

Determinants of Second Birth Risks in Great Britain and West Germany

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Title: Determinants of Second Birth Risks in Great Britain and West Germany

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Abstract: This paper deals with the determinants of second birth risks, comparing western Germany and Great Britain. We use data from the German Socio-Economic Panel (GSOEP) and from the British Household Panel Survey (BHPS) to investigate the effects of women's as well as their partner's labor market status and occupational characteristics on the transition to the second child. Differences in the structure of welfare state institutions can lead one to expect quite different results for the two countries. Germany is largely considered a regime that is highly supportive of the standard 'male bread-winner model'. In this institutional context, one would expect that the partner's economic position is highly important for the decision to have a larger family. The British welfare state is less financially supportive of single-earner households. While public childcare is also scarce, there is a better supply of private childcare, though at a higher cost. Women's income may be especially important to afford quality daycare. An 'income effect' might also contribute to a positive effect of women's employment on the decision to have a larger family.

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Introduction

In his widely cited typology, Esping-Andersen (1990, 2000) has categorized industrialized countries into three broad categories: the liberal, the conservative and the social-democratic regimes. This typology has been employed extensively – and just as extensively, it has been criticized. It has been questioned whether all countries had been classified in a meaningful way and if one requires a more refined scheme, particular one that pays greater attention to gender specific issues (Lewis 1992; Daly 1994; Shaver and Bradshaw 1995; Sainsbury 1997).

However, little dispute arises over the classification of Germany as a conservative and familialistic welfare regime and Great Britain as a liberal market regime. According to Esping-Andersen (2000: 65) Germany “stands out as powerfully dedicated to the conventional male breadwinner model”. Treas and Widmer (200: 1431) consider Germany as “the archetype of a conservative state promoting breadwinner-husband-and-homemaker-wife families”. Dingeldey (2001: 606) labels the German tax system as “ideal type” in the way that it supports the male breadwinner model. Presumably, it is indeed the particularities of the tax system, which provides substantial transfers to married one-earner couples, that makes a classification of Germany unambiguous. However, just as important is presumably that adequate public daycare is scarce and a private market of care ill-functioning. The overall expenditures for families are fairly high, but they are directed in the first place to traditional family forms, i.e. to married one-earner couples.

Compared to Germany, the British welfare state is substantially less generous in supporting families with children (Alber 2002; European Commission 2002a; Gauthier 2002; Rürup and Gruescu 2003). Policies are oriented more towards providing low-level benefits to alleviate need. In principle, they are rather unbiased towards a specific family form (Daly 2000: 90). There has been some concern, however, of whether the transfer system encourages single parenthood among low income women (Ermisch and Wright 1991; Jenkins 1992). Being classified as the only European liberal market regime, market forces are the overarching allocation mechanism. This becomes particularly visible in the daycare system. Childcare subsidies encourage the use of

childcare for low income households. However, the costs of care are mainly a private matter.

According to Esping-Andersen (2000: 67), “the great paradox of our times is that familialistic policy appears counterproductive to family formation”. There is no unambiguous correlation between a country’s expenditure for family policies and its level of fertility. Instead, “familialistic countries” like Germany, which support family and family work, appear rather ineffective in stimulating fertility (Mc Donald 2000; Castles 2003: 214; Rindfuss et al. 2003). The countries which nowadays encounter the highest fertility rates are, on the one hand, the Nordic countries which provide extensive public daycare and measures to support mother’s employment. On the other hand, these are the liberal market regimes (such as Great Britain and the US) which are rather reluctant to have the government intervene at all. Figure 1 displays completed fertility rates of the cohort 1965.¹ While West Germany’s fertility, at 1.5 children per woman, is the lowest in Europe, the UK ranks quite high by European standards, with an average of 1.9 children per women. Higher completed fertility rates are encountered in Scandinavian countries and France.²

The aim of this paper is to compare the transition to second births in western Germany and Great Britain. We limit the analysis to the western states of Germany, since the particular demographic situation in the eastern states would require a separate investigation (Kreyenfeld 2003; Kreyenfeld and Huinink 2004). Our primary interest is how a woman and her partners’ labor market status and occupational characteristics determine the transition to the second child. Differences in the welfare state institutions can lead one to expect quite different results for the two countries. The German welfare regime primarily supports the ‘male breadwinner model’. With the birth of the first child, most women interrupt their employment and only few return to full-time work. In this regime, partner’s income and employment characteristics must be particularly important to support the family. The decision to have a larger family should depend on the economic performance of the ‘male breadwinner’. In the British welfare state,

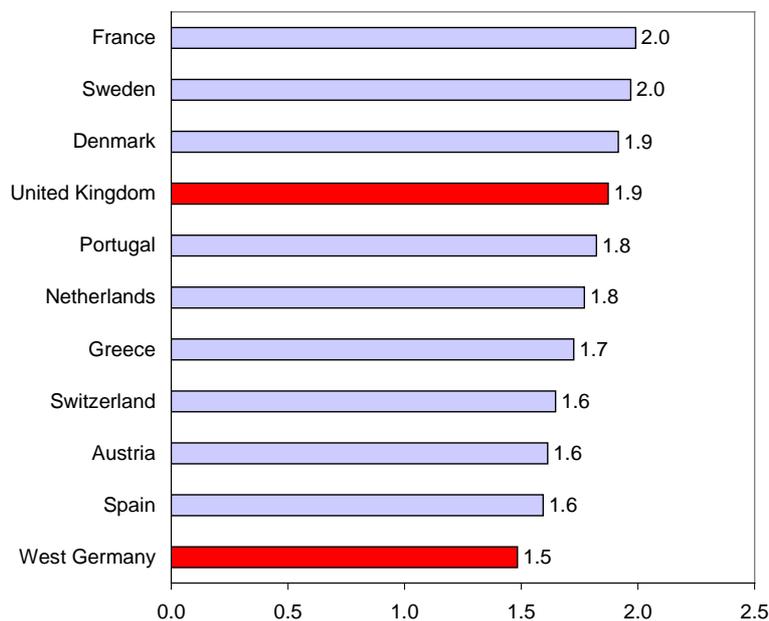
¹ Instead of the completed fertility rate by birth cohorts, it is more common to report the total period fertility rate (TFR). We do not follow this convention, because the period TFR of Southern and Eastern Europe is currently distorted by severe tempo effects (Bongaarts and Feeney 1998).

² Completed fertility for the cohort 1965 in Eastern European is still higher than in the rest of Europe. This can largely be attributed to special institutional conditions during socialism. For the younger cohorts, it is still too early to calculate a completed fertility rate.

women are better able to return to work after childbirth, provided they are also able to arrange daycare. The woman's income should be decisive for the decision to afford adequate quality daycare and it might be important for decisions to have a larger family. Economically speaking, we expect that the 'income effect' dominates the 'substitution effect' in the UK.

The remainder of this paper is organized as follows. Section 1 gives an account of the welfare state institutions in Great Britain and Germany. Section 2 develops the major hypotheses on the determinants of second and third birth risks. Section 3 discusses the data sources for the empirical investigation. We use data from the German Socio-Economic Panel (GSOEP) and from the British Household Panel Survey (BHPS). The GSOEP covers the period 1984 until 2000, and the BHPS covers the period 1991 until 2000. Section 4 provides the results of piecewise constant event history models on the transition to second and third birth risks. The last section draws together the main findings.

Figure 1: Total number of children, birth cohort 1965



Source: Council of Europe (2002)

1 Welfare state institutions in Great Britain and Germany

1.1 Taxes and transfers

In German public policies, the ‘subsidiary principle’ is an overarching scheme. It is usually interpreted in the sense that public intervention should be limited to situations where ‘family fails’. In practice, it means that family work and family care is actively encouraged by government intervention. Marriage and Family are under the special protection of Article 6, § 1 of the constitution, which becomes manifest in the tax and transfer system. Most importantly, this includes the system of income splitting, which allows married couples to file their taxes jointly. Due to the progressive tax schedule, this system gives generous transfers to couples with very unequal incomes. Put differently, this system provides extensive ‘housewife bonuses’ (Sainsbury 1997: 186). Other countries (such as Portugal or France) also offer joint taxation. However, Germany’s regulation is more far-reaching due to high taxes and the strong progression in the tax code. No other country offers higher transfers to non-working wives (Sainsbury 1997: 195; Dingeldey 2001, 2002).³ The splitting system demonstrates the familialistic nature of German policies in the way that it is focused on married couples with a pronounced traditional division of labor. However, subsidies to the standard ‘male breadwinner family’ are not restricted to the tax system alone. Other regulations can be found in the social security system. Non-working women are automatically covered by the health insurance of the employed spouse and they are entitled to a widow’s pension. In the public retirement scheme, childcare related work interruptions are credited in the calculation of the pension.

In Britain, support for low-income families has traditionally been the main focus of family policy. In the 1990s, the most important instrument in this respect was presumably Family Credit, an income supplement which was in 1999 replaced by

³ With more than 20 million € per year, the income splitting makes up a substantial share of Germany’s expenditures for family policies (Engstler 2004). This is particularly important to mention, because most cross-national comparisons of family policies only take into account child benefits and other policies which are clearly labeled as family support packages.

Working Family Tax Credit (WFTC).⁴ WFTC is a benefit for low-income families with a dependent child. It is conditional on at least one member working at least 16 hours a week. Single parents receiving WFTC, as well as couples with both partners working 16 hours or more, are additionally eligible for a childcare credit which covers 70 percent of childcare costs (Rake 2001: 218f.). Families with no or low earnings (and who work less than 16 hours per week) can claim Income Support, which contains a child support element. Formerly, there was a Single Parent Premium to Income Support, which was dropped by the Labor government (Rake 2001: 217). Single parents also had access to permanent social housing, but this was also reduced in 1996 (Pascall 1999: 266).

Support for specific family forms has been found to be comparatively weak Britain. As Daly (2000: 90) notes, marriage as an institution is much less privileged in Britain than in Germany. There had, however, been substantial concern whether the tax system encourages single parenthood among low income women. The policy changes that were introduced in the course of the 'New Deal' were fueled by the idea to provide stronger work incentives for families on welfare and to increase employment rates among single mothers (Holmwood 2000: 454). However, differences between the British and the West German system in the support of single parents are surprisingly small.⁵ There are some differences in the overall amount of child benefits with Germany paying higher

⁴ Family Credit was combined with a childcare disregard, which did, however, not result in a very high level of compensation. The level of compensation through the new childcare element in WFTC is much higher (Dilnot and McCrae 2000: 72; Duncan et al. 2001: 34f.). WFTC, as well as the child support element of Income Support, were replaced by Working Tax Credit and Child Tax Credit in April 2003. For a short time, there was an additional income-tested benefit, Children's Tax Credit. However, this was also replaced by the new benefits in April 2003 (Inland Revenue 2002; Rake 2001).

⁵ In Germany, single parents have priority access to means tested benefits since they have no partner whose income is considered in the calculation of eligibility (Konietzka and Kreyenfeld 2003). Single parents are regarded as limited employable ("nur bedingt dem Arbeitsmarkt verfügbar"). On these grounds they can claim social benefits until the child reaches age 16 (§ 120, Abs. 4 Sozialgesetzbuch III). In Britain, there was a single parent supplement to Income Support and to child benefits, which have recently been dropped. Similar to German regulations, single parents do not need to register as unemployed and can receive Income Support until the child reaches the age of 16. However, since April 2000, single parents are requested to attend an interview with a personal advisor to work out a possible plan for returning to work. While Income Support is reduced if they do not attend the interview, the benefit is not conditional on actually entering the labor market (Rake 2001; Department for Education and Employment 1998).

levels of benefits.⁶ The most significant difference between the two countries is the privileged position of married one-earner couples in Germany and the focus on family transfers to needy families in Great Britain.

1.2 Parental leave

Tax and transfers are certainly central elements of welfare state institutions. However, the taxes and transfers do not give a comprehensive picture of how institutional constraints shape mother's labor market choices and how they encourage certain family types and discourages others. Parental leave systems are considered to be important regulations to support the compatibility of work and family life. In Germany, maternity leave was introduced in 1952 and since 1965, it covers the period of six weeks before and eight weeks after delivery. Maternity leave is granted to working women and benefits amount roughly to the prior income. After maternity leave, the mother or the father can take parental leave for the duration of up to three years. Parental leave benefit can be claimed for the maximum duration of two years. All parents, irrespective of their prior employment status, are eligible to it. This benefit is income tested. The maximum payment is currently 300€ per month.⁷

Britain's regulations have particularly stood out by the very short duration of maternity and parental leave (Kamerman 2000; Deven and Moss 2002). Until recently, women had a right to 18 weeks paid maternity leave.⁸ In 2003, more extensive leave regulations were introduced. Maternity leave was extended to 26 weeks paid and 26 weeks unpaid

⁶ In both countries, child benefit is a flat-rate benefit paid to parents with children, independent of income. In Germany, child benefits increase with the parity of the child. However, the most recent reform in 2004 only grants higher payments to families with four and more children. In Britain, child benefits are slightly higher for the first child and lower for subsequent children. Single parents also received a higher child benefit, but this regulation was abandoned in 1998 for new claimants. In 2004, the child benefit for the first child is 154 € per month in Germany. In Britain, it is 16.50 £ per week (roughly 100 € per month) (Information and Analysis Directorate 2003; Bundesministerium für Familie, Senioren, Frauen und Jugend 2004).

⁷ German parental leave regulations have undergone several changes. The period of leave has been extended several times, most recently in 1992, when it was increased to 3 years. Since its introduction in 1986, the parental benefits amounts to roughly 300€ per month. In recent years, some flexibility has been added to the parental leave regulations. For example, parents who take one year of parental leave can claim a parental leave benefit of a maximum of 450€ per month.

⁸ Additional leave was conditional on length of previous employment, and its length depended on how exactly ordinary maternity leave was timed.

leave. Additionally, fathers can now take two weeks paid paternity leave. For mothers, benefits cover 90 percent of average weekly earnings for the first six weeks and 100 £ per week for the remaining 20 weeks (Department of Trade and Industry 2003). Parental leave was nonexistent before 1999. Now, unpaid parental leave of 13 weeks can be taken by each parent up to the child's 5th birthday (European Union 2000b; Department of Trade and Industry 2002).⁹

Compared to British regulations, Germany's parental leave system appears quite generous at first sight. Not only was the German government more rapid in introducing extensive parental leave regulations for both men and women. Furthermore, the duration of leave is substantially longer. However, it has frequently been questioned whether Germany's 'generosity' indeed supports the compatibility of work and employment. The income tested parental leave benefit of currently 300 Euro is generous compared to the unpaid parental leave in Britain. It is still nowhere near income replacement and presumably the major reason why fathers hardly ever take advantage of parental leave (Rost 1999; Beckmann 2001). The 'generous' leave period of three years is also ambiguous since a long work interruption is understood to jeopardizes a person's employment career (Waldfogel 1998). Certainly, parents are free to more rapidly return to work after childbirth. In practice, this strategy is confined by restricted childcare facilities (see below). Instead of facilitating the compatibility of work and family life, the German parental leave regulations are another twist of a familialistic regime, which the primary intention of which is to compensate women for the care of children in the household.

1.3 Childcare

The restricted possibilities to combine work and family life in West Germany have frequently been identified as chief parameters for both low levels of fertility and low maternal employment rates (Gornick et al. 1998; Rürup und Gruescu 2003; Hank et al. 2004). However, it would still be simplifying to assume that there was no public

⁹ British maternity and parental leave regulations have undergone some minor changes before 2003. For example, prior to 2000, maternity leave was 14 weeks only (European Commission 2002a).

daycare available. Since the 1980s, there has been almost complete coverage of public daycare for preschool children (ages 3-6). Since 1996, there is even a statutory right to a slot in public daycare for pre-school children. The important aspect rather is that part-time daycare for pre-school children is provided, but virtually no additional care arrangements for older or younger children exist. The latter is particularly unfortunate because schools are run part-time only. Under this restricted supply of daycare, parents are confined to take care of their children themselves until they reach age 3. Thereafter, part-time care is provided. But even then, it has been suspected that inflexible opening hours of the public daycare centers make it difficult to hold a regular part-time job (Spieß und Büchel 2003; Hank and Kreyenfeld 2003).

Insufficient and inflexible public daycare might be a major reason why West German mother's employment rates are low. But still, the question arises why there is no private market for childcare that meets the – generally presumed – ‘unmet’ need of parents. Esping-Andersen (2000: 63) claims that “there is no guarantee that markets thrive where states are absent.” Stier, Lewin-Epstein and Braun (2001: 1735) suspect that in social-democratic welfare regimes, the “social regulation overrides market principles.” Presumably, it is a combination of several reasons that explain the absence of a private market of childcare. Compared to Great Britain, Germany's tariff wages are high, the economy is more strongly regulated and less service-oriented. Also important might be that childcare and education are widely understood as public tasks. West German parents are rather unwilling to pay for childcare services out of their private budget (Engelbrech and Jungkunst 1998). Furthermore, it is important to take into account attitudes and preference. West German attitudes towards maternal employment stand out as being exceptionally traditional. Most people think that mother's employment harms the child's development (see below). Ultimately, the childcare system is embedded into the other institutions of the welfare state. Germany's institutions are tailored to fit the ‘male breadwinner model’. In a political context that nurses traditional family forms, it is explicable why traditional attitudes towards maternal employment persist and why a demand for private childcare is insufficient to stimulate a private market for care.

Unlike in the German system, childminders and private daycare centers play a significant role in the British childcare system.¹⁰ In 2001, out of 285,100 nursery places 93 percent were provided by private daycare centers (Department for Education and Skills 2001). Registered child minders provided another 304,600 places. Another major difference to the West German system, where school starts at age six, is that British pupils enter elementary school at age five already. Furthermore, schools are run through lunchtime and in the afternoon. In a system where public daycare is scarce and childcare generally considered a private matter, the household income determines the use of childcare. Since women with low income are unable to afford expensive private care arrangements, they will be less likely to work, more likely to rely on the partner's income, or on transfer payments. If there is substantial pressure to be employed, the quality of care becomes a chief parameter. Low income households will primarily use informal care arrangements and low quality care (Blau und Hagy 1998; Blau 2001). Considerations like these have fueled changes in the reform of the family tax system. As described above, a childcare credit was introduced together with the WFTC at the end of 1999, which may have a positive effect on the affordability of childcare for low-income families. However, there is still a strong positive correlation between the use of formal care arrangements and household income (Woodland et al 2004).

1.4 Maternal employment

Figure 2 compares employment rates of British and West German mothers by the age of their youngest children. British mothers are generally more likely to be employed. The largest differences can be observed in respect to full-time employment rates for women with school-aged children. 32 percent of British women are employed full-time when the child is age 7-12, which applies to only 13 percent of West German mothers. Almost half of all women with older children in Great Britain are employed full-time, but only 28 percent in West Germany.

¹⁰ Four-year-olds have been given an entitlement to a free nursery place. This entitlements however involves an average of only 12.5 hours of childcare a week (Rake 2001: 222f.; Randall 1996).

There are also great differences in attitudes towards maternal employment in the two countries. In West Germany, mother's employment is regarded as uncommon and harmful to the development of children (Braun et al. 1994; Sundström 1999; Treas and Widmer 2000; Stier et al. 2001). Scott (1999) presents analyses of the 1994-International Social Survey Programme on attitudes towards maternal employment. In a measure of the average extent of disagreement with the statement that preschool children suffer from maternal employment, she finds that, of the eight European countries studied, respondents in Germany were among those with the lowest level of support for maternal employment. On a five point Likert scale, the mean for Germany was slightly over 2. British respondents were among the most liberal, comparable only to Sweden. Their mean extent of disagreement with the statement that maternal employment is harmful to the development of children was measured to be slightly over 3.¹¹

Table 1: Mother's employment rates by age of youngest child in 2000

	Age 0-3	Age 4-6	Age 7-12	Age 13-18
Germany				
Employed full-time	13%	12%	13%	28%
Employed part-time	25%	44%	59%	49%
Not employed	63%	44%	28%	23%
Great Britain				
Employed full-time	19%	23%	32%	49%
Employed part-time	30%	40%	42%	30%
Not employed	50%	37%	26%	21%

Note: The sample comprises women aged 18-45 with children aged 0-18. The German results refers the self-assessed employment status (variable qp10). The British results refer to self-assessed employment status and hours worked (variables jjbstat, jjbhrs, and jjshrs)

Source: GSOEP 2002 sample A; BHPS 2001

¹¹ An interesting result is, however, that British respondents were among those with the lowest level of support for maternal employment when the child is of pre-school age (only 38% agreed, only slightly more than in Germany), but were among those with the highest average level of support for women working when the child is of school-age (almost 91% agreed – again comparable only to the Netherlands and Sweden).

2 Theoretical considerations on the determinants of higher order birth risks

For many countries, a positive effect of women's education on higher order births has been found (B. Hoem 1996; Hoem and Hoem 1989; Berinde 1999; Hoem et al. 2001; Kravdal 2001; Oláh 2003). Smallwood (2003) also reports this result for England and Wales. Kreyenfeld (2002) and Köppen (2004) report similar findings for West Germany. The standard assumption has long been that higher levels of female education are associated with lower fertility rates (Becker 1993; Hirschman 1994). Assuming that employment is largely incompatible with bringing up children, one would expect the disincentive against having a further child to rise with women's income. Assuming that education is a good predictor for labor market income, there should be a negative effect of woman's education on further childbearing.

Many different hypotheses have been brought forward aimed at explaining this unexpected finding of higher transition rates to the 2nd (and 3rd) child for higher educated women. A possible reason might be an income effect of women's employment. On the one hand, more highly educated women have a higher earning potential and therefore encounter higher opportunity costs of childrearing. On the other hand, they will also be better able to afford to pay for private childcare due to their higher income and thus will be more likely than lower educated women to be able to maintain their careers with two or three children. If they are able to combine childrearing and employment, they also have greater earning capacities to afford a larger family. Economically speaking, if the income effect overrides the substitution effect, women's higher education and earnings will lead to higher fertility (Blau and Robins 1989; Ahn and Pedro 2002). We will refer to this hypothesis as the *income effect hypothesis* in the following.

There might, however, be other interfering factors that affect a woman's transition rate to higher order births:

- For example, better *job conditions*, such as better job security, or more flexibility from the employees' point of view are largely expected to influence fertility decisions positively (Glass and Estes 1997). Higher educated women are more often employed in the public sector which offers better job security and working

conditions. A positive effect of women's education could therefore be related to omitted job characteristics.

- Another important aspect refers to the specific modeling of fertility transitions in event history models. The dependent variable in an event history model is the rate of occurrence of an event in the life course of individuals. A great drawback of the 'rate' is that it mixes the probability that an event will ever occur and the rapidity that it happens (Bernardi 2001). In the modeling of higher order fertility, this aspect is important for two reasons. More highly educated women are expected to be more career oriented, to earn higher wages and, thus, to experience higher opportunity costs of childrearing. They should have a greater incentive to space their births closely in order to minimize career interruption due to childbearing (Ni Bhrolcháin 1986a, 1986b). Lowly educated women might space their births further apart. They are less career oriented and encounter lower opportunity costs of childrearing. They should be less inclined to return to work after childbirth and might even employ birth spacing as a strategy to legitimize their absence from the labor market (Ni Bhrolcháin 1986b: 45). *Work accelerated childbearing* increases transition rates to higher order births for the highly educated. However, the overall probability of having a second or third child might be very similar by different educational levels.
- A similar argument can be made for the role of age at first birth. Educational participation usually defers family formation (Hoem 1986; Blossfeld and Huinink 1991). This results in highly educated women being older at first birth than their less educated counterparts. Because they are older at first birth, they have less time at their disposal to have subsequent children before they reach the biological limits of fertility. A perceived *age squeeze* might accelerate transition rates to higher order births for highly educated women.¹²

¹² Selectivity might play a role in the relationship between education and higher order fertility. The *selectivity hypothesis* is based on the finding that levels of childlessness are higher among women with higher than with lower levels of education. Therefore, it is assumed that those higher-educated women who do have a first child are a very select group (Kreyenfeld 2002). One possible variant of the selectivity hypothesis is that higher educated women who left the labor market took higher opportunity costs into account than lower educated women who left the labor market after having a first or second child. The idea is that higher-educated women must have had a strong motive, such as being particularly family-oriented, to accept these higher opportunity costs. This hypothesis would lead one to expect a positive effect of education on higher order birth rates among mothers outside the labor market. We are unable to address this hypothesis in the analysis.

- Another explanation why research has found a positive effect of women's education might be due to omitted *partner characteristics*. Even in a welfare regime where women are able to combine childrearing and employment, one would still expect that the labor market status of both partners influences fertility. In a 'male breadwinner regime', it should be primarily the male partner's employment that fosters transitions. The positive effect of partner characteristics on fertility is important if educational homogamy is high. If partners' levels of education are strongly correlated, the positive effect of women's level of education on higher order birth rates might then be due to the omitted characteristics of the partner.

In the following empirical section, we investigate how women's and their partner's education and labor market characteristics influence second birth risks in Great Britain and West Germany. Due to the differences in the welfare regimes, we expect that women's higher education and labor market orientation reduce second birth risks in West Germany. In Great Britain, where childcare is more accessible, we expect that women's higher education and labor market orientation have a positive influence on transitions to higher order births.

3 Data, sample, variables and method

3.1 Data

For this study, we use data from the German Socio-Economic Panel (GSOEP) and the British Household Panel (BHPS). The BHPS and the GSOEP are panel studies and the same individuals are re-interviewed on an annual basis. In order to describe the way we set up our data, it is useful to introduce the term ‘panel period’ and ‘pre-panel period’. ‘Panel period’ covers the time since a respondent has been surveyed for the first time until he or she drops out of the sample. For the ‘panel period’, the BHPS and the GSOEP provide a rich set of information on employment, attitudes, household composition and changes in demographic states. For the ‘pre-panel period’, i.e. the time prior to entry into the panel, respondents are only requested to provide fairly rough information on their past employment, fertility and marital histories. Since only rough information is available for the ‘pre-panel period’, we restrict the analysis to the ‘panel period’. For the GSOEP, we employ the period 1984 until 2000, for the BHPS the period 1991 until 2000.¹³

A great advantage of a panel study, compared to a retrospective survey, is that it provides reliable longitudinal information on wages, labor market positions and attitudes. In order to construct our covariates, we proceed as follows: We utilize information which the respondent reports at the date of interview and we assume that this information is constant over the last and the following six months.¹⁴ Figure 2 visualizes this procedure. In this example, the first interview was conducted in April 1991 and the respondent reports that she earned 2,000 German Marks. This person experiences several income changes in the following years. In February 1995, the woman gives birth to a child and when she is interviewed in April 1995, she is no

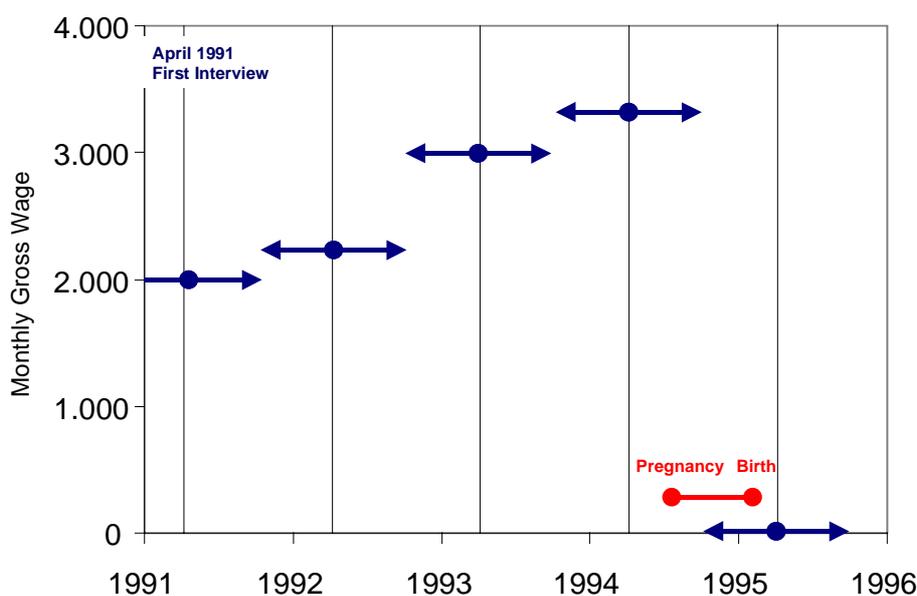
¹³ Restricting the analysis to the panel period involves that some of the cases are left-censored. Some respondents therefore enter the observation period after they become at risk of second or third birth for the first time.

¹⁴ If two interviews are more or less than 12 month apart, we assume that the characteristics of the previous year are constant until six months before the next interview.

longer employed. In order to make sure that the employment situation proceeds the decision to have a child, we backdate the date of birth by nine months.¹⁵

The BHPS and the GSOEP are both household surveys. This makes it possible to link the respondent's to the cohabiting partner's characteristics. This can be done through the 'partner identifier', (i.e. the id of the respondent's partner which is provided as a generated variable by the GSOEP- and the BHPS-group). The partner characteristics are constructed along the same line as the other covariates. For example, a woman is surveyed in April 1991. At the date of interview, she is living with a partner who has a vocational degree. In April 1992, when the respondent is interviewed the next time, she has a new partner with a university degree. We employ the first partner's characteristics from October 1990 until October 1991 and the second partner's characteristics from October 1991 until October 1992.

Figure 2: Survey design and covariates



¹⁵ When the birth occurs three to nine months after the interview, the employment status is measured after pregnancy. But, it is still measured before childbirth.

3.2 Selection of the sample

The GSOEP consists of various subsamples, i.e. a ‘West German sample’, a ‘foreigner sample’, an ‘East German sample’, an ‘immigrant sample’ etc. (Haisken-DeNew and Frick 2003). For this study, we employ respondents of the ‘West German sample’ and the ‘foreigner sample’. The original BHPS sample covers England, Wales and Scotland south of the Caledonian Canal, however after wave one, respondents were followed to Scotland north of the Caledonian Canal. In later waves, several subsamples were introduced. In wave 7, subsamples of the United Kingdom European Community Household Panel were incorporated into the BHPS, and in waves 9 and 11 respectively, the Scotland and Wales Extension Samples and the Northern Ireland Household Panel Survey were introduced. For this analyses, we use only the original sample, and not the additional subsamples introduced in later waves. We restrict the analysis to women who were aged 17-45 during the observation period. We omit respondents with incomplete or implausible fertility histories. This leaves the West German sample with 1,824 respondents who gave birth to 784 second children and 816 in the British sample who gave birth to 363 second children.

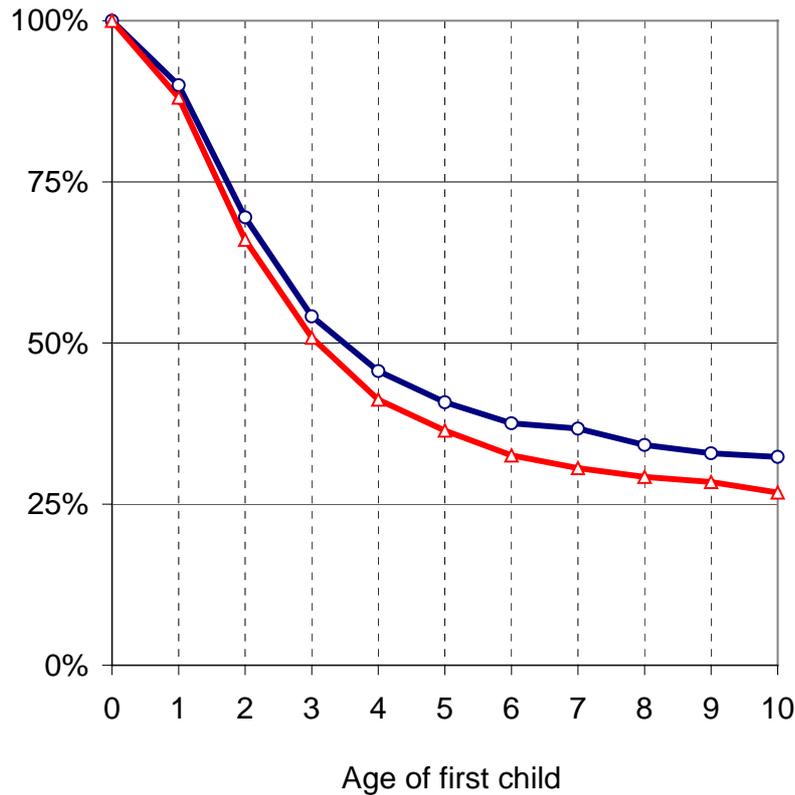
3.3 Dependent variable

The dependent variable is the transition to second *pregnancy*, i.e. we backdate the date of birth by nine months.¹⁶ The reason for using the date of pregnancy instead of birth is to avoid reversed causation, which particularly concerns the effect of employment on fertility. The process time starts at the birth of the first child and it ends nine month before the date of second birth or nine months before censoring. A case is censored

¹⁶ For all female respondents in the GSOEP and BHPS, the complete fertility history is surveyed. In the case of the GSOEP, when surveyed for the first time, respondents are requested to report the sex, parity and year of birth of their children. During the panel time, changes in the demographic composition of the household are surveyed every year by requesting the respondent to give the exact month a demographic event, such as the birth of a child, has occurred. In the case of the BHPS, fertility histories were collected at wave 2. Thereafter, fertility information can be reconstructed using the household composition file. We employed the ‘annual fertility history’ and information on the demographic changes which occurred during the ‘panel time’ to construct the exact date of childbirth.

when a respondent drops out of the sample or at the last date of interview.¹⁷ Figure 2 displays the survival curves to the second conception. It shows that the overall probability of a second birth is lower in the West German sample.

Figure 2: Transition to second conception, Kaplan-Meier survival curves



Source: BHPS 2001; GSOEP 2002 (sample A only)¹⁸

¹⁷ For some few cases, it is not possible to identify the exact month of birth. In such cases, we assume that the child was born in June (and conceived in September of the previous year).

¹⁸ In the calculation of the survival curves for Germany, we only used 'sample A' (the 'West German sample'). Since foreigners are over-sampled in the GSOEP, we would have to use weights, otherwise.

3.4 Independent variables

One of the key independent variables is a time-varying covariate of the *educational level* of the respondent. We distinguish a university degree, a vocational training certificate and respondents without a degree. In the GSOEP, information on the educational level of the respondent was gathered from the generated variables provided each year by the GSOEP-group (Haisken De-New and Frick 2003). In the BHPS, education histories were constructed from information given the first time respondents were interviewed and yearly education updates.

We control for the *age at first birth*. We distinguish women who were ages 15-20, 21-25, 26-30, 30-35 and above age 35 at the birth of the first child. For the analysis of third birth risks, we also take into account the age at second birth. In order to capture time trends, we use the *calendar period* as a time-varying covariate. For West Germany, we distinguish the periods 1984-1990, 1990-1995 and 1995-2000. For Britain, we only distinguish the period before and after 1995. For the British sample, we distinguish respondents who were born in Britain and *foreign born respondents*. For the West German sample, we distinguish foreigners (respondents surveyed in the ‘foreigner sample’) and Germans (respondents surveyed in the ‘West German sample’).

Furthermore, we take into account the *employment status*. We distinguish full-time employment, part-time employment and not employed. For the full-time employed, we take into account the *monthly labor market income*. In the GSOEP, the labor market income is the self-reported monthly gross wage in DM. We deflated it by using the price index provided by the German Statistical Office. We finally classified the monthly gross wages into low income (less than 2000 DM per month), medium (2000 DM-4000 DM per month) and high income (more than 4000 DM per month). In the BHPS, monthly gross wage is a derived variable constructed by the BHPS group. Respondents were asked to report their last gross wage along with the reference period to which it applies. We deflated wages using the consumer price index provided by the Office for National Statistics. Monthly gross wages were finally classified into low income (less than £ 900), medium (£ 900 - £ 1400) and high (over £ 1400). Another labor market indicator is whether a person is working in the *private or public sector*.

We also take into account the *partnership status* and we distinguish singles (or rather single mothers), married women and cohabiting couples. Divorced and widowed

women are classified into one category. For women who live with their partner, we take into account the partner's characteristics, which were constructed along the same lines as the woman's characteristics.

3.5 Method

We apply event history techniques to the analysis of second pregnancy risks (Allison 1984; Yamaguchi 1991; Blossfeld and Rohwer 2001). The process time is the duration between first birth and second conception. The baseline hazard is modeled as a piecewise constant function. This means that the baseline is partitioned into several segments. The hazard rates are constant for these pre-defined time segments, but they can vary across them. In our analysis, the cut points are when the first child is age 1, 2, 3, 4, 6 and 10. We control for various time-varying covariates such as educational level, calendar period and partnership status. When $\ln h(t)$ is the natural log of the intensity of the event, $h_0(t)$ the baseline hazard (which is the woman's age represented as a piecewise constant hazard), $x(t)$ a time-varying covariate and β the parameter estimate, one yields the following general relationship

$$\ln h(t) = h_0(t) + \beta x(t)$$

In order to estimate the model, we use the event history module in STATA 8.1 and the extension for piecewise constant models provided by Jesper Sorensen (Stata Corporation 2003).

4 Results

Table 2 and 3 report the results from a stepwise model. Apart from woman's education, the model includes some standard control variables, like nationality, calendar period and marital status. Let's first turn to the effect of the control variables:

There is a bell-shaped effect of duration since last birth on second conception risks. Hazard rates are highest between one and three years after first birth and they gradually level off thereafter. Foreigners (and foreign borns in Britain) encounter a higher second birth fertility. This effect is, however, non-significant.¹⁹ There are no major changes in second birth risks over time, neither in West Germany nor in Britain.²⁰ Marital status has the expected effect. Second birth risks are highest for married couples and lowest for single mothers. In West Germany, however, there is no significant difference in second birth fertility between marital and non-marital unions. In general, one would expect a higher fertility for married couples. That we do not find significant results can presumably be attributed to the small numbers of non-marital couples at risk of second birth in West Germany.

The effect of education is similar to the one reported in other studies. In Britain and West Germany, second birth risks are highest for women with a university degree. Compared to women with a vocational training certificate, second birth risks for university graduates increase by more than 30 percent. This result is very much in line with other findings (B. Hoem 1996; Hoem and Hoem 1989; Berinde 1999; Hoem et al. 2001; Kravdal 2001; Oláh 2003). It also complies with our theoretical argumentation that there are various mechanisms that lead to a positive effect of woman's education on higher order fertility. The critical question is which are the 'true' mechanisms that contribute to this positive effect of woman's education on second birth risks.

¹⁹ A model with only nationality shows positive and significant effects on second birth risks. This effect vanishes after the inclusion of marital status.

²⁰ For improved readability, we employ the term *birth* risks although we actually deal with *conception* risks.

Table 2: Relative risks of the transition to second pregnancy – West Germany

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age of first child*)						
Age 0 –1	0.009	0.014	0.012	0.012	0.011	0.011
Age 1 –2	0.020	0.031	0.023	0.023	0.022	0.022
Age 2 –3	0.021	0.033	0.025	0.024	0.023	0.024
Age 3 –4	0.015	0.024	0.018	0.018	0.017	0.017
Age 4 –6	0.011	0.017	0.013	0.013	0.013	0.013
Age 6 –8	0.005	0.008	0.006	0.006	0.006	0.006
Age 8 –10	0.004	0.006	0.005	0.005	0.004	0.005
Age 10+	0.001	0.001	0.001	0.001	0.001	0.001
Nationality						
Native	1	1	1	1	1	1
Foreign/ foreign born	1.13	1.00	1.02	1.02	1.03	1.07
Calendar period						
1984-1990	1	1	1	1	1	1
1991-1995	1.02	1.06	1.03	1.03	1.03	1.04
1996-2000	0.86	0.94	0.91	0.91	0.89	0.90
Partnership status						
Married	1	1	1	1	1	1
Non-marital partnership	0.79	0.75 *	0.77	0.77	0.77	0.81
Single	0.38 ***	0.34 ***	0.35 ***	0.35 ***	0.35 ***	0.43 ***
Divorced/widowed	0.69 **	0.67 **	0.70 **	0.70 **	0.70 *	0.81
Education						
No degree	1.04	0.95	0.93	0.92	0.92	0.92
Vocational degree	1	1	1	1	1	1
University degree	1.35 **	1.53 ***	1.56 ***	1.56 ***	1.52 ***	1.39 **
Age at first birth						
Age 15-20		1	1	1	1	1
Age 21-25		0.72 ***	0.73 ***	0.73 ***	0.72 ***	0.72 ***
Age 26-30		0.64 ***	0.66 ***	0.66 ***	0.66 ***	0.64 ***
Age 31-35		0.48 ***	0.48 ***	0.48 ***	0.47 ***	0.43 ***
Age 35-45		0.17 ***	0.17 ***	0.17 ***	0.17 ***	0.16 ***
Employment						
Not employed			1.36 **	1.36 ***	1.42 **	1.40 **
Employed part-time			1.38 ***	1.42 ***	1.48 **	1.47 **
Employed full-time			1	1	1	1
Sector						
Public sector				1	1	1
Private sector				1.03	1.04	1.04
Wage						
low					1.10	1.10
medium					1	1
high					1.52	1.51
Partner's education						
No degree						0.93
Vocational degree						1
University degree						1.42 ***

Flag variables for missing information were also added to the regression

*: $p \leq 0.01$ **: $0.01 \leq p \leq 0.05$ *: $0.05 \leq p \leq 0.10$

Source: SOEP 2002

Table 3: Relative risks of the transition to second pregnancy – Great Britain

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age of first child*)						
Age 0 –1	0.013	0.027	0.021	0.025	0.018	0.017
Age 1 –2	0.032	0.063	0.051	0.060	0.044	0.041
Age 2 –3	0.030	0.059	0.049	0.057	0.043	0.041
Age 3 –4	0.025	0.048	0.040	0.047	0.035	0.034
Age 4 –6	0.015	0.030	0.025	0.030	0.022	0.021
Age 6 –8	0.007	0.014	0.012	0.014	0.010	0.010
Age 8 –10	0.006	0.011	0.009	0.011	0.008	0.008
Age 10+	0.001	0.002	0.002	0.002	0.001	0.001
Nationality						
Native	1	1	1	1	1	1
Foreign/ foreign born	1.15	1.08	1.12	1.15	1.14	1.12
Calendar period						
1984-1990	--	--	--	--	--	--
1991-1995	1	1	1	1	1	1
1996-2000	0.84	0.88	0.90	0.90	0.91	0.93
Partnership status						
Married						
Non-marital partnership	0.68 **	0.54 ***	0.53 ***	0.53 ***	0.53 ***	0.55 ***
Single	0.42 ***	0.30 ***	0.28 ***	0.28 ***	0.28 ***	0.30 ***
Divorced/widowed	0.37 ***	0.34 ***	0.33 ***	0.33 ***	0.33 ***	0.34 ***
Education						
No degree	0.92	0.90	0.88	0.90	0.89	0.87
Vocational degree	1	1	1	1	1	1
University degree	1.31 *	1.55 ***	1.59 ***	1.53 **	1.47 **	1.39 *
Age at first birth						
Age 15-20		1	1	1	1	1
Age 21-25		0.61 **	0.63 **	0.65 **	0.66 **	0.69 *
Age 26-30		0.54 ***	0.56 ***	0.57 ***	0.58 ***	0.59 **
Age 31-35		0.41 ***	0.43 ***	0.43 ***	0.44 ***	0.45 ***
Age 35-45		0.22 ***	0.24 ***	0.23 ***	0.24 ***	0.25 ***
Employment						
Not employed			1.35 **	1.12	1.49 *	1.49 *
Employed part-time			1.18	1.20	1.62 **	1.62 **
Employed full-time			1	1	1	1
Sector						
Public sector				1	1	1
Private sector				0.76 *	0.74 **	0.74 **
Wage						
low					1.59 *	1.62 *
medium					1	1
high					1.47	1.44
Partner's education						
No degree						1.17
Vocational degree						1
University degree						1.22

Flag variables for missing information were also added to the regression

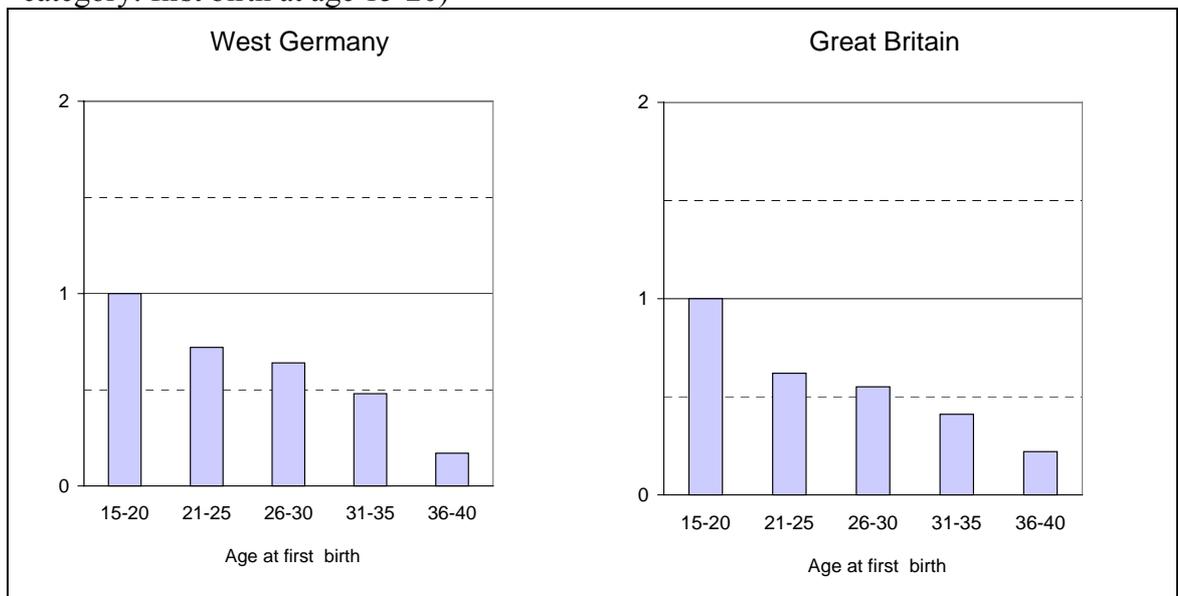
*: $p \leq 0.01$ **: $0.01 \leq p \leq 0.05$ *: $0.05 \leq p \leq 0.10$

Source: BHPS 2001

Is there an age-squeeze?

One reason for the elevated second birth risks of university graduates could be an ‘age-squeeze’. University graduates are usually older at first birth. They have spent longer times in education during which they have postponed parenthood. Since they are older at first birth, they have less time at their disposal to have a second child before they reach the biological limits of fertility. This ‘age squeeze’ might accelerate their transition rates to the second child. In order to address this aspect, we insert the age at first birth into the model (Model 2). There is a very strong negative relationship between age at first parenthood and second birth risks (Figure 3). Compared to teenage mothers, second birth risks are cut by half for women who had their first child at ages 31-35. For women who were over age 35 at first parenthood, second birth risks are reduced by roughly 80 percent. This result suggests that there is not much support for the ‘age-squeeze hypothesis’. After the inclusion of this variable into the model, the positive effect of women’s education on second birth risks becomes stronger. Compared to women with a vocational training certificate, second birth risks increase by roughly 50 percent in both countries.

Figure 3: The effect of age at first birth on second birth risks (relative risks, base category: first birth at age 15-20)



Note: For the full model, see Table 2 Model 1b

How does female employment influence second birth fertility?

The results for the woman's employment status are fairly similar for the two countries (Model 3). Not working and part-time working women encounter significantly higher second birth risks than the reference category of full-time employed women. If the 'income effect hypothesis' applied, one would expect that highly educated women who are able to return to the labor market encounter higher fertility rates than others.

In order to address this aspect, we employed an interaction of employment status and education (Table 5). In West Germany, second birth risks are highest for part-time employed and not working women across all educational groups. The highest second birth risks are even encountered by non-working women with a university degree. In Great Britain, findings are similar. However, among those with a university degree, the part-time employed stand out as having much higher second birth risks than either those not employed or employed full-time. In general, there seems to be a strong education effect for the part-time employed, with part-time employees without a degree having the lowest second birth risks of all.

Table 5a: Results from interaction model of woman's education and employment, relative risks - West Germany

Woman's employment	Woman's education		
	No degree	Vocational degree	University degree
Not employed	0.92	1.09	1.73***
Employed part-time	1.04	1	1.76*
Employed full-time	0.83	0.73***	1.00

Table 5b: Results from interaction model of woman's education and employment, relative risks – Great Britain

Woman's employment	Woman's education		
	No degree	Vocational degree	University degree
Not employed	1.13	1.06	1.05
Employed part-time	0.59**	1	2.56**
Employed full-time	0.79	0.79	1.18

Other control variables: age of first child (baseline), age at first birth, nationality, calendar period, partnership status

Do working conditions matter?

In Great Britain, work characteristics matter for the transition to the second child. Working in the public sector has a strong positive impact on second birth risks (Model 2). It increases second birth fertility by more than 35 percent. Including work characteristics into the model also decreases the positive effect of woman's university education on second birth risks. In West Germany, there is no impact of woman's employment characteristics on second birth risks. Whether the woman works in a private firm or in the public sector does not seem to matter at all for the decision to have a second child.

Is there an income effect?

Given that neither an age squeeze nor work characteristics explain the positive effect of woman's education on second birth risks, does this give support for the 'income effect hypothesis'? With the data from the GSOEP and the BHPS, the 'income effect' hypothesis can more directly be tested, since labor market wages are available in this data set. For the full-time employed, we distinguish a low, medium and a high monthly gross wage, which we also add to the regression (Model 5). In West Germany, there is no significant effect of income on second birth fertility. One certainly needs to take into account the very low number of women returning to full-time work after first birth at all. In Britain, there is U-shaped relationship between woman's income and second birth fertility with lower and higher income groups experiencing higher second birth risks. This result is also only weakly significant.

What about the partner's characteristics?

Particularly for the case of West Germany, the positive effect of women's university education on second birth fertility is rather surprising. One reason for this result could be the omitted partner characteristics. In Germany, educational homogamy is high and women with a university degree often live with partners who have similar characteristics (Wirth 1996). In West Germany, there is indeed a strong positive effect of partner's education on second birth risks (Model 6). Compared to women with partners with less than a university degree, second birth risks increase by 40 percent.

After including the partner's characteristics, the coefficient for women's education on second birth risks becomes smaller, but it is still significant. In Great Britain, there is some positive gradient of partner's education on second birth risks. However, this effect is weaker than in West Germany and it is insignificant. Including further partner employment variables (labor market income and sector of the economy) did not provide any additional insight either.

5 Summary

In this paper, we compared the determinants of second birth risks in the UK and West Germany. The major results from the empirical analysis can be summarized as follows:

- Regarding the basic demographic variables, age at first parenthood had the most pronounced impact on second birth risks. The later the first birth, the less likely it is that a woman will have any subsequent children.
- In both countries, women's full-time labor market participation reduces second birth risks. Working in the public sector (compared to the private sector) has a positive impact on second birth transitions in Britain, while there is no such effect in West Germany.
- Similar to previous empirical findings on second birth fertility, we find that woman's university education accelerates birth risks. Partner's educational attainment positively influences second birth fertility in West Germany, but not so much in the UK.

We suspected that the positive effect of women's university education is due to different factors in the two countries. For West Germany, we suspected that it was due to omitted partner characteristics. This hypothesis was only partially supported, since some of this effect remained even after controlling for partner characteristics. For the UK, we suspected that omitted job characteristics or an 'income effect' was more important. Women with higher education earn higher earnings, are better able to afford daycare and have the earning capacity to afford a larger family. There is some support that more stable working conditions in the public sector positively influence second

birth risks. However, we did not find much evidence that a high female (or male) labor market income matters for second birth transitions.

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