninterrupted employment months	1.19	***	0.94	**	1.05	.
Organization: Medium(50-200)	1.42		0.93		1.53	
Organization: Small(<50) or N/A	0.65	.	0.79	.	0.99	
Organization: Very large (1000+)	2.07	**	7.22	***	0.77	
Category: Blue collar	1.59	.	0.42	***	1.06	
Category: Civil servant	0.45	*	0.2	***	1.66	.
Married	0.95		0.98		1.13	
Other children in HH:(1)	0.74		0.51	***	0.97	
Other children in HH:(2+)	0.46	**	0.23	***	0.94	
Male child born in 2003	0.75	.	0.97		1.19	
Twins or triplets in 2003	1.05		2.59	*	0.86	
Nationality: France	4.18	***	0.95		1.96	***
Nationality: Portugal	2.38	**	0.32	***	1.2	
Nationality: Belgium	5.73	***	0.82		1.82	**
Nationality: Germany	1.29		7.05	***	0.62	.
Nationality: Other	2.05	*	0.78		0.7	.
Age in 2003	1.01		1.01		0.95	**
N	3867		3701		2729	
Chi-Square	229.47		945.83		137.93	
df	29		29		29	
p	0		0		0	

Table 7: Results for the estimation in the three decision stages Reference categories: Salary: <1000, Salary growth: Quintile 1, Hours: Part time, Category: White collar, Married: No, Other children in HH:(0), Sex of child born in 2003: Female, Single Birth, Nationality: Luxembourgcodes: *** 0.001, ** 0.01, * 0.5, . 0.1

6.3   Decision III

Opportunity costs seems to play an important role in the third decision. The results are in line with the expectation that higher earning women would be more willing to return to their pre-birth jobs. The odds ratios for all categories have higher values than the reference group of the lowest earners. The variable measuring the years since first time entry into the Luxembourgish labour market, which was introduced as proxy for work experience and job-specific human capital is significant at this stage and it indicates that women with more experience are more likely to return to work after parental leave. Relative to Luxembourgish women, French and Belgian nationalities are more likely to return to work after parental leave, while German women were less likely.

6.4   Graphical Illustration of the Results

The sequential nature of the decisions is reflected in the way fitted probabilities and marginal effects are computed at each step. Figure 2 shows the succession in which fitted probabilities are computed with each other. Following the theoretical expectation that women make decisions in the three stages based on the opportunity cost of not-working and the value of their time at home the fitted probabilities are displayed varying according to number of children, monthly income prior to taking maternity leave and nationality. Nationality was included because it was significant at all three stages. The results are displayed Figure 3[12]

Figure 3 shows that although women have a relatively high probability to remain in the labour force after Decision I, the number of children in the household does play a role. This is especially visible when comparing the probability of remaining in the labour force for women with lower income levels. While the fitted probability for the lowest earners to remain employed is above 70 % if this is their first child, it drops to as low as 50 % in the case of two or more other children in the household. For the highest earning

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[12]For predicting the probabilities continuous variables (age, years of experience) were fixed at their mean levels, while categorical predictors were fixed at the following levels: Luxembourgish nationality, no multiple births, female child born in 2003, married, standard full time (173) working hours, 3rd salary growth quintile, white collar worker, large enterprise (200 - 1000 employees.)
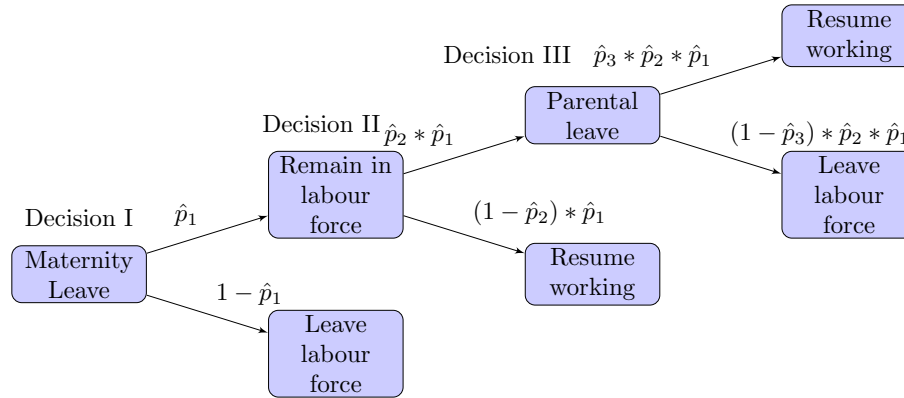
Figure 2: Decisions diagram showing how predicted probabilities are computed
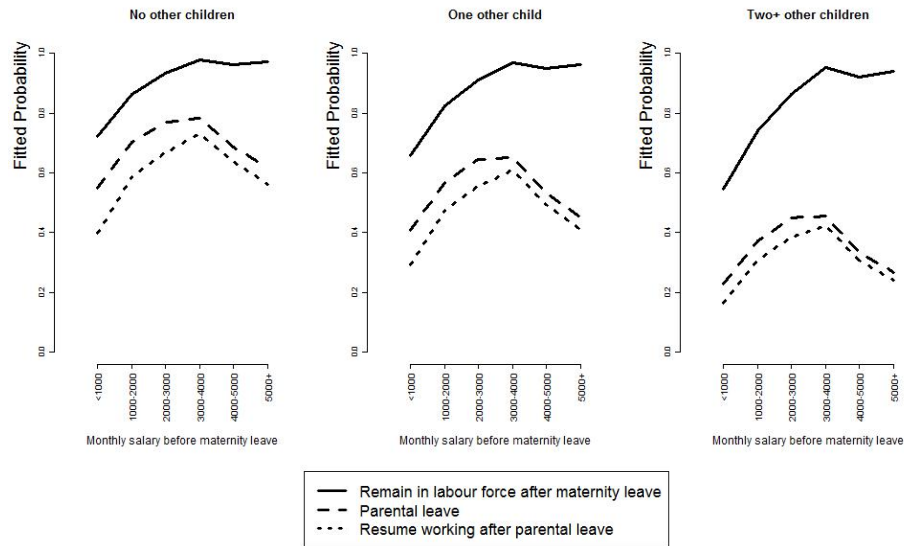
Figure 3: The fitted probabilities for women to make decisions 1, 2 and 3, according to number of other children and their average monthly salary income in the period before taking maternity leave.

Values for the other covariates used: Salary Growth: Quintile 3, Hours: Full time(173), Years of participation: mean, Uninterrupted employment months: mean, Organization: Large, Category: White collar, Married: Yes, Female child born in 2003, Single birth in 2003, Nationality: Luxembourg, Age in 2003: mean

women, however, the probability to remain employed is close to 100 % in all cases.

Conditional on remaining in the labour force, women make a second decision: to take parental leave or to return to work immediately. Figure 3 shows that the effect of income varies non-linearly related to the outcome of this decision. Starting from the lowest earning levels, we see that the probability of taking parental leave increases as income increases. At income levels higher than 3000 - 4000 €per month, however, the relationship takes the opposite direction. As income increases the probability to take leave decreases. These results are somewhat consistent with the predictions from previous literature. Women at the highest earning level have a very high opportunity cost to take leave, so they return directly to work. However, it is somewhat perplexing why women who earn less than the parental leave benefit (<1000 €per month) are the least likely to use leave. One possibility is that they are using the child-raising allowance available in Luxembourg, for which parents are eligible if they make a partial reduction of their working hours.

It is also interesting to note that the shape of the relationship remains the same across the three groups, however, the starting point tends to shift downwards as the number of children in the household increases. This means that women with more children are actually less likely to use parental leave. A possible explanation for these counter-intuitive results could lie in the selected nature of the group of women who already have one or more children in the household. These are women with very high attachment to the labour market, as they have remained employed after the birth of their previous children and they have not left the labour market now. It would definitely be interesting to learn more about this group in future research.

Finally for takers of parental leave, Figure 3 shows that the probability to return to work after parental leave closely follows the probability to take parental leave. It is interesting that women in the highest earning categories have lower probability to return to work than women earning at the medium level. One possible explanation for this result is that only a select group of women is taking parental leave if they are in the highest earning category. Highest earners with the strongest labour market attachment have probably not even taken parental leave. It is also interesting that women in the lowest earning category have the lowest probability to both use parental leave and the return to leave afterwards. There were also some interesting differences in terms of nationality. These are illustrated in Figure 4 in Appendix C.

Relative to other nationalities, Luxembourgish women seem to have the highest probability to leave the labour force after having a child. It is possible that this reflects a selection into working, especially for cross-border workers. It is reasonable to expect that women who commute from another country are more attached to the labour market than women who work in their home country on average. In terms of parental leave use it seems like women of German nationality were most prone to use parental leave, while women of Portuguese nationality were least likely to use it.

7   Discussion

This paper has provided an integrated analysis of women's labour market participation decisions after the birth of a child. The analysis has been based on a conceptual model of the decision-making process involving three steps: the decision to remain in the labour force after maternity leave, the decision to take parental leave and the decision to return to work after parental leave. The analysis has incorporated the sequential nature of the decisions by using the model of nested dichotomies (Fox, 1997), also known as a sequential logit model (Buis, 2010).

The results of the analysis lend partial evidence to economic reasoning about mothers' decisions. The opportunity cost of not working, measured by the pre-birth salary does seem to play an important role in the decisions related to leaving the labour force (Decisions I and Decision III). However, it does not seem to explain decisions related to taking parental leave. Women who have two or more other children are more likely to take leave their employment after maternity leave. Interestingly, however, women seem less likely to use parental leave when they already have other children, provided they have not left their employment. This fact could possibly be explained by selection, as women who already have children and do not leave the labour force possibly have a very strong attachment to the labour force and/or have found ways to combine parenthood and employment. Multiple births make it more likely that a mother would use leave, however, it does not seem to play a role in returning to work after parental leave.

The variable capturing previous experience was also statistically significant and indicated a positive association with return to work after parental leave.

This is consistent with the hypothesis derived from the theoretical framework of (Klerman and Leibowitz, 1997), although the hypothesis that women with less experience are more likely to quit after maternity leave has not been confirmed.

The variable measuring the number of uninterrupted employment months in the twelve-month period prior to the start of the maternity leave was intended as a measure of labour market attachment. The variable was significant in Decisions I and II and approaching significance for Decision III, which is consistent with the expectations. Similar results have been found in other studies, albeit with using slightly different variables. For example Joesch (1994) found that work status during pregnancy to be one of the major predictors of women's work after birth. Similarly in both Norway and Sweden Ronsen and Sundstrom (1996) have found that the proportion of time during pregnancy worked is significantly and positively associated with the probability of return to work after having a child.

The study has also revealed some interesting nationality differences between women. Given the fact that a large proportion of foreigners in Luxembourg are labour migrants or cross-border workers, the differences between foreign and Luxembourgish nationals is to be expected. One possibility, as suggested in Brosius and Ray (2012) is that foreign workers may have a lower reservation wage than natives.

Finally, the study can be improved in a number of ways. To begin with, the analysis would greatly benefit from the possibility to include a variable measuring education. It would also be valuable to add some more information about the earnings of the spouse and his use of parental leave. It would also be a possible direction for future research to extend the decision model to include a distinction between full-time and part-time parental leave, as well as to explore the reduction of working hours as a longer-term work-family reconciliation strategy of mothers.

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A   Description of covariates

Table 8: Description and construction of covariates

Variable	Notes
Work related covariates	
Monthly salary prior to the birth in 2003	
Categorical variable with 6 levels.	This variable was constructed by taking the average of the monthly salary-related income received 12 months prior to the start of the maternity leave for mothers in 2003. Salary-related income was converted to 2005 Euro values using the monthly *Harmonized Consumer Price Indices (HCIP)* provided by Eurostat[13] for Luxembourg. The variable was categorized so that non-linear effects could be captured and the effects of extreme observations can be eliminated.
Salary growth prior to the birth in 2003	
Categorical variable with 5 levels based on a quintile division.	This variable was constructed based on the deflated values of salary-related income for the period of 12 months prior to maternity leave. The average salary growth was computed using the following formula: Average monthly growth from period t to period s = $(\frac{wage_t}{wage_s})^{\frac{1}{t-s}}$
Uninterrupted employment months	
• Min = 0 • Max = 12	This variable counts the months in which the parent had a status of "employed" without any interruptions, such as sick leave, family leave, unemployment, etc. The variable counts the months with uninterrupted employment for the period of 12 months prior to the maternity leave
Working hours per month	

<div align="right">continued ...</div>

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[13]http://epp.eurostat.ec.europa.eu/

Variable	Notes
• Part time • Full time • Overtime	In Luxembourg the standard full time contract is considered to be 173 hours per month. Part-time and overtime codings were thus created relative to this number. For blue collar workers the hours of work are usually recorded exactly, while for the others the hours of work are more likely to reflect contractual hours and not actual hours of work.

Years since entry in Luxembourg labour force

• Recorded in years	This variable was constructed as a proxy for working experience. The variable was constructed by subtracting the year when the parent had an administrative record in Luxembourg for the first time from 2003. The variable is only a partial indicator of working experience, because it does not account for working interruptions since the first point of entry into the Luxembourgish labour force or for experience acquired in other countries.

Workplace

Type of employment

• White collar • Civil servant • Blue collar	Variable constructed based on the 12 months prior to the start of the maternity leave for women and 12 months prior to the birth in the household for men. In cases of multiple employers with different categories, the category reflecting longest hours worked was chosen.

Family related characteristics

Married

Variable	Notes
• Yes (Married) • No (Single)	Luxembourg provides a legal alternative to marriage, known as a *Partenariat (PACS)*, which provides the same tax, civil and social security rights as marriage. However, in the administrative data co-habiting couples are coded as "not married" and it is not possible to find the difference between single and cohabiting parents. In addition, Luxembourg does not recognize registered partnerships in other countries. Therefore co-habiting couples from other countries are also considered as single persons.
Other children in the household as of 2003	
• No • Yes	This variable describes whether in 2003 there were already any other children below 18 years of age living in the same household as the parent. The count excludes the baby born in 2003. The records do not distinguish between biological children or other children (e.g. step-children, siblings, etc.) living in the household.
Child sex	
• Female • Male	For this variable, information from the annualized IGSS records was used. In the case of twins or triplets the sex of the child was chosen randomly.
Multiple births	
• No (single birth) • Yes (twins or triplets)	For this variable, information from the annualized IGSS records was used. The majority of births were single births. Twins and triplets were grouped in the multiple births category.
Socio-demographic controls	

Variable	Notes
Nationality	
• Luxembourg • France • Portugal • Belgium • Germany • Other	This variable was constructed based on the annualized IGSS files. There were no instances of changes in nationality during the observation period. Values of 2003 were used.
Age	
• Recorded in years	Age was measured in 2003. This variable was constructed using the information on year of birth for each parent.

B   Distribution of covariates

Variable	Decision I			Decision II			Decision III		
	0	1	N	0	1	N	0	1	N
Monthly salary prior to the birth in 2003									
<1000	34.70	65.30	167	57.80	42.20	109	37.00	63.00	46
(%) 1000-2000	16.40	83.60	1311	32.80	67.20	1096	19.00	81.00	736
(%) 2000-3000	7.30	92.70	1005	20.20	79.80	932	14.90	85.10	744
(%) 3000-4000	3.40	96.60	783	17.60	82.40	756	7.40	92.60	623
(%) 4000-5000	3.90	96.10	533	25.00	75.00	512	8.30	91.70	384
(%) 5000+	3.10	96.90	451	33.90	66.10	437	9.30	90.70	289
Salary growth prior to the birth in 2003: Quintiles									
0-20	11.80	88.20	816	29.90	70.10	720	13.70	86.30	505
(%) 20-40	7.90	92.10	796	25.40	74.60	733	13.90	86.10	547
(%) 40-60	8.30	91.70	860	24.60	75.40	789	12.80	87.20	595
(%) 60-80	7.60	92.40	853	24.50	75.50	788	12.10	87.90	595
(%) 80-100	9.30	90.70	818	27.10	72.90	742	12.60	87.40	541
(%) Missing	34.60	65.40	107	44.30	55.70	70	30.80	69.20	39
Monthly hours prior to the birth in 2003									
(%) Part time(<173)	15.10	84.90	1656	29.90	70.10	1406	17.50	82.50	985
(%) Full Time (173)	5.90	94.10	1838	22.90	77.10	1729	9.90	90.10	1333
(%) Overtime (173+)	6.40	93.60	755	28.70	71.30	707	13.70	86.30	504
(%) Missing	100.00	0.00	1			0			0
Years since first entry into Luxembourg labour force									
Mean	7.90	7.50	4237	7.40	7.50	3832	7.30	7.60	2814
SD	4.50	4.10	-	4.10	4.10	-	4.40	4.00	-
Uninterrupted employment in 12 months prior to maternity leave in 2003									
Mean	8.80	10.30	4250	10.00	10.40	3842	9.80	10.50	2822
SD	3.30	2.60	-	2.80	2.60	-	3.10	2.50	-
Organization size									
(%) Large: 200-1000	5.50	94.50	613	39.20	60.80	579	10.50	89.50	352
(%) Medium: 50-200	4.30	95.70	514	38.40	61.60	492	8.30	91.70	303
(%) Micro/Small <50 or Not Appl	9.00	91.00	857	45.30	54.70	780	12.60	87.40	427
(%) Very Large: 1000+	2.70	97.30	1977	12.10	87.90	1923	12.80	87.20	1690
(%) Missing	76.50	23.50	289	26.50	73.50	68	80.00	20.00	50
Employment category in 2003									
(%) White collar	6.80	93.20	2778	20.50	79.50	2590	12.20	87.80	2059
(%) Blue collar	16.70	83.30	1019	43.20	56.80	849	21.00	79.00	482
(%) Civil servant	11.00	89.00	453	30.30	69.70	403	7.50	92.50	281

Variable	Decision I			Decision II			Decision III		
	0	1	N	0	1	N	0	1	N
Other children in household in 2003									
(%) None	6.90	93.10	2483	20.70	79.30	2312	12.10	87.90	1834
(%) One	10.60	89.40	1386	31.20	68.80	1239	15.40	84.60	852
(%) Two+	23.10	76.90	377	53.40	46.60	290	15.60	84.40	135
(%) Missing	75.00	25.00	4	0.00	100.00	1	0.00	100.00	1
Sex of the child born in 2003									
(%) Female	9.20	90.80	2060	26.40	73.60	1870	14.20	85.80	1377
(%) Male	10.00	90.00	2190	26.70	73.30	1972	12.30	87.70	1445
Multiple births in 2003									
(%) Single birth	9.50	90.50	4167	26.80	73.20	3770	13.20	86.80	2760
(%) Twins or triplets	13.30	86.70	83	13.90	86.10	72	14.50	85.50	62
Multiple births in 2003									
(%) Luxembourg	13.90	86.10	1349	22.30	77.70	1161	12.00	88.00	902
(%) France	4.20	95.80	1088	22.00	78.00	1042	10.00	90.00	813
(%) Portugal	14.20	85.80	564	50.80	49.20	484	17.60	82.40	238
(%) Belgium	3.70	96.30	602	26.40	73.60	580	9.60	90.40	427
(%) Germany	6.60	93.40	196	3.80	96.20	183	24.40	75.60	176
(%) Other	12.70	87.30	448	32.20	67.80	391	21.90	78.10	265
(%) Missing	66.70	33.30	3	0.00	100.00	1	0.00	100.00	1
Age in 2003									
Mean	31.10	31.70	4247	31.70	31.70	3841	32.00	31.60	2821
SD	4.80	4.40	-	4.60	4.40	-	4.70	4.30	-

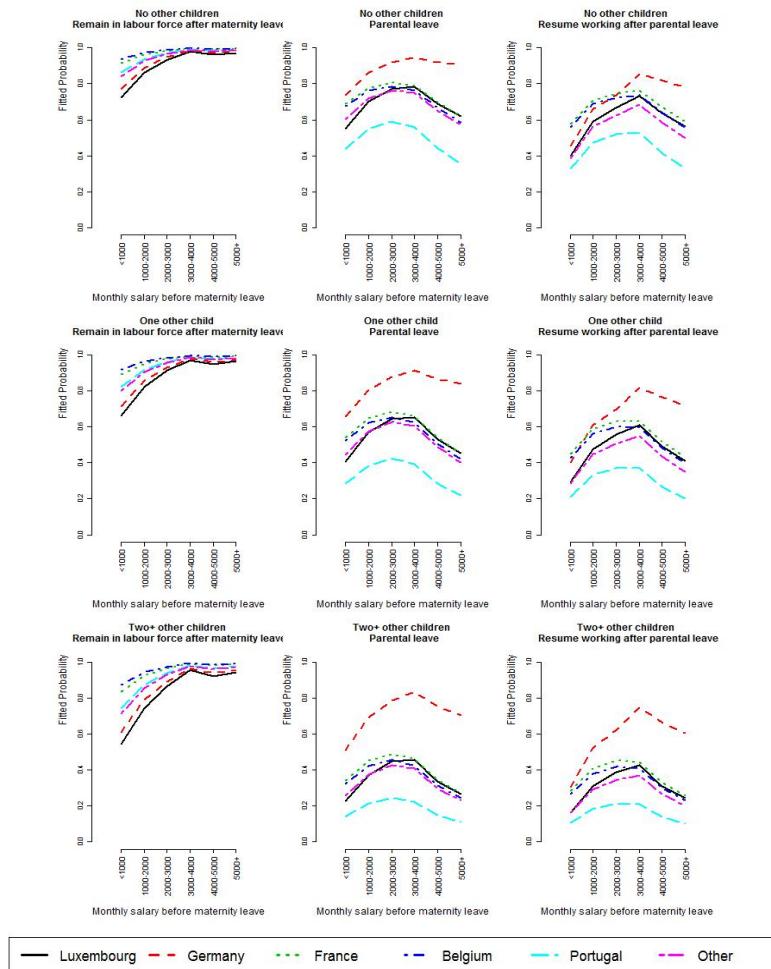# C Graphical illustration of results including nationality differences

Figure 4: The fitted probabilities for women to make decisions 1, 2 and 3, according to nationality, number of other children and their average monthly salary income in the period before taking maternity leave.
Values for the other covariates used: Salary Growth: Quintile 3, Hours: Full time(173), Years of participation: mean, Uninterrupted employment months: mean, Organization: Large, Category: White collar, Married: Yes, Female child born in 2003, Single birth in 2003, Age in 2003: mean

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