Uptake of Parental Leave and Effects on Second Birth Hazards in Belgium, France and Germany: A Shared Frailty Approach

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Abstract

The impact of policy uptake on childbearing has hitherto largely been neglected in most contributions. This paper studies the impact of leave-taking for the first child on second birth hazards in Belgium, France and Germany using a shared frailty approach which allows to control for unobserved heterogeneity. Results show a positive relation between uptake of leave policies and second births. Controlling for selection attenuates the positive association, but the effect remains significant. While leave-taking is much more prevalent among higher educated women, the effect of parental leave on parity progression is similar across educational groups. Although additional efforts are required to distinguish causal effects from self-selection, which presents an ongoing source of concern in research focusing on the effects of family policies, we also identify design features of parental leave schemes and differential uptake of family policies as relevant routes for future research.

Keywords: second birth – family policy – parental leave – policy uptake – Europe – shared frailty

1. **Introduction**

The investigation of family policy effects on childbearing behaviour has been high on the demographic research agenda for decades. The emergence of a positive association between fertility and female employment in OECD countries suggests that family policies have played an important role in reducing the 'parent-worker' conflict (Ahn and Mira 2002). However, research based on aggregate-level indicators and research based on individual-level data have both suggested that the (positive) correlation between various family policies and fertility outcomes is typically small, and that available studies yield mixed results. This inconclusive body of research may be fuelled by the wide range of research designs which have been adopted in order to look into the effects of family policies on fertility (see Gauthier 2001, 2007 for an overview). Recent reviews of the literature on policy effects have unveiled that population heterogeneity has hitherto not been addressed sufficiently (Gauthier 2007; Neyer and Andersson 2008; Mills et al. 2011; Sobotka 2011; Luci and Thévenon 2012). As a result, recent research has focussed more on individual-level fertility rather than aggregate measures in order to investigate effects of family policy by population subgroups. Whereas a considerable amount of publications aim to capture the effect of aggregate-level family policy on micro-level childbearing decisions, very few aim to assess the effect of family policy uptake at the individual level.

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This paper focuses on parental leave schemes as a type of family policy which can facilitate the combination of childrearing and labour market careers (Thévenon 2011). Although some researchers indicate the absence of a relation between parental leave payments and fertility (Gauthier and Hatzius 1997; Hilgeman and Butts 2009; Kalwij 2010), most research finds positive effects (Vikat 2004; D'addio and d'Ercole 2005; Lappegard 2008; Luci and Thevenon 2012). Well-known findings are the effects of the Speed premium on the timing of the second and third birth in Sweden (Hoem 1993; Andersson et al. 2006) and Austria (Hoem et al. 2001; Lalive and Zweimüller 2009; St'astna and Sobotka 2009). Concerning the impact of duration of leave research has found significantly negative effects (D'addio and d'Ercole 2005; Hilgeman and Butts 2009), non-effects (Gauthier and Hatzius 1997), and significantly positive effects (Luci and Thevenon 2012).

In comparison to the number of studies addressing the effects of leave availability at the aggregate level, few contributions have been made investigating the impact of leave-taking at the individual level. Although a number of studies have investigated the effect of uptake of parental leave after the first birth on continued childbearing (see, for example, Duvander and Andersson 2005; Duvander et al. 2010; Andersson et al. 2011), these studies have primarily considered Nordic European countries. For France, Thévenon (2011) states that recent studies have considered the effect of specific work-related policies on labour market participation of women, whereas only one has focussed on fertility. A second shortcoming is that available studies — acknowledging that uptake of parental leave is likely to be correlated with higher fertility desires — rarely attempt to separate selection effects into leave-taking from causal effects (Aassve and Lappegård 2010; Duvander and Andersson 2005; Duvander et al. 2010).

The aim of this article is to investigate the effect of leave-taking for the first child on second birth hazards for Belgium, France, and Germany. Among other common features these conservative corporatist welfare regimes are characterized by the reliance on the male-breadwinner model[2], and an intermediate position in terms of family policy generosity (more generous than Southern European countries while less generous compared to Nordic European countries) (Esping-Andersen, 1990; Morel 2007; Thévenon 2008). Morel (2007) shows that these three countries have also witnessed a similar pattern of family policy reforms. Due to high unemployment levels during the 1980s and 1990s women were discouraged to participate in the labour force and care for children was shifted to the familial and private sphere (e.g. parental leave benefits). However recent reforms have introduced a U-turn in family policy, re-emphasizing the importance of labour market participation of women (e.g. through formal childcare) (Morel, 2007).

Despite the similarities, these three countries provide interesting differences concerning parental leave and the family policy context it is embedded in. First, while parental leave benefits in Belgium and Germany are low (Morel 2007; Klüsener et al. 2013), France until recently did not provide any benefits for leave-taking for the first child (see 2.2). Second, Belgium and France differ from Germany as preschools (for children aged three or older) are a part of the national school system and day-care services for children under three were developed rapidly during the 1970s and early 1980s. Thévenon (2011) notes that in France the extensive provision of child-care and preschool services encouraged women with one child to remain in (full-time) employment. Belgium and France display a contradictory mix of family policy with childcare services allowing the care for children to be outsourced, and cash benefits encouraging women to stay at home. Germany displays family policy which more strongly relies on the male-breadwinner model and until recently mothers with small children were not expected to work (Morel 2007; Thévenon 2011; Klüsener et al. 2013).

The paper contributes to the literature in several ways. First, we document the effect of parental leave on family formation for countries that have hitherto not been considered in the literature. Second, we adopt a shared frailty approach which allows to control for unobserved characteristics

[2] For instance, these countries are characterized by relatively underdeveloped policies promoting women's employment. In the 1960s "guest" workers were chosen instead of drawing on the domestic reserve of labour of women as Scandinavian countries did. Also these countries show tax-splitting system for married couples favour single earner couples or couples with a large income differential (Morel 2007).

which may affect both leave uptake and parity progression. Finally, we consider variation in the effect of leave uptake by sex, age, education, and country.

The paper is structured as follows. Section two discusses leave schemes in the countries and time-frames studied. Section three develops a behavioural framework connecting leave schedules and second births. We present our main research questions in section four. The data and method used in this paper are presented in section five whereas results are discussed in section six. Finally our main conclusions are drawn in section seven.

2. Leave schemes

2.1 Belgium

In Belgium generally two possibilities were introduced concerning career-interruption in order to take care of children. The first system is Time Credit[3]. Generally Time Credit allows for a temporal reduction or even interruption of labour market activities for any type of reason (care for children, travelling, education, etc.). During the interruption the employee receives a benefit and is protected from job-loss. The system of Time Credit was introduced in 1985 during the government Martens (1981-85) in a period of high unemployment. Hence at the time this measure aimed to stimulate participation in the labour market of unemployed persons by means of employment rotation. Since 1985 employees, if approved by the employer, can partially or fully interrupt labour activity. They receive a benefit (set at the lowest level of unemployment insurance which is for an unemployed cohabiting person) while their position is temporally taken by an unemployed person. In addition to the benefit provided by the federal institutions, since 1994 the Flemish government also provides a benefit[4] for people living in the region. During the 1990s the system was extended with three more specific leave legislations: (i) leave in order to provide palliative care (1995), (ii) parental leave schedules (1997, cf. infra.), and (iii) leave to care for seriously ill relatives. In 2002 changes to the system occurred for employees in the private sector. From then on the replacement of an employee on leave by an unemployed person is no longer a requirement for the employee to receive a benefit. Further the private sector witnessed a cutback in the range of possible degrees of employment reduction, a decrease of the maximum duration of leave[5], and a limitation was set to the amount of employees taking leave at the same time within one company (Falkner et al. 2002; Neyer 2003; Desmet et al. 2007; Morel 2007; Ray 2008; Merla and Deven 2013).

The second system, which was already mentioned above, is the system of parental leave which allows to take up leave before and after a birth. This system is basically a more specific type of leave which was introduced by the Royal Decree of 29 January 1997 shortly after the 1996 European commission's parental leave directive (Falkner et al. 2002). Leave is an individual entitlement and the Flemish government pays an extra benefit for citizens of Flanders (cf. amounts mentioned above). During the late 1990s and 2000s changes in the system occurred particularly affecting the age of the child up to which parents can take parental leave (from four to six years in 2005, to twelve in 2009) and the range of degrees of labour reduction. Whereas the original legislation in 1997 offered a three-month labour interruption, the 1998 Royal Decree allowed two options: (i) suspend the execution of his/her employment contract for an uninterrupted period of three months or (ii) a 50 per cent reduction of working hours under a part-time contract for an uninterrupted period of six months. In 2002 a third option became available: (iii) a 20 per cent reduction of working hours for 15

[3] Up to 2001 the system was called "loopbaanonderbreking" [career break]. Thereafter the system was called "tijdskrediet" [time credit] in the private employment sector whereas in the public sector the name remained "loopbaanonderbreking". For simplicity we will consistently refer to it as the Time Credit system.

[4] The amount of benefit depends on which sector one is employed in (public, private or social profit sector). In 2004 the average benefit received was respectively €71, €89, and €246 for the public, private, and social profit sector. Additional benefits were introduced respectively in 1995, 2001, and 2002 (Desmet, Glorieux et al. 2007).

[5] One year if not extended to five years in a collective labour agreement compared to six years in the public sector.

months. In 2005 legislative changes allowed parents to split up the periods depending on the sector of employment and previous work history (Desmet et al. 2007; Morel 2007; Ray 2008; UNECE 2012; Merla and Deven 2013).

2.2 France

In France a 1977 legislation introduced parental leave for employed parents. This leave could be taken after maternity leave for two years and no payment was provided, though job protection was guaranteed during the whole period. The only requirement was that the employee needed to be working at the company for at least one year. Further the leave could be taken by fathers only if the mother declined her right. In 1984 fathers became eligible to two years of leave and the degree of job protection was decreased as dismissal for reasons not related to the leave was made possible. In 1985 a child rearing benefit (“Allocation Parentale d'education, (APE)”) (i.e. a non-taxable amount of about €225 per month for a maximum of two years[6]) was introduced for people with at least three children one of which needs to be aged under three years old. In order to receive the benefit women needed to work at least two years in the last five years before birth[7]. A partial payment was provided to part-time workers and the benefit was a flat-rate family entitlement. The goal of this new policy was to encourage both third births as well as encouraging women to withdraw from the labour market (Morel 2007; Thévenon 2011).

In 1994 the APE also became a possibility for two-child households if the second child was aged below three years old and the parents must have worked at least two years in the last five years before birth. For third births the requirement from now on was that the youngest child needs to be under the age of three and parents need to have two years of work experience over the last ten years. This extension[8] of leave policies was forged by an urge felt by the government to lower unemployment rates for men by freeing up jobs. Between 1994 and 1997 the number of women receiving the APE benefit tripled and the number of two-child women in the labour force dropped by 16 per cent. It has been shown that this strategy of stimulating active mothers to stay at home after maternity leave or reduce economic activity is particularly successful among poorly qualified or low-income mothers (Fagnani 2002; Morel 2007). Since the beginning of the 2000s seemingly progressive reforms have taken place, the introduction of a 14 days paid leave for fathers for instance.

In 2004 the APE was replaced by the “Complément de libre choix d’activité (CLCA)”. This new system introduced paid parental leave also for first children for six months after maternity leave. For second and higher-order children leave is paid up to the third birthday. The reforms in 2004 put high emphasis on promoting free choice between combining work and family or retreating from the labour force in order to take up care. Benefits include a birth allowance (€800 plus an additional means-tested benefit of €160) and an additional ‘free choice supplement’ which can be used for paid leave or to help cover costs of a nanny or childminder (Fagnani 2002; Falkner et al. 2002; Ray 2008; Thévenon 2011; UNECE 2012; Fagnani et al. 2013).

2.3 Germany

Parental leave in East-Germany (former GDR) goes back to 1972 when paid leave for single mothers was introduced in case no place in day care was available. Also since 1972 mothers of three or more children are entitled to reduce working hours. In 1976 this parental leave schedule was extended to one year of paid leave for mothers with two or more children. In 1984, 18 months of paid leave for mothers with three or more children were provided, whereas two years later legislation introduced one year of paid leave for all mothers (UNECE 2012). In East-Germany the system of leave taking coexisted with a strong reliance on nurseries in line with other communist states.

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[6] In 1986 the maximum duration was extended to three years since the number of women taking up the benefit was surprisingly low (Morel 2007).

[7] Originally the requirement a parent applying for the APE needed to fulfil was that one needed to have had worked at least 24 months out of the previous 30 months. However due to a disappointingly low number of mothers taking leave in 1986, eligibility was extended (Morel 2007).

[8] The amount of the benefit was also doubled compared to the 1985 value.

In West-Germany (former FRG) the 1986 act on Child Benefit ("Bundeserziehungsgeldgesetz") introduced a job protection of one year during which a mother or father can take leave ("Erziehungsurlaub"). This act was introduced in a period of high unemployment and the explicit aim was to encourage women to take up the caring function and withdraw from the labour market (Morel 2007). The leave can be taken for three years when maternity leave is exhausted and the period of financial compensation (i.e. a flat-rate benefit of around €300 a month which after six months is reduced according to income) lasts for ten months. In addition, a variant of the leave concerning part-time activity of the parent is possible with the employer's approval. This parental leave schedule can only be used by parents who are in an employment relationship (Falkner et al. 2002; Geisler and Kreyenfeld 2011; UNECE 2012).

In 1990[9], both the period of leave and payment in Germany were extended respectively to 24 and 18 months. The duration of job protection and leave-taking was extended to 36 months and the duration of financial compensation is 24 months for children born after the first of January 1992. No state support was provided in terms of financial compensation for the third year of leave, however some regional governments (Länder) did provide additional support. The 1992 act of change also allowed non-married fathers without child custody to take up leave if the mother agreed. The change in 2001 allowed both parents to take leave at the same time and also extended eligibility of the parental leave arrangements to all parents who do not work more than 30 hours a week, whether or not they are in an employment relationship. Parents were given the possibility to take up the third year of leave until the eighth birthday of the child and part-time work combined with leave is extended[10] which can be seen as a way to further flexibilise the labour force (Falkner et al. 2002; Morel 2007; Ray 2008; Geisler and Kreyenfeld 2011; UNECE 2012; Blum and Erler 2013).

3. Theory

Due to its inherent flexibility, the theory of the 'new home economics' (Becker 1981; Cigno 1991) remains applicable widely in demography without altering the central ideas (Ghysels 2004). Children are seen as costly but desired goods and decisions on childbearing are rational actions based on costs and benefits within the household production model. Economic theory distinguishes an *income* effect and the effect of *opportunity costs* which is related to the intrahousehold time allocation (Becker 1960). As income rises, the demand for children will grow and as child related (opportunity) costs rise, the demand for children will decline. Thus the balance between income and child related costs determines whether or not parents progress to second births. However, a quantity-quality swap — meaning that higher income can also be used to enhance the quality of the upbringing rather than having another child — does complicate the effect on childbearing.

3.1 Use of leave

Literature relating parental leave availability to fertility indicates that the uptake of leave by parents entails an easier combinability of work and family (Gauthier 2007; Mills, Rindfuss et al. 2011; Klüsener et al. 2013). This combinability in turn leads to lowering opportunity costs and a higher second birth risk. In line with this reasoning Duvander and colleagues (2010) find a positive effect of uptake of long leaves on third births for women.

However – depending on the legislation in the country or region considered – the use of parental leave temporarily leads to a lower income and – depending on the work setting – parents who take up parental leave could witness penalties in terms of future labour market prospects. Although

[9] After the collapse of the communist regime East-Germany adopted the West-German social system. However East-Germany did provide a short-term working benefit to workers taking time off due to child-related reasons which was more generous and more widely applicable compared to West-Germany. The differences in social and economic policy between East- and West-Germany are due to the cumbersome political negotiations regarding harmonization of social and economic policies after 1989 (Donnelly 2012).

[10] The amount of hours of part-time work while taking leave was increased from 15 to 30 hours per week (Morel 2007.

negative side-effects in terms of income and leave experience can be thought of, we expect that the positive effect of combinability outweighs the former since in many cases negative effects of leave uptake on future work opportunities will be anticipated. Persons who expect to face negative consequences of leave uptake (e.g. due to the rigidness of the corporation or low income compensation) plausibly will forgo leave uptake in the first place.

Hence an understanding of which factors determine uptake of leave is necessary since the group of leave-users potentially is a selective group. The uptake of leave typically depends on the availability of leave schedules, but also on (i) the eligibility to these schedules, (ii) the acceptance of the work environment, (iii) financial affordability of leave, (iv) personal preferences, and so on. This gives rise to selection effects influencing the effect of leave-taking on fertility depending on the research design. First, when unable to single out people who are not eligible for leave schedules, the effects of leave-taking on fertility will also represent effects of characteristics which constitute eligibility requirements. Second, since the decision to take up leave also potentially depends on corporate-level factors (e.g. norms towards leave-taking, supervisors' attitudes), the group of people taking up leave is likely to be employed in a setting which is relatively favourable towards employment reduction. A third possible selection effect depends on the benefit received when in parental or childcare leave. Whenever the income replacement is low affordability becomes an issue towards the decision whether or not to take up leave. Hence in this case the effect of previous leave taking may also reflect an income or wealth effect. Fourth, the uptake of childcare/parental leave is likely to be positively related to childbearing intentions. Hence positive effects of leave on further childbearing can also be due to self-selection of people into different modes of behaviour (Duvander and Andersson 2005; Duvander et al. 2010). One of the contemporary challenges in the investigation of effects of leave policies on fertility is to further develop and implement various modelling techniques in order to distinguish causality from self-selection (Neyer and Andersson 2008). Contributions investigating the effect of leave-taking on further childbearing for men or women, and others relating household-level dimensions of gender equality to continued childbearing cannot make hard claims on the causality of associations found (Duvander and Andersson 2005; Duvander et al. 2010; Andersson et al. 2011). Since people select themselves into different modes of behaviour, men/women taking up leave or couples displaying gender equal task divisions in the household are likely to differ in unobserved characteristics which potentially affect further fertility decisions as well.

3.2 Use of leave by fathers

For fathers we also assume that the aforementioned effects play. Furthermore, fathers' uptake of leave also indicates an aspect of gender equality (Duvander and Andersson 2005; Duvander et al. 2010). The use of fathers' leave in the context of dual-earner families can be a crucial step toward gender equity in family-oriented institutions (McDonald 2000). This in turn lowers opportunity costs especially for women who have been found to continue to take up the majority of household and childrearing tasks (Pott-Buter 1998; McDonald 2000; Fagnani 2002; Kreyenfeld 2002; Sobotka 2004; Buchholz et al. 2009; Miettinen et al. 2011). Duvander and Andersson find a positive effect of a father's leave on second and third births in Sweden, although the effect disappears in case of very long leaves. They assume that paternal involvement in leave-taking reflects (i) a more compatible context for women's labour force participation and childbearing and (ii) a higher interest of the father toward continued family formation. Similarly Duvander and colleagues (2010) find that for Norway and Sweden fathers' parental leave use is positively associated with second and third births. We do note that since leave generally is not full paid, differences in salary between men and women may prevent men from taking up parental leave (Lapuerta et al. 2010).

3.3 Institutional setting

The institutional setting in which the decision whether or not to take up leave is made also determines the nature of the effects of the use on further childbearing. First, the rate of income replacement varies by country, which entails varying impacts on the income-cost balance of childbearing decisions. Also the range of possible rates of employment reduction and the length of leave depend on the country considered. Third, as single family policy measures do not operate in a vacuum, the broader family policy context may impact the effects of parental leave uptake on second births. The relation between uptake of parental leave on the one hand and childbearing on the other is likely to be dependent on the occurrence of other alternatives (e.g. (in) formal childcare).

3.4 Negative side-effect of leave-taking

Finally we note that leave-taking may have an ambiguous effect on second births due to the fact that people can postpone a second birth to the point at which they become eligible again. The occurrence of leave-taking for the first child is likely to reflect the ambition to take leave for the second child in case the experience was positive. Though in case a person is not yet eligible[11] to take leave for a second time, a rational strategy would be to postpone the second birth until eligibility is recovered (e.g. through sufficient work experience,..) (Luci and Thevenon 2012).

4. Research questions

This paper aims to investigate the effects of leave-taking on second birth hazards in Belgium, France and Germany. Resulting from the aforementioned theoretical considerations the following research questions are formulated:

i. *What is the effect of childcare/parental leave uptake of respondents and their partners on second births?*
ii. *To which degree do the effects of childcare/parental leave uptake on second births change when controlling for self-selection?*
iii. *Do the effects of childcare/parental leave uptake on second births vary by sex, age, and educational group?*

5. Data and Methods

5.1 Microdata

The analyses use longitudinal microdata on uptake of parental leave and parity progression drawn from the Generations and Gender survey (GGS) in Belgium, France and Germany. Second births will be modelled for men/women aged 15-49. The beginning of the period considered in the analyses depends on the year of introduction of leave schemes (Belgium: 1985, France: 1977) and is set to 1990 for Germany due to the specific nature of Germany before reunification. The end of the period is determined by the survey date of the country (Belgium 2008-2010, France 2005, Germany 2005). The GGS provides information on whether or not childcare/parental leave was used for the first child[12]. Both uptake of childcare/parental leave of the respondent and his/her partner is reported which allows an investigation of uptake effects of respondent and partner. Unfortunately duration or timing of leave-taking is not included in the data which prevents us from investigating the effect by duration of leave-taking or the effect of timing of leave-taking. Also histories of activity status and household income are not sufficient to distinguish effects of leave-taking from the self-selection due to eligibility (and the socio-demographic characteristics which constitute eligibility requirements) and

[11] Parental leave in France for the first child requires that the employee has been working in the company for at least one year whereas the requirement for paid parental leave for the second child is that one has worked two out of five years before the birth (see 2.2). Hence it is possible that a women who has taken parental leave for the first birth needs additional work experience in order to ensure paid leave entitlement for the second birth. In Belgium the system of time credit in the private sector provides benefits which are dependent to the work experience with the current employer (Desmet, Glorieux, et al. 2007), which may forge people to reach the highest benefit before progressing to the second birth. To our knowledge the German system does not require people to regain eligibility.

[12] Belgium, France and Germany are the only European countries in GGS wave one which include this question and also belong to the Bismarckian or corporatist welfare states. The question was also included in a number of Central and Eastern European countries (Bulgaria, Estonia, Georgia, Lithuania, Romania, Russia).

affordability of leave-taking. For France Wave two of the GGS data does provide employment histories which will be used in the analysis.

5.2 Macrodata

In addition to the GGS microdata, aggregate-level data are provided by the OECD. Harmonized unemployment rates provided by OECD (OECD 2013) reflect the number of unemployed persons as a percentage of the civilian labour force.

5.3 Method

Two types of models will be estimated in order to answer the aforementioned research questions. First, we use random effects discrete-time event history models of second births using a complementary log-log link function, which allows an interpretation of the exponentiated parameter estimates in terms of hazard ratios. This model is called the '*single spell model'*. As person-years of exposure are nested within individuals (leading to correct variance estimates), we account for the hierarchical structure of the data. The model includes a time-invariant random coefficient at the level of individuals to control for unobserved time-constant characteristics of individuals that affect second birth hazards. Separate analyses are performed by sex and country. Studying the association between individual-level leave uptake and individual-level second births by country averts problems of non-random distribution of parental leave arrangements across countries and periods.

Second, We aim to distinguish self-selection into different modes of behaviour from causal effects of leave-taking on second births by modelling first and second births in a '*shared frailty model'* (Mills 2011). First and second birth hazards will be modelled as repeated events on pooled person-period data (parity specific parameters for first births are not shown) (Kravdal 2001). We assume that unobserved characteristics in the equation toward first births originate from a normal distribution and can be used to capture effects of self-selection on characteristics which are not captured by the covariates included in the model. Higher chances of leave uptake are presumably correlated with unobserved characteristics inducing a spurious relation between uptake and second births. Hence we will estimate the effect of leave uptake after a first birth on second births while allowing for time invariant unobserved characteristics over spells to influence second births. This repeated events model improves control for unobserved characteristics (Allison 2004). The strategy of the shared frailty model (Model 2a) is to compare effects of leave-taking with the effects found in the single spell model. The comparison of the estimates in the shared frailty and single spell model will answer our second research question to some extent. Depending on the country considered models 2b-2e investigate whether the effects of uptake of leave vary by education, age groups (research question iii), and region/period, whereas for France robustness of the effects to activity status is examined.

Besides our main independent variable of interest —uptake of leave of both the respondent and partner— the following individual-level covariates are included: (i) educational level, (ii) age at first birth, and (iii) duration since first birth in years. The *educational variable* distinguishes three levels of education based on the international standard classification of education (ISCED): Low (Isced levels zero to two), Medium (Isced levels three and four) and High (Isced levels five and six). *Age at first birth* in years allows us to control for the age at which a woman has entered the risk set. A quadratic effect is included in the model. Finally a cubic specification of the *duration since the first birth* is used as the baseline hazard function as second birth hazards show a positively skewed polynomial distribution over duration since first birth. An interaction between education on the one hand, and the baseline hazard function and age at first birth on the other is included in the model allowing second birth schedules to vary across educational groups. Hence the model controls for the fact that higher educated individuals are likely to space second births more closely to the first birth (which is known as the 'time-squeeze' effect (Kreyenfeld 2002)). For France we also include activity status (employed, student, self-employed, unemployed, homemaker, and other) at the individual level which is lagged by one year.

In addition to individual-level covariates the following aggregate-level covariates are also included in the model: (i) year, (ii) unemployment rates, and (iii) indicators capturing regional or period differences. The effect of *year* represents the linear effect of calendar time. Harmonized *unemployment rates* are included in the model with a one year time lag. Controlling for aggregate-level unemployment is advisory since childbearing has been found to respond to changes in the former, especially concerning first births (Neels et al. 2012), but also concerning higher order births (Adsera 2011; Neels and Wood 2013). Finally, *regional or period differences*[13] are investigated if literature (see 2) indicates that differential effects may play. For Belgium this implies that we include a dummy-variable indicating one for Flanders from 1994 on (as the Flemish community received additional benefits from then on). For Germany we investigate differential effects by region (East and West) since East Germany was left with a strong reliance on nurseries as a part of the legacy of the communist state (see 2.3).

6. Results and Discussion

6.1 Belgium

6.1.1 Leave-taking by sex and education

Before considering the effect of parental leave on second birth hazards, figure 1 documents variation in uptake of parental leave over time. Keeping the legislative changes and introductions of leave schemes in 1985 and 1997 in mind (see 2.1), the per cent of men/women reporting to have used leave connected to the first birth in the Belgian GGS seems to indicate a generally increasing pattern of leave uptake. Especially after the introduction of parental leave more parents took leave around first births.

Figure 1 about here

For men we find that their partners are much more likely to take up leave schedules for the first child than themselves (Desmet and Glorieux 2007). From the perspective of women a similar conclusion is reached concerning sex differences in leave-taking. Concerning the educational gradient in the uptake of leave, highly educated parents are more likely to take up leave connected to the first birth and so are their partners (Desmet and Glorieux 2007).

Figure 2 about here

6.1.2 Multivariate models

Individual-level covariates for Belgium (Table 1) show that second birth schedules vary by level of education both for men and for women. The significant effects of the exposure indicators show that a cubic specification of second birth schedules is needed, but also that especially highly educated individuals show second births more closely spaced to the first compared to lower educated parents. This is also true for medium level educated women. The results also indicate that later entry into the risk set of second births entails lower second birth hazards for medium educated men and lower educated women[14]. The macro-level covariates indicate that the yearly trend is significantly negative for both men and women while unemployment rates do not seem to correlate with second birth hazards. The variable indicating whether exposure is situated in Flanders after 1993 displays a positive effect on second birth hazards for men.

[13] In accordance to the changes in leave schemes (see 2.) we tested if these changes entailed differential effects by means of dummy-coded variables indicating zero before the legislative change and one thereafter. In this paper we solely present the findings of such indicators which did impact second birth hazards.

[14] Models without a quadratic effect of age at first birth indicate that later entry in the risk set is negatively correlated with second birth hazards (results not shown).

The effects of leave-taking in the *single spell model* (model 1) indicate that for men previous leave-taking increases the hazards ratio by ((1.498-1)*100) 49.8 per cent, however the estimate is not significantly different from unity (which signifies no effect). We do note that the occurrence of low cell frequencies may be an explanation for the non-significance of the effect for men and the p-value (.133) does approximate statistical significance. Turning to the effect of previous leave-taking by the partner we note a significant increase of second birth hazards by ((1.511-1)*100) 51.1 per cent for male respondents. Focussing on the effects of leave-taking for women, a strong positive effect is found when the respondent previously had taken up leave increasing second birth hazards by ((1.658-1)*100) 65.8 per cent, whereas no significant effect of the partner's leave uptake is found.

Next we turn to the *shared frailty model* (model 2a) in order to assess to which degree the effects of previous leave-taking on second births change when controlling for time-invariant unobserved characteristics. The comparison of the models for men and women reveals that all significantly positive effects weaken. Whereas in the single spell model for men previous leave-taking increased second birth hazards by 49.8 per cent, the shared frailty model indicates 33.6 per cent higher second birth hazards (though the p-value for the estimate has changed from .133 to .095). The positive effect of partner's uptake on second birth hazards for men has changed from 1.511 to 1.388. For women we find a reduction in the positive effect of second birth hazards from 65.8 to 54.4 per cent.

Further sensitivity analyses (models 2b-2d) investigate whether the aforementioned positive effects of leave-taking vary by educational levels, age-groups, and for Flanders after 1993. Concerning the educational differences in the effects, results illustrate that the inclusion of the interaction between education and the leave parameters does not entail a significant improvement of the model for men (Δ -2LL: 3.01 Δ df: 4, P: .556) and women (Δ -2LL: 2.64 Δ df: 4, P:.620).

Previously we showed that both respondents' and partners' leave-taking is associated with higher second birth hazards for men. Investigating the relation between leave-taking and second births by age group for men indicates that the aforementioned positive effects only hold for men aged 30 to 49. Whereas for men the inclusion of this interaction entails a significant model improvement (Δ -2LL: 14.61 Δ df: 2, P: .001) this is not the case for women (Δ -2LL: 2.87 Δ df: 2, P:.238).

Finally a difference in the effect for exposure intervals in Flanders after 1993 is tested. Whereas for women the inclusion of this interaction does not significantly alter the model (Δ -2LL: 4.35 Δ df: 2, P:.114) it does for men up to the .100 level of statistical significance (Δ -2LL: 5.18 Δ df: 2, P:.075). Hence only weak indications are found for a stronger effect of leave-taking on second birth hazards for the Flemish community after the introduction of additional benefits in this region.

6.2 France

6.2.1 Leave-taking by sex and education

Figure 3 documents the degree of reported leave use for first births in the French GGS data over time. At the onset of parental leave very few parents took up leave for the first child. During the 1980s leave-taking for first children remained low. During the 1990s leave-taking for the first child rose to somewhat higher levels though remained low which can be related to the fact that leave for first children was unpaid.

Figure 2 about here

Figure 4 shows leave-taking of both the respondent and partner by education for both sexes in France. Also in France we find that mothers are much more likely to take up leave schedules than fathers (Morel 2007). For men we find that medium and high level educated fathers are more likely to take up leave arrangements. Concerning the partner's leave use, especially men with low education have partners who are not very likely to show leave-taking. Turning to the right-hand side panel of the figure, highly educated women show the highest per cent of first children for which leave schedules are used. Concerning their partners, especially lower educated women have partners who are unlikely to take up leave arrangements. The low use of leave connected to the first child for lower educated parents — which contrasts with literature that states that especially lower educated parents take paid leave connected to second and third births (Morel 2007) — may be related to the fact that this leave is unpaid (see 2.2).

Figure 4 about here

6.2.2 Multivariate models

The results for France (Table 2) show that the cubic specification of exposure since first birth towards second births varies between educational groups. Women/men with medium levels of education and especially people with higher education seem to space second births closer to first births than lower educated individuals which is reflected by the positive differential linear exposure estimates and negative differential quadratic parameters. The effects of age at first birth indicate that later entry into the risk set is negatively correlated with second birth hazards if only linear effects are included (results not shown). For women the inclusion of a quadratic effect shows that the initial linear effect of later entry is positive while at later ages of entry the second birth hazards decline, especially for highly educated women. Concerning the macro-level covariates, we note that both for men and women the yearly trends reveal a significant positive trend in second order childbearing, whereas unemployment rate does not seem to affect second birth hazards.

For France the *single spell model* (model 1) indicates that the progression to a second birth does not seem to be affected by previous leave-taking of respondent nor leave-taking of the partner for men. In contrast to the non-relation between uptake and second birth hazards for men, we find that whenever women have taken up leave in the past for a first child the hazard of second births is elevated by ((1.450-1)*100) 45 per cent.

The *shared frailty model* (model 2a) shows that for second births for men the picture has not changed noteworthy and effects of previous leave remain non-significant. For women the shared frailty model indicates that whereas previously the occurrence of previous leave-taking resulted in a 45 per cent increase in the hazard of a second child, this increase is weakened by controlling for unobserved characteristics connected to the entry into parenthood and elevates hazard ratios with 25.4 per cent. Hence the increase in second birth hazards has weakened by 19.6 percentage points when controlling for self-selection.

Next sensitivity models (Model 2b-2c) address the third research question which concerns varying effects between population subgroups. Concerning the educational differences in the effects the model parameters show that the inclusion of the interaction between education and the leave parameters does not entail a significant improvement of the model for men (Δ -2LL: 3.17 Δ df: 4, p: .530) and for women (Δ -2LL: 4.22 Δ df: 4, p:.377).

Whereas previous results for men showed no effect of own or partner's previous leave-taking on second births, model 2c indicates that the partner effect depends on the age-group considered. Previous leave by the partner entails lower second birth hazards for men in age group 15-29 and this interaction significantly improves the model fit (Δ -2LL: 12.82 Δ df: 2, p:.002). The interaction between age-groups and leave-taking does not entail a significant improvement of the model for women (Δ -2LL: 0.22 Δ df: 2, p:.896).

Given the fact that the French GGS data provide a second wave which includes retrospective information on activity status, an additional robustness check is performed (Models 2d-2e). Using people aged 15-39 from 1977 to 2004 from the second wave of the GGS, we again find that only women's uptake of leave connected to the first child influences second birth hazards for women. The positive effect elevates second birth hazards by ((1.430-1)*100) 43 per cent when activity status is not included in the model (results not shown). Model 2d shows that this effect hardly changes when controlling for activity status in the equation towards first births as second birth hazards are now elevated by ((1.458-1)*100) 45.8 per cent. The effects of activity status show that being a student has a negative impact on first birth hazards for men and women, unemployment has a negative effect for men, and being a homemaker is positively related to first birth hazards for women. The inclusion of activity status as a control variable does entail a significant model improvement for both men (Δ -2LL: 70 Δ df: 5, p:.000) and women (Δ -2LL: 207.72 Δ df: 5, p:.000). Model 2e allows the time-varying activity status of men and women to affect first as well as second birth hazards one year later. The effects of leave-taking on second birth hazards do not change notably. The effect of activity status shows that for men unemployment is also negatively related to second births, whereas being a homemaker continues to be positively related to birth hazards for mothers. The inclusion of activity status effects on second birth hazards does not entail a significant improvement of the model for men (Δ -2LL: 6.39 Δ df: 5, p:.270), whereas the deviance statistics do change significantly for women (Δ -2LL: 25.34 Δ df: 5, p:.000).

6.3 Germany

6.3.1 Leave-taking by sex and education

Figure 5 illustrates that Germany historically has shown rather high levels of leave-taking connected to the first child[15]. During the 1960s, 1970s and 1980s the leave use hovered around 30 per cent for Germany. After the reunification of East- and West-Germany a sharp rise occurred in leave-taking.

Figure 5 about here

Figure 6 shows leave-taking of both the respondent and partner by education for both sexes in Germany. Both panels indicate that men are much less likely to take up leave. Concerning the educational differences in the uptake of leave from the perspective of male respondents, medium level educated men are more likely to take up leave connected to the first birth. From the perspective of female respondents we find that women with medium levels of education are most likely to show leave-taking while highly educated women are more likely to have a partner who takes up leave connected to the first child.

Figure 6 about here

6.3.2 Multivariate models

Results for Germany (Table 3) indicate that the linear, quadratic and cubic specification of the exposure effect is significant and significant differences occur between educational levels for women. Whereas for Belgium and France we found that men/women with medium or high education show second births which are timed more approximate to the first birth, this is not the case for German men. We do find that women with high levels of education space births closer together than lower educated women. Age at entry into the risk set elevates second birth hazards for medium and highly educated men and women, whereas the quadratic term shows that very late entry decreases second birth hazards. Aggregate-level covariates indicate that there is no impact of the yearly trend or unemployment rates, whereas second birth hazards for people who lived in East Germany at the time of the survey[16] are significantly lower compared to west Germany.

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[15] A considerable amount of parents reported to have taken leave in connection with the first child even before the introduction of parental leave in the GDR. This indicates that our policy overview lacks other policies allowing parents to take leave. However due to the specific nature of Germany before the 1990s our empirical investigation will focus on a time frame situated in the era of reunified Germany.

[16] Due to the absence of migration histories in the GGS wave one data and the interregional migration which occurred after the reunification of Germany, this parameter cannot be interpreted as the effect of time-varying region of residence.

The effects of respondent's and partner's previous uptake of leave in the *single spell model* (model 1) for Germany show that respondents' uptake more than triples the second birth hazards for men whereas the positive effect for women increases second birth hazards by ((1.510-1)*100) 51 per cent. Whether or not partners' have taken up leave for the first child does not seem to affect second birth hazards.

The *shared frailty model* (model 2a) allows us to compare the effects of the single spell and the model controlling for unobserved characteristics connected to the entry into parenthood. Both for men and women we find that the positive effects weaken when controlling for time-invariant unobserved characteristics. The effects of previous leave use for men and women respectively decrease from 3.703 to 2.051 and from 1.510 to 1.291 when controlling for self-selection into the risk set.

Sensitivity analyses (Models 2b-2d) address the third research question for Germany, i.e. whether the aforementioned pattern of effects of previous leave on second births varies by educational level, age-group, and region. Model parameters show that the interaction between educational group and leave-taking does not improve the model significantly for men (Δ -2LL: .89 Δ df: 2, P:.236), and neither does it for women (Δ -2LL: 2.14 Δ df: 4, P:.710).

The inclusion of the interaction of the leave indicators and age-groups does not entail a significant improvement of the model for men (Δ -2LL: .60 Δ df: 2, P:.741). The age-specific effects for German women indicate that own previous leave has the strongest effect on further childbearing for the 30-49 age-group whereas in this group the effects of partners' leave turns out to be weakly negative. The inclusion of the interaction between age and the leave parameters does entail a significant improvement of the model for women (Δ -2LL: 8.18 Δ df: 2, P:.017).

Finally, varying effects by region are investigated. Whereas no significant improvement of the model is found for women (Δ -2LL: 4.03 Δ df: 2, P:.133), the inclusion of the interaction between region and leave-taking indicates that leave-taking and second birth hazards correlate positively especially in west Germany. However we do note that the model improvement is only statistically significant up to the ten per cent level.

7. **Conclusion**

The relation between family policy and fertility has been high on the research agenda in demography and numerous publications investigate effects of the availability of family policies on family formation. As literature reviews conclude that population heterogeneity has hitherto not been addressed sufficiently recent research has focussed more on individual-level fertility rather than aggregate measures in order to investigate effects of family policy by population subgroups. However very few contributions relate use of leave schemes to childbearing behaviour and to our knowledge very few investigates selectivity in the reported effects (See, for example, Aassve and Lappegård 2010). This article investigates the relation between uptake for the first birth and progression to second births.

The findings of this paper suggest that previous studies investigating the relation between leave-taking and continued childbearing overestimate the positive association due to self-selection in terms of unobserved characteristics connected to entry into parenthood (research question ii). By comparing the *single spell model* and the *shared frailty model* this paper provides evidence that people who take up leave also have unobserved characteristics which positively relate to first and second birth hazards. Failing to control for this frailty results in an overestimation of the (positive) relation between the use of leave schemes and second birth hazards.

Despite the fact that the relation between leave use for the first child and second birth hazards weakens when controlling for selectivity, the evidence in this paper suggests a positive relation between leave-taking and second birth hazards (research question i). The positive relation was strongest in Belgium and Germany, whereas for France less convincing evidence is presented. The latter may be related to the fact that leave for the first child was unpaid in France (see 2.2). For Belgium the results show positive effects of mothers taking leave for the first child on second birth hazards for both men and women. In Germany both men and women display a strong positive relation between leave-taking and second birth hazards, while uptake of leave for men is much lower than for women. In France only women show a positive impact of leave use.

The positive relation between leave-taking and second birth hazards is found to be robust to changes in the labour market (unemployment) and also the individual-level labour market position (in France). For all three countries no differences in the effects by educational group are found. This indicates that – while uptake of leave schemes varies greatly between educational levels with especially low uptake for lower educated parents – all educational groups react similarly to the use. This suggests that the aggregate effect of parental/childcare leave policies on second births might be enhanced by focussing on educational groups which are harder to reach. Hence we conclude that design features of parental leave schemes and differential uptake of family policies are relevant routes for future research.

Limitations

This paper aims to distinguish selection effects from the causal impact of leave-taking on second birth hazards. The approach adopted in this article controls for unobserved characteristics which are related to the progression to first births. Hence unobserved characteristics which are unrelated to the transition to parenthood or which vary over time potentially influence the results. Secondly, throughout the paper the degree of leave-taking and the effect on second birth hazards by sex does not seem to be consistent when comparing the analysis of male versus female respondents. This inconsistency may occur due to differential response patterns by gender, but it also may be fuelled by low cell frequencies for men who show low leave-taking.

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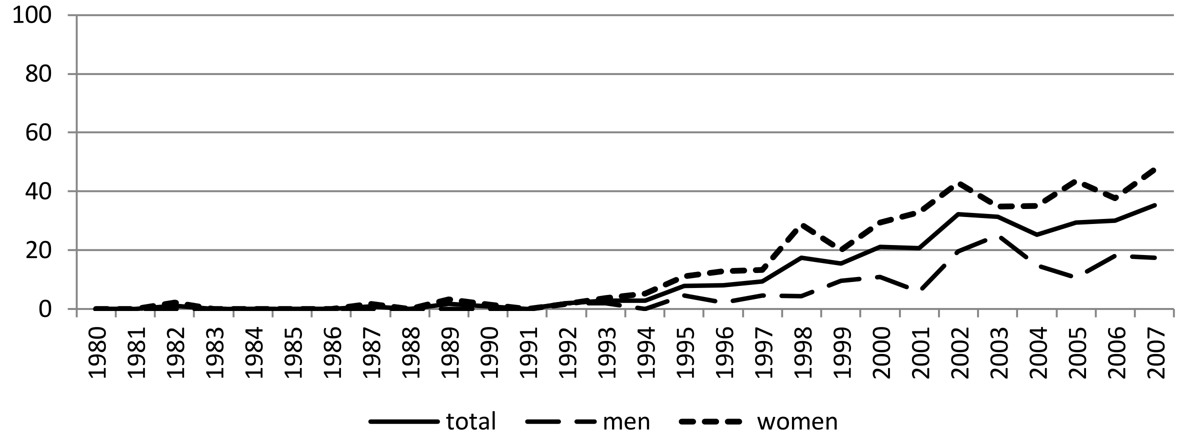
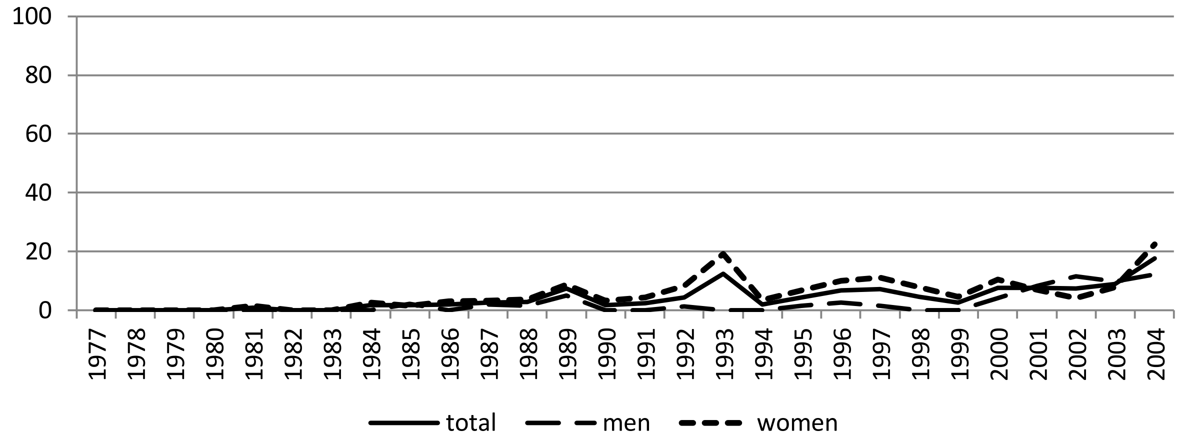
Figures & Tables

Figure 1: Leave use for first child (%) by birth year first child, Belgium 1980-2007



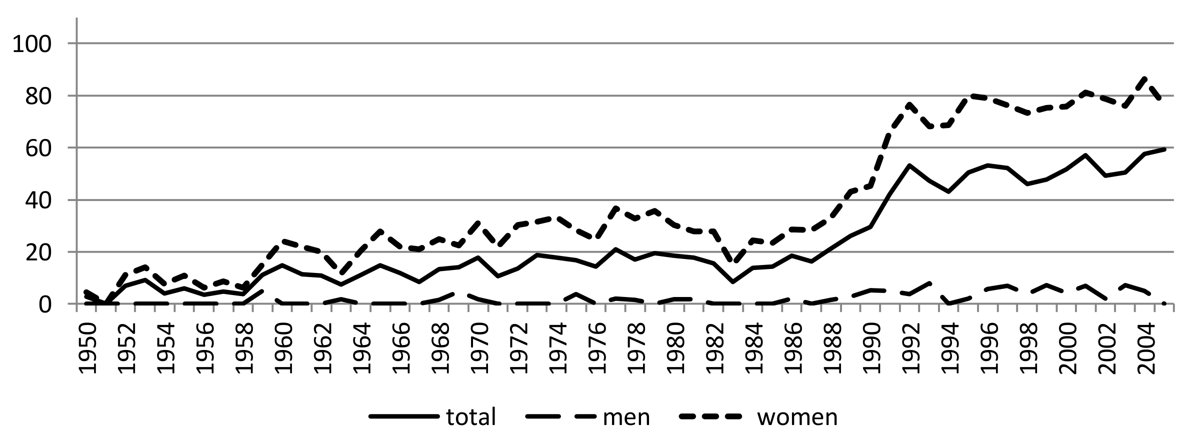
Source: GGS Belgium (2008-2010)

Figure 2: Leave use for first child (%) by birth year first child, France 1975-2004



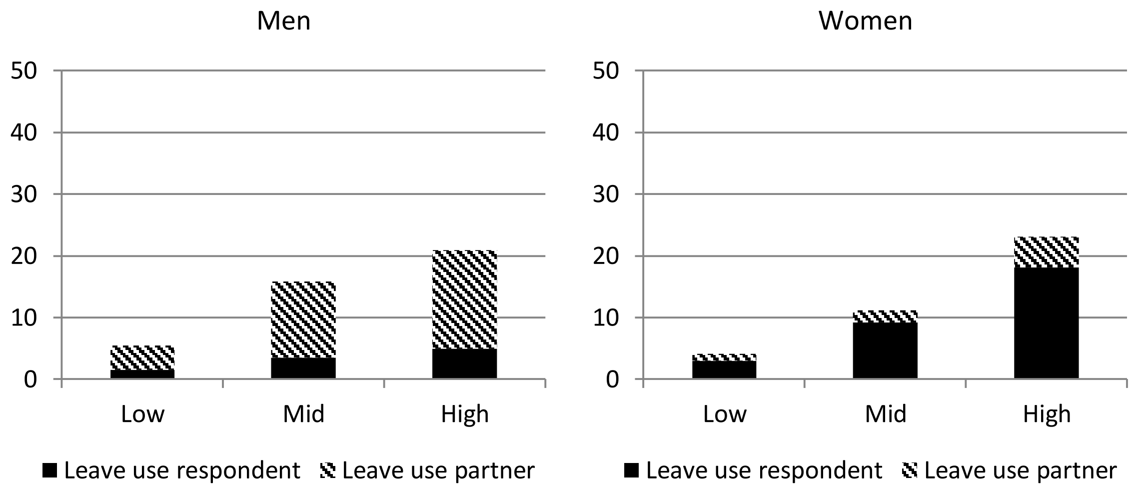
Source: GGS France (2005)

Figure 3: Leave use for first child (%) by birth year first child, Germany 1950-2004



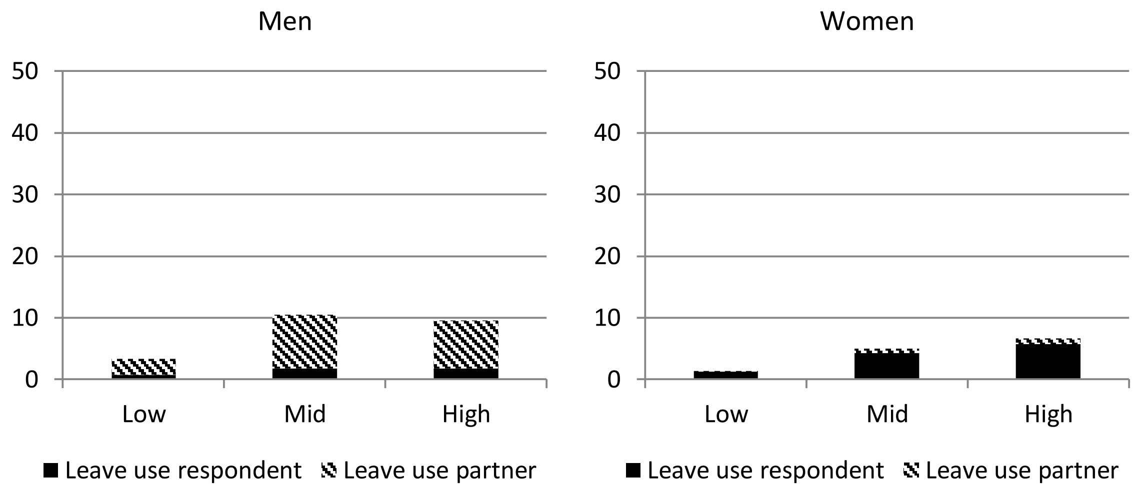
Source: GGS Germany (2005)

Figure 4: Leave use for first child (%) by sex and education, Belgium 1985-2007



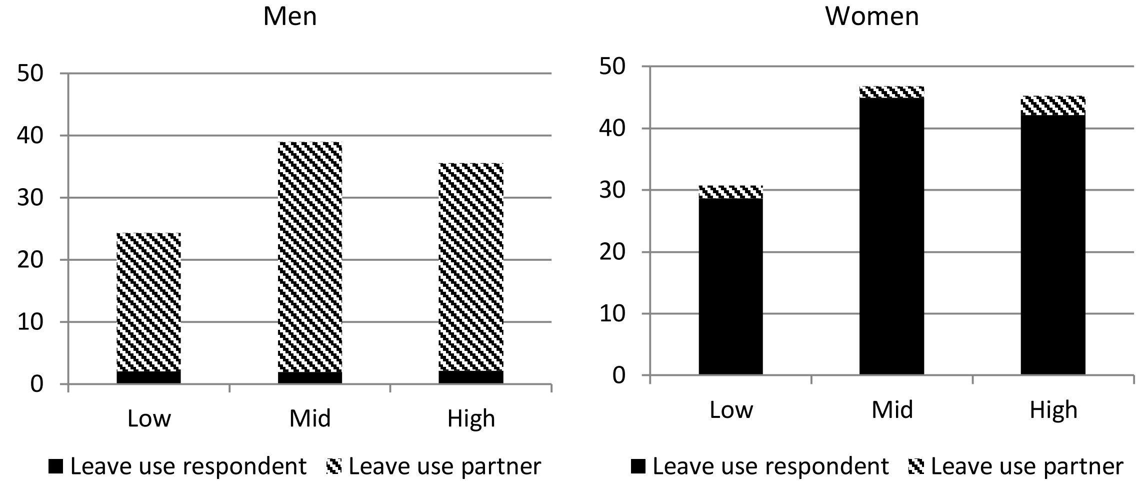
Source: GGS Belgium (2008-2010)

Figure 5: Leave use for first child (%) by sex and education, France 1977-2004



Source: GGS France (2005)

Figure 6: Leave use for first child (%) by sex and education, Germany 1990-2004



Source: GGS Germany (2005)

Table 1 Exponentiated coefficients (hazard ratios) from random-effects complementary log-log model of 2nd birth hazard, women/men aged 15-49, Belgium 1985-2007

	model 1				**model 2a**				**model 2b**			
	men		*women*		*men*		*women*		*men*		*women*	
	e(b)	*sig*	*e(b)*	*sig*	*e(b)*	*sig*	*e(b)*	*sig*	*e(b)*	*sig*	*e(b)*	*sig*
individual-level covariates												
exposure												
. linear	3.168	***	3.520	***	2.835	***	2.434	***	2.844	***	2.440	***
. quadratic	0.871	***	0.845	***	0.847	***	0.867	***	0.847	***	0.867	***
. cubic	1.004	***	1.005	***	1.006	***	1.004	***	1.006	***	1.004	***
education *(low is reference)*												
. medium	0.183	*	0.548		0.385		0.454	*	0.375		0.464	
. high	0.355		0.413		0.858	*	0.526		0.858	*	0.522	
exposure by education												
. linear medium	1.463	*	1.285		1.008		1.486	***	0.999		1.478	***
. quadratic medium	0.923	***	0.961		0.989		0.940	***	0.990		0.940	***
. cubic medium	1.003	**	1.001		1.000		1.002	***	1.000		1.002	***
. linear high	3.310	***	1.895	***	1.215	*	1.593	***	1.211	*	1.587	***
. quadratic high	0.802	***	0.888	***	0.966	**	0.917	***	0.966	**	0.917	***
. cubic high	1.009	***	1.004	***	1.001	**	1.003	***	1.001	**	1.003	***
age at first birth by education												
.age at 1st low	0.938		1.035		0.944		1.035		0.937		1.032	
.age at 1st low sq	1.001		0.994	**	1.001		0.995	***	1.101		0.995	
.age at 1st mid	1.167		1.036		1.097		1.043		1.032		1.044	
.age at 1st mid sq	0.993	**	0.996		0.996		0.996		1.001		0.996	
.age at 1st high	1.049		1.100		1.040		1.081		0.995	*	1.082	
.age at 1st high sq	0.996		0.995		0.997		0.995	*	0.997		0.995	
leave uptake *(no leave is reference)*												
. main/refgroup	1.498		1.658	***	1.336	*	1.544	***				
leave uptake *by* education												
. leave low									1.295		1.965	**
. leave medium									1.534		1.460	*
. leave high									1.228		1.482	***
leave uptake partner *(no leave is reference)*												
. main/refgroup	1.511	**	0.917		1.388	***	0.911					
leave uptake partner by education												
. leave low									1.739	**	0.878	
. leave medium									1.091		0.455	
. leave high									1.577	***	1.042	
macro-level covariates												
year												
. year	.946	***	0.980	*	0.963	***	0.985	*	0.963	***	0.986	*
unemployment *(lagged 1 year)*												
. main/refgroup	.963		0.975		0.982		0.980		0.981		0.978	
first birth after 1993 in Flanders												
.main/refgroup	1.706	***	1.237		1.418	***	1.133		1.407	***	1.133	
model parameters												
rho	0.468	***	0.419	***	0.000		0.000		0.000		0.000	
N person-periods	5798		7617		33848		33897		33848		33897	
df	24		24		39		39		43		43	
deviance (-2ll)	3819.07		4546.06		11644.61		13437.46		11641.60		13434.82	
AIC	3867.07		4594.06		11722.61		13515.46		11727.60		13520.82	
BIC	4027.04		4760.58		12051.37		13844.28		12090.08		13883.36	

Source: Generations and Gender Survey Belgium (2008-2010) & OECD, calculations by authors
Significance levels: p < .100 (*), p < .050 (**), p < .010 (***)

Table 1 Exponentiated coefficients (hazard ratios) from random-effects complementary log-log model of 2nd birth hazard, women/men aged 15-49, Belgium 1985-2007

	model 2c				**model 2d**			
	men		*women*		*men*		*women*	
	e(b)	*sig*	*e(b)*	*sig*	*e(b)*	*sig*	*e(b)*	*sig*
	individual-level covariates							
exposure								
. linear	2.790	***	2.415	***	2.826	***	2.435	***
. quadratic	0.848	***	0.868	***	0.847	***	0.867	***
. cubic	1.006	***	1.004	***	1.006	***	1.004	***
education *(low is reference)*								
. medium	0.456	**	0.465	*	0.398	*	0.454	*
. high	1.178	***	0.594		0.817	***	0.539	
exposure by education								
. linear medium	1.004		1.482	***	1.017		1.485	***
. quadratic medium	0.989		0.940	***	0.989		0.940	***
. cubic medium	1.000		1.002	***	1.000		1.002	***
. linear high	1.209	*	1.582	***	1.225	*	1.594	***
. quadratic high	0.966	**	0.918	***	0.965	***	0.917	***
. cubic high	1.001	**	1.003	***	1.001	***	1.003	***
age at first birth by education								
.age at 1st low	0.943	**	1.036		0.944	**	1.482	***
.age at 1st low sq	1.001		0.995	***	1.001		0.940	***
.age at 1st mid	1.077		1.043		1.092		1.002	***
.age at 1st mid sq	0.996	*	0.996		0.996	*	1.582	***
.age at 1st high	0.999		1.067		1.045		0.918	***
.age at 1st high sq	0.998		0.995		0.997		1.003	***
leave uptake by age group								
. leave aged 15-29	1.085		1.335	*				
. leave aged 30-49	1.524	**	1.738	***				
leave uptake partner by age group								
. leave aged 15-29	0.735		0.814					
. leave aged 30-49	1.641	***	1.029					
leave uptake by region and period								
. leave Wallonia or before 1994					0.921		1.297	
. leave after 1993 in Flanders					1.705		1.795	***
leave uptake partner by region and period								
. leave Wallonia or before 1994					1.231	**	0.639	
. leave after 1993 in Flanders					1.554	***	1.013	
	macro-level covariates							
year								
. year	0.964	***	0.985	*	0.966	***	0.988	
unemployment *(lagged 1 year)*								
. main/refgroup	0.982		0.980		0.983		0.980	
first birth after 1993 in Flanders								
.main/refgroup	1.414	***	1.135		1.266	**	1.020	
	model parameters							
rho	0.000		0.000		0.000		0.000	
N person-periods	33848		33897		33848		33897	
df	41		41		41		41	
deviance (-2ll)	11630.00		13434.59		11639.43		13433.11	
AIC	11712.00		13516.59		11721.43		13515.11	
BIC	12057.61		13862.26		12067.05		13860.78	

Source: Generations and Gender Survey Belgium (2008-2010) & OECD, calculations by authors
Significance levels: p < .100 (*), p < .050 (**), p < .010 (***)

Table 2 Exponentiated coefficients (hazard ratios) from random-effects complementary log-log model of 2nd birth hazard, women/men aged 15-49, France 1977-2004

	model 1				**model 2a**				**model 2b**			
	men		*women*		*men*		*women*		*men*		*women*	
	e(b)	*sig*	*e(b)*	*sig*	*e(b)*	*sig*	*e(b)*	*sig*	*e(b)*	*sig*	*e(b)*	*sig*
					individual-level covariates							
exposure												
. linear	3.070	***	3.278	***	2.365	***	2.490	***	2.365	***	2.488	***
. quadratic	0.887	***	0.873	***	0.887	***	0.879	***	0.887	***	0.879	***
. cubic	1.003	***	1.004	***	1.003	***	1.004	***	1.003	***	1.004	***
education *(low is reference)*												
. medium	0.187		0.047	*	0.165		0.095	*	0.170		0.098	*
. high	4.942		0.000	***	14.31		0.000	***	15.34		0.000	***
exposure by education												
. linear medium	1.277	**	1.091		1.106		1.058		1.107		1.062	
. quadratic medium	0.965	**	0.979		0.992		0.993		0.992		0.993	
. cubic medium	1.001	*	1.001		1.000		1.000		1.000		1.000	
. linear high	2.111	***	1.459	***	1.303	***	1.258	***	1.305	***	1.259	***
. quadratic high	0.881	***	0.939	***	0.961	***	0.968	***	0.961	***	0.968	***
. cubic high	1.004	***	1.002	***	1.001	***	1.001	***	1.001	***	1.001	***
age at first birth by education												
.age at 1st low	0.971		1.093	***	0.990		1.073	***	0.991		1.073	***
.age at 1st low sq	1.000		0.996	***	1.000		0.997	***	1.000		0.997	***
.age at 1st mid	1.122		1.318	**	1.142		1.238	**	1.139		1.235	**
.age at 1st mid sq	0.997		0.993	***	0.997		0.995	***	0.997		0.995	***
.age at 1st high	0.887		2.922	***	0.854		2.229	***	0.850		2.233	***
.age at 1st high sq	1.001		0.980	***	1.002		0.985	***	1.002		0.985	***
leave uptake *(no leave is reference)*												
. main/refgroup	0.669		1.450	*	0.757		1.254	*				
leave uptake by education												
. leave low									0.223		0.627	
. leave medium									1.068		1.374	*
. leave high									0.877		1.311	
leave uptake partner *(no leave is reference)*												
. main/refgroup	1.034		0.548		0.988		0.526					
leave uptake partner by education												
. leave low									0.922		0.000	
. leave medium									0.980		1.430	
. leave high									1.086		0.334	
					macro-level covariates							
year												
. year	1.013	*	1.013	**	1.010	*	1.010	**	1.010	**	1.010	**
unemployment *(lagged 1 year)*												
. main/refgroup	0.994		1.013		1.005		1.024		1.005		1.025	
					model parameters							
rho	0.511	***	0.417	***	0.068	**	0.017		0.067	**	0.018	
N person-periods		10604		14772		51241		59318		51241		59318
df		23		23		37		37		41		41
deviance (-2ll)		6601.65		8667.03		19047.79		24299.04		19044.62		24294.82
AIC		6647.65		8713.03		19121.79		24373.04		19126.62		24376.81
BIC		6814.84		8887.84		19449.03		24705.70		19489.23		24745.43

Source: Generations and Gender Survey France (2004) & OECD, calculations by authors
Significance levels: p < .100 (*), p < .050 (**), p < .010 (***)

Table 2 Exponentiated coefficients (hazard ratios) from random-effects complementary log-log model of 2nd birth hazard, women/men aged 15-49, France 1977-2004

	model 2c				**model 2d**				**model 2e**			
	men		*women*		*men*		*women*		*men*		*women*	
	e(b)	*sig*	*e(b)*	*sig*	*e(b)*	*sig*	*e(b)*	*sig*	*e(b)*	*sig*	*e(b)*	*sig*
individual-level covariates												
exposure												
. linear	2.342	***	2.490	***	2.463	***	3.105	***	2.441	***	3.114	***
. quadratic	0.888	***	0.879	***	0.881	**	0.858	***	0.882	**	0.859	***
. cubic	1.003	***	1.004	***	1.004	***	1.004	***	1.004	***	1.004	***
education *(low is reference)*												
. medium	0.192		0.094	*	0.085		0.228		0.109		0.153	
. high	21.42		0.000	***	4.955		0.000	***	5.988		0.000	***
exposure by education												
. linear medium	1.106		1.058		1.072		0.923		1.079		0.923	
. quadratic medium	0.992		0.993		0.998		1.012		0.997		1.012	
. cubic medium	1.000		1.000		1.000		1.000		1.000		1.000	
. linear high	1.304	***	1.257	***	1.317	**	1.173	*	1.321	**	1.170	*
. quadratic high	0.961	***	0.968	***	0.951	***	0.974	**	0.951	***	0.974	**
. cubic high	1.001	***	1.001	***	1.002	***	1.001	**	1.002	***	1.001	**
age at first birth by education												
.age at 1st low	0.992		1.074	***	1.008		1.080	***	1.008		1.067	***
.age at 1st low sq	1.000		0.997	***	0.999		0.997	***	0.999		0.997	***
.age at 1st mid	1.134		1.239	**	1.210		1.168		1.185		1.201	
.age at 1st mid sq	0.997	*	0.995	***	0.996	**	0.996	*	0.996	**	0.996	**
.age at 1st high	0.834		2.227	***	0.925		1.962	***	0.914		1.976	***
.age at 1st high sq	1.002		0.985	***	1.000		0.987	***	1.000		0.987	***
leave uptake *(no leave is reference)*												
. main/refgroup					1.075		1.458	***	1.059		1.489	***
leave uptake by age group												
. leave aged 15-29	0.191		1.188									
. leave aged 30-49	1.021		1.311									
leave uptake partner *(no leave is reference)*												
. main/refgroup					1.027		0.517		1.032		0.506	
leave uptake partner by age group												
. leave aged 15-29	0.567	**	0.640									
. leave aged 30-49	1.169		0.462									
activity status *(employed is reference)* **on 1st birth**												
. student					0.273	***	0.388	***	0.273	***	0.388	***
. self-employed					1.061		1.103		1.061		1.103	
. unemployed					0.566	***	1.099		0.566	***	1.098	
. homemaker					0.298		3.343	***	0.298		3.334	***
. other					0.428	***	0.787		0.428	***	0.788	
activity status *(employed is reference)* **on 2nd birth**												
. student									0.568		1.062	
. self-employed									0.938		1.161	
. unemployed									0.525	*	0.997	
. homemaker									1.216		1.600	***
. other									0.927		0.860	
macro-level covariates												
year												
. year	1.010	*	1.010	**	1.015	***	1.009		1.016	***	1.009	*
unemployment *(lagged 1 year)*												
. main/refgroup	1.010		1.024		0.977		1.013		0.978		1.013	
model parameters												
rho	0.067	*	0.018		0.000		0.105	***	0.000		0.104	***
N person-periods	51241		59318		33375		40530		33375		40530	
df	39		39		42		42		47		42	
deviance (-2ll)	19034.97		24298.82		12735.96		16629.20		12729.58		16629.20	
AIC	19112.97		24376.82		12819.96		16713.20		12823.58		16713.20	
BIC	19457.90		24727.46		13173.41		17074.81		13219.12		17074.81	

Source: Generations and Gender Survey France (2004) & OECD, calculations by authors
Significance levels: p < .100 (*), p < .050 (**), p < .010 (***)

Table 3 Exponentiated coefficients (hazard ratios) from random-effects complementary log-log model of 2nd birth hazard, women/men aged 15-49, Germany 1990-2004

	model 1				**model 2a**				**model 2b**			
	men		*women*		*men*		*women*		*men*		*women*	
	e(b)	*sig*	*e(b)*	*sig*	*e(b)*	*sig*	*e(b)*	*sig*	*e(b)*	*sig*	*e(b)*	*sig*
individual-level covariates												
exposure												
. linear	14.71	***	6.130	***	5.664	***	3.444	***	5.689	***	3.465	***
. quadratic	0.696	**	0.784	***	0.750	**	0.816	***	0.750	**	0.816	***
. cubic	1.014		1.010	***	1.012		1.009	***	1.012		1.009	***
education *(low is reference)*												
. medium	0.377		0.078	***	0.625		0.219	***	0.577		0.271	***
. high	0.045		0.001	***	0.196		0.014	***	0.168		0.016	***
exposure by education												
. linear medium	0.559		1.553		0.689		1.511		0.691		1.499	
. quadratic medium	1.048		0.916		1.039		0.912		1.038		0.912	
. cubic medium	1.000		1.003		1.000		1.004		1.000		1.004	
. linear high	1.165		2.782	**	1.128		2.198	**	1.127		2.176	**
. quadratic high	0.934		0.804	***	0.945		0.829	***	0.944		0.829	***
. cubic high	1.005		1.011	***	1.004		1.010	***	1.004		1.009	***
age at first birth by education												
.age at 1st low	1.086		0.901		1.050		0.962		1.044		0.965	
.age at 1st low sq	0.993		0.997		0.996		0.998		0.996		0.997	
.age at 1st mid	1.210	*	1.254	**	1.105		1.149	***	1.112	*	1.149	***
.age at 1st mid sq	0.993		0.989	***	0.996	*	0.993	***	0.996	*	0.993	***
.age at 1st high	1.538	*	1.979	***	1.262	*	1.558	***	1.278	**	1.577	***
.age at 1st high sq	0.986	**	0.977	***	0.993	**	0.985	***	0.993	**	0.985	***
leave uptake *(no leave is reference)*												
. main/refgroup	3.703	**	1.510	**	2.051	***	1.291	***				
leave uptake by education												
. leave low									2.555		1.653	**
. leave medium									2.555		1.256	*
. leave high									0.640		1.130	
leave uptake partner *(no leave is reference)*												
. main/refgroup	1.335		0.605		1.156		0.757					
leave uptake partner by education												
. leave low									1.136		0.775	
. leave medium									1.136		0.790	
. leave high									1.069		0.708	
macro-level covariates												
year												
. year	0.977		1.038		0.984		1.017		0.984		1.017	
unemployment *(lagged 1 year)*												
. main/refgroup	0.964		0.951		0.951		0.969		0.951		0.970	
region *(west is reference)*												
.east	0.302	***	0.377	***	0.652	***	0.802	***	0.652	***	0.802	***
model parameters												
rho	0.706	***	0.623	***	0.155	**	0.048		0.160	**	0.045	
N person-periods	3801		6856		22186		24278		22186		24278	
df	24		24		38		38		40		42	
deviance (-2ll)	2298.89		4099.69		7352.33		11652.73		7351.44		11650.59	
AIC	2346.89		4147.69		7428.33		11728.74		7431.44		11734.59	
BIC	2496.72		4311.68		7732.60		12036.43		7751.73		12074.68	

Source: Generations and Gender Survey Germany (2004) & OECD, calculations by authors
Significance levels: p < .100 (*), p < .050 (**), p < .010 (***)

Table 3 Exponentiated coefficients (hazard ratios) from random-effects complementary log-log model of 2nd birth hazard, women/men aged 15-49, Germany 1990-2004

	model 2c				**model 2d**			
	men		*women*		*men*		*women*	
	e(b)	*sig*	*e(b)*	*sig*	*e(b)*	*sig*	*e(b)*	*sig*
	individual-level covariates							
exposure								
. linear	5.595	***	3.459	***	5.678	***	3.459	***
. quadratic	0.751	**	0.816	***	0.751	**	0.816	***
. cubic	1.012		1.009	***	1.012		1.009	***
education *(low is reference)*								
. medium	0.677		0.266	**	0.562		0.261	**
. high	0.234		0.016	***	0.186		0.014	***
exposure by education								
. linear medium	0.692		1.482		0.693		1.513	
. quadratic medium	1.037		0.911		1.037		0.912	
. cubic medium	1.000		1.004		1.000		1.004	
. linear high	1.133		2.186	**	1.153		2.206	**
. quadratic high	0.944		0.830	***	0.942		0.829	***
. cubic high	1.004		1.010	***	1.004		1.010	***
age at first birth by education								
.age at 1st low	1.041		0.946		1.044		0.952	
.age at 1st low sq	0.996		0.998		0.996		0.998	
.age at 1st mid	1.087		1.112	***	1.113	*	1.139	***
.age at 1st mid sq	0.997		0.994	***	0.996	*	0.993	***
.age at 1st high	1.226		1.497	***	1.258	*	1.548	***
.age at 1st high sq	0.993	*	0.986	***	0.993	**	0.985	***
leave uptake by age group								
. leave aged 15-29	2.342		1.094					
. leave aged 30-49	1.984	**	1.517	***				
leave uptake partner by age group								
. leave aged 15-29	1.014		1.189					
. leave aged 30-49	1.195		0.606	*				
leave uptake by region								
. leave east					0.403		1.006	
. leave west					2.474	***	1.361	
leave uptake partner by region								
. leave east					0.938		0.892	
. leave west					1.212		0.738	
	macro-level covariates							
year								
. year	0.985		1.015		0.982		1.018	
unemployment *(lagged 1 year)*								
. main/refgroup	0.949		0.967		0.949		0.968	
region *(west is reference)*								
.east	0.654	***	0.803		0.715	***	0.875	*
	model parameters							
rho	0.156	**	0.057		0.164	**	0.060	
N person-periods	22186		24278		22186		24278	
df	40		40		40		40	
deviance (-2ll)	7351.73		11644.55		7346.51		11648.70	
AIC	7431.73		11724.55		7426.51		11728.70	
BIC	7752.02		12048.45		7746.80		12052.59	

Source: Generations and Gender Survey Germany (2004) & OECD, calculations by authors
Significance levels: p < .100 (*), p < .050 (**), p < .010 (***)