Beyond the two-child family: factors affecting second and third birth rates in West Germany

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Einflussfaktoren auf die Übergangsraten zur zweiten und dritten Geburt in Westdeutschland

Abstract
Based on retrospective data from the German Family Survey (DJI Familiensurvey) 2000, we investigate factors associated with the transition from the second to the third child for West German women of the birth cohorts 1944-1979 and contrast them to the determinants of the transition from the first to the second child. Applying event history analysis, we confirm effects of timing and spacing of children and mothers' labor force participation reported in previous studies. In addition, we find a higher third birth rate for women with two children of the same sex, who might wish to have a child of the opposite sex. Further, we find a higher third birth rate for women with two or more siblings, which we interpret as transmission of family values. Finally, women with a new partner since the first birth as well as women with a new partner since the second birth show higher third birth rates, which might result from a union-confirmation effect of shared children in combination with a two child norm.

***Key words*:** fertility, higher parity births, third child, second child, Germany, event history analysis

Zusammenfassung
Anhand von Retrospektivdaten des DJI Familiensurvey 2000 untersuchen wir die Einflussfaktoren auf den Übergang vom zweiten zum dritten Kind für westdeutsche Frauen der Geburtskohorten 1944-1979 und stellen sie denen des Übergangs vom ersten zum zweiten Kind gegenüber. Anhand von Ereignisdatenanalysen bestätigen wir die aus früheren Studien bekannten Effekte von Alter und Berufstätigkeit. Wir finden eine höhere Übergangsrate zur dritten Geburt für Frauen mit zwei gleichgeschlechtlichen Kindern, die sich vermutlich noch ein Kind des anderen Geschlechts wünschen. Darüber hinaus finden wir eine höhere Übergangsrate zur dritten Geburt für Frauen, die selbst zwei oder mehr Geschwister haben, was wir als Transmission von Familienwerten interpretieren. Zudem haben Frauen, die seit der Geburt des ersten oder des zweiten Kindes den Partner gewechselt haben, eine höhere Übergangsrate zur dritten Geburt, was unter Umständen auf den Wunsch, die Beziehung durch gemeinsame Kinder zu bestätigen, in Kombination mit einer Zwei-Kind-Norm zurückzuführen ist.

***Schlagwörter*:** Fertilität, Geburten höherer Parität, drittes Kind, zweites Kind, Deutschland, Ereignisdatenanalyse

1. Introduction

In West[1] Germany, as in most industrialized countries, declining fertility rates have been observed over decades, reaching one of the lowest levels of fertility in the European Union (European Commission 2011). A closer look at the fertility trends in West Germany since the 1960s reveals that not only a high rate of childlessness but also diminishing family size has contributed to this development (Kreyenfeld 2004; Dorbritz 2008). The share of families with more than two children has been declining over time (Huinink 1988; Frejka 2008), while one-child and two-child families seem to be the preferred model: 68% of West German women and 79% of those in East Germany want to have one or two children in 2004, but only about 15% want to have three or more children (Dorbritz 2008). Ideal family sizes even seem to shift to the one-child-family (Goldstein et al. 2003).

While becoming somewhat of a rarity, the third child has received considerable attention in research over the years. Several studies have investigated the factors influencing third birth rates, mainly with focus on the effect of education and labor force participation on women's childbearing behavior (Kravdal 1992; Berinde 1999; Hoem et al. 2001; Callens/Croux 2005). A number of recent studies find that women with high levels of education have the highest third birth rate (Kravdal (1992) for Norway and the US, Hoem (1993) and Berinde (1999) for Sweden), but Hoem et al. (2001) cannot reproduce this effect with Austrian data, and Callens and Croux (2005) even find a negative effect in a sample of 14 European countries. Also Kravdal (2001) reports negative effects after controlling for unobserved heterogeneity and selectivity. Labor force participation, in contrast, has been shown unambiguously to have a negative effect on the probability to have a third child (Hoem/Hoem 1989; Kravdal 1992; Berinde 1999; Callens/Croux 2005).

A further key aspect in prior research was the effect of age and spacing of births: Martin (2000) investigates birth rates for US American women after age 30, finding a very low third birth rate as well as an inversely U-shaped relationship between the time since the previous birth and the transition to the next child. Morgan and Rindfuss (1999) observe a strong association between the age at first birth and (completed) fertility when comparing mean parities of women over age 40, using the US Current Population Surveys. Yamaguchi and Ferguson (1995) find a negative effect of the mother's age at the second birth and a positive effect of a short interval between the first two births on the third birth.

A considerable number of studies put their focus on sex preferences: Parents of same-sex children are often found to have a higher third birth rate than parents of different-sex children (for an overview see Hank 2007). Yamaguchi and Ferguson (1995) confirm this pattern in particular for highly educated and younger women in the US. Tian and Morgan (2015) show that the effect of gender composition still exists, although it declined in the US until the mid-1990s.

Second birth rates in Germany are rather well researched (amongst others Huinink 1989; Kreyenfeld 2002; Köppen 2006). However, literature on third birth rates in Germany is rare. We are aware of Alich (2006), who has his focus on the effects of welfare state regimes, however. We are also aware of Hank and Kohler (2003), who put their focus on par-

1 Due to data restrictions, we limit our focus to West Germany to avoid the comparison between the former German Democratic Republic and Federal Republic of Germany. Accordingly, our statements relate to West Germany even when not stated explicitly.

ents' sex preferences, and an early study of Huinink and Tuma (1990). Therefore, the main contribution of this paper is that we undertake the first encompassing analysis on third birth rates for Germany. Our analysis will shed light on the factors associated with having a third child in (West) Germany during the second half of the last century. We contrast the third birth to the second in order to highlight the specifics of the progression from the "normal" two-child-family to the more unusual three-child-family constellation.[2] Therefore, we run the model both for the progression from the first to the second and for the second to the third birth in order to reveal differences in the factors affecting second and third birth rates.

Based on retrospective data from the German Family Survey (DJI Familiensurvey) 2000, we apply event-history analysis to estimate effects of socio-demographic factors such as age, spacing of births, and education on second and third birth rates. The German Family Survey is well-suited for our purpose, since it includes detailed fertility information for a large number of two-child mothers. Event-history analysis can be regarded as the most appropriate method for investigating fertility as it takes into account the timing of births.

A second contribution of our paper is that we try to give a careful explication of the theoretical mechanisms that generate the observed effects. To our view, the existing literature concerning higher parity progression did not make these mechanisms fully clear. We thus hope that our relatively detailed discussion in the next section will clarify some points.

2. Theoretical framework

When deciding about a third child parents consider reasons for and against it. This fertility decision can be analyzed with economic models where the couple weighs the children's utility against the costs when deciding about the number of children (Becker 1993). For higher parity, progression sequential models (Udry 1983) are adequate which take into account family constellation and circumstances when the decision about an additional child is made. Heiland et al. (2008) show that desired family size changes over time and that childbearing influences further fertility desires. Hence, the decision about a third child differs from the decision about a second child only insofar as it is made under the specific conditions of two children already born.

A number of factors drive parents' decision about an additional child. Evans et al. (2009) identify three reasons *against* the third child: the parents' age and health, financial constraints, and parental capacity. The effect of the parents' age and health on family size has been expressed by Kippen (2006): "the later you start, the fewer you have". At the point of the decision about the third child, higher age has three implications: declining female fertility, higher risk of medical complications for mother and child, but also concerns about parental capacities in the future. These factors, but also the fact that women who start childbearing early may have a higher family orientation, explain the lower probability of higher parity births for older couples (Hoem et al. 2001).

2 As our main interest is on the third child, we limit the literature review as far as possible to the third child. Literature on the progression to the second child is rich (e.g. Huinink 1989; Kreyenfeld 2002), and a considerable number of contributions deals with both the second and the third parity progression (e.g. Kravdal 2001; Hoem/Hoem 1989). We mention the respective literature where necessary.

Financial aspects include direct costs like an additional bedroom and spending for childcare, but also opportunity costs if one of the parents will have to cut down hours of work to care for the child. Accordingly, families with a higher income in general should have a higher propensity to have a third child. However, higher income may induce higher childrearing costs (e.g. better childcare, better education, and better equipment) because parents invest more in the quality of children (Becker 1993), which may reduce or even reverse the positive effect of additional income. In addition, income levels of men and women may have different effects: While a higher income of the (typically male) breadwinner may lead to a larger probability to have a third child (assuming constant childrearing costs and no parental leave), a high wage rate of the mother means higher opportunity costs (in case of parental leave) and thus might even have a negative effect (Hotz et al. 1997). Obviously, this effect depends on institutional conditions like the parental leave regime as well as the availability and costs of childcare (Hank/Kreyenfeld 2003). If generous parental leave arrangements and/or childcare are available at relatively low cost, the income effect might dominate the opportunity cost effect (Ermisch 1989). It should be noted that only in the case of parental leave (without complete wage substitution), higher income of the women means higher opportunity costs. In contrast, if the mother again takes up paid work shortly after birth, opportunity costs are substituted by wage-independent costs of childcare, so that only the income effect should exist for both parents.

A further aspect is parental capacity which might not allow them to have an additional child. Apart from age and health (as mentioned above), parental capacity depends on various factors like support from personal networks (Balbo/Mills 2011), satisfaction with the current situation (Luppi/Mencarini 2013), or the division of childcare tasks between the parents (Cooke 2004). The decision against a third child can even be driven by the wish to invest more in the existing children without overburdening parental capacities (i.e. a substitution effect between quality and quantity of children, as Becker (1993) states).

An obvious factor is the existence of a partner. Not only do women need a male sexual partner to (naturally) conceive a child, couples also provide better conditions regarding parental capacity and family finances than single parents (Misra/Moller/Budig 2007). Thus, mothers in a partnership may have lower opportunity costs than single mothers. What is more, having children manifests the parents' commitment to the partnership (Griffith/Koo/Suchindran 1985), leading to a higher value of children for couples than for single mothers. This is relevant in particular with regard to the first birth in a relationship.

In addition, individual preferences may play a role. Some individuals place higher value on children than others, while others have higher career-orientation or preferences towards a leisure-oriented lifestyle and thus perceive (immaterial) opportunity costs as high. Preferences seem to be influenced by the family of origin, as parents tend to reproduce family constellations they experienced themselves as children (Huinink 1988; Berinde 1999), so that people with siblings will be more likely to have more than one child. Furthermore, research results indicate that some parents have a preference for opposite sex-children as couples with two boys or two girls are more likely to have a third child than parents of a son and a daughter (e.g. Andersson et al. 2006; Hank/Kohler 2003; Tian/Morgan 2015). Evans et al. (2009) argue that, additionally to the mentioned factors, an (empirically unobservable) "biological" desire to have another child drives the decision for an additional child, which might differ between individuals as well.

These individual preferences as well as the decision about having an additional child are influenced to a certain degree by social norms. Dorbritz (2008) shows that the majority of German men and women ideally want to have two children. Comparing a number of German datasets, Philipov and Bernardi (2011) report that the majority of respondents indicate two children as the ideal number of children for a family. The majority's view on the ideal number of children for families is sometimes interpreted as social norm (Philipov/Bernardi 2011). Hence, it could be argued that a two-child-norm exists in Germany. On the other hand, ideal number of children may rather be a standard guiding individual fertility decisions than a social norm (Girard/Roussel 1982).

From the above considerations we derive our hypotheses about the effects of sociodemographic characteristics on second and third parity births: To take into account the age effect we include the mother's age at first birth as well as the intervals between the births. Regarding age at first birth, we expect that higher age at first birth will be associated with lower probability to have an additional child, the effect being greater for third births. The effect of birth intervals needs some more consideration since birth intervals are influenced by several factors: On the one hand, financial opportunity costs of an additional child may be lower in case of a short spacing between second and third birth if the mother has not returned to her job yet (Becker 1993).[3] Similarly, opportunity costs regarding leisure activities are higher if the preceding children are already older and more independent of the parents. Another factor promoting short birth intervals is a strong family orientation (Berinde 1999). On the other hand, very young children may make particular demands on parental capacities, so that the decision for an additional child is postponed. Accordingly, we derive two hypotheses regarding birth intervals: First, we expect a negative effect of the interval between the first two births on third birth rate (owing to an assumed lower family orientation and higher age of the mother); second, we expect an inversely U-shaped relationship between the age of the previous child and the probability to have an additional child, since shortly after the birth of the previous child high demands regarding parental capacities and later on increasing opportunity costs (both regarding the mother's income and leisure time) negatively affect the decision for an additional child.

The income situation, for which no data is available, is approximated by the educational[4] level of both the woman and her partner and the woman's occupational status, in order to compensate for the lacking longitudinal income data. For the partner's level of education, we expect a positive effect on fertility assuming that higher income is not only invested in the quality of children but also in the quantity. Female education, in contrast, has been argued to increase opportunity costs due to a higher wage rate – and thus higher loss of income – if the mother reduces hours of work or resigns from her job. However, in case of higher parity births the mother might already have experienced career interruptions before, resulting in part-time work or a family-friendly job, or alternatively may have managed to combine work and family (and thus is confident to manage it also with an additional child), so that opportunity costs for highly educated mothers might be lower than often argued and

3 Childcare for toddlers was still rare in the second half of the last century in West Germany.

4 We are aware that educational level is a crude proxy for income (even in combination with occupational status) as it reflects a wide range of additional attributes. Thus, we cannot claim to test any income hypotheses. But as income is associated with education, one of the mechanisms underlying the effects of education on parity progression may be income.

– in contrast to the first birth – the income effect may dominate. The actual opportunity costs will depend on the mother's occupational status and her future occupational plans.

Furthermore, as women with a high level of education have a significantly higher propensity to stay childless, highly educated women with children are a selective group who have already revealed family-oriented values and might therefore be more likely to have a second or third child despite the opportunity costs (Hoem et al. 2001; Kravdal 2001). As argued above it is not unlikely that the income effect dominates the opportunity cost effect, resulting in a positive combined effect, which than would be emphasized by this selection effect. Even if the combination of income effect and opportunity cost effect results to be negative, however, we would expect the overall effect of education to be U-shaped, instead of negative, due to this selection effect. Hence we hypothesize a positive or U-shaped relationship between the woman's education and both the second and third birth rate.

Regarding employment, both a positive and a negative effect could be hypothesized. On the one hand, working mothers may face higher opportunity costs (if they go on parental leave and forgo their income) than non-working mothers, and employment can be regarded as a sign for a mother's career orientation, leading to a lower probability of an additional child. On the other hand, if a mother managed to work soon after the birth of the previous child, her opportunity costs of an additional child might be lower (and thus the probability of an additional child might be higher) than for a non-working mother who is waiting for her last child to be old enough allowing her to reenter the labor market then. This is the case if the working mother will be able (due to childcare arrangements) to take up work early after the next child, whereas for the non-working mother an additional child will substantially extend her time out of the labor market.

In order to take into consideration that own familial experiences may form preferences regarding family size (Huinink 1988; Hoem 1993; Berinde 1999), we include the number of siblings a woman has. We expect that the more siblings a woman has, the more likely she is to have more than one child. The effect is expected for both second and third child rates, whereby the third child rate may be higher only for women with two or more siblings, whereas women with one sibling may rather reproduce the two-child-family constellations they experienced. Unfortunately, we do not have the number of the partner's siblings, which we would expect to have the same effect as the women's family experiences. However, as the man's influence on the decision to have a second or third child is limited (Bauer/Kneip 2014), the number of the partner's siblings should be of limited importance.

In line with existing research (e.g. Andersson et al. 2006; Hank/Kohler 2003; Tian/Morgan 2015), we take into account the sex of the first two children. If parents prefer having mixed-sex children, mothers of two sons or two daughters should be more likely to have a third child, since in these cases the expected utility of a third child is higher. For the analysis of the second birth, we include the first child's sex. If there was a general preference for a specific child's sex over the other, the transition rates to the second child would be higher for women whose first child did not have the preferred sex, again due to the greater expected utility (Hank/Kohler 2003). Our hypothesis is, however, that the decision for the second child does not depend on the sex of the first child.

Finally, we test the effect of having a relationship. We expect mothers without a partner to be unlikely to have a second or a third birth. Moreover, as having a child in a new partnership in addition to the existing children manifests the parents' commitment to the

relationship (Griffith/Koo/Suchindran 1985); for stepfamilies (or more exactly: for mothers with a new partner after the previous birth), higher parity progression rates are expected (Henz 2002; Klein/Eckhard 2004).

3. Data and method

Our analysis is based on the third wave of the German Family Survey (DJI Familiensurvey) conducted in 2000 in Germany. This survey contains about 10,000 respondents, of which we use only the refresher sample drawn in the year 2000 with 8,091 respondents. We use only data from female respondents. Detailed retrospective fertility information is available including month of birth of all the respondents' children. The sample includes birth cohorts 1944-1979, i.e. at the time of the interview a large part of the female respondents has already reached the end of their fertile years. Due to this age structure, we have a sufficient number of women with at least two children, enabling the analysis of the transition to the third child. To avoid the systemic comparison between West Germany and the former socialist German Democratic Republic, the analysis is restricted to women with German citizenship who lived in West Germany during their fertile years (N=3,022).[5] Excluding respondents with missing values or inconsistent information in their fertility history or missing values in the independent variables, we retain 1,674 women who have at least one child, 1,073 women with at least two children and 311 with three children. For the analysis of the transition to the second child, the information of 1,589 one-child mothers can be used, of whom 1,036 have a second child within the observation period. For the analysis of the transition to the third child, the information of 1,019 two-child mothers is available, of whom 292 have a third child.[6]

To analyze the transitions to the second and to the third (biological) child we apply a flexible event-history model. We estimate the piecewise constant exponential model, where the baseline hazard rate $h_{j(t)}$ is considered to be constant in the process intervals $j(t)$ defined beforehand (for a description of the model see for example Blossfeld/Rohwer (2002)). The model can be written as follows:

$$h(t|\boldsymbol{x}_{it}) = h_{j(t)}\exp(\boldsymbol{x}_{it}\boldsymbol{\beta})$$

The model is a proportional hazard model with a multiplicative log-linear modeling of effects of time-constant and time-varying variables on the transition rate to the conception of the second/third child as the dependent variable. Conception is calculated as the month nine months before birth in order to ensure that time-varying independent variables precede the dependent variable.

5 Based on the information available in the data, only persons are included which fulfill the following conditions: 1. German citizenship, 2. Living in West Germany at the time of interview, 3. Either born in West Germany or German refugee from the former eastern territories of Germany (but not ethnic German resettlers from former communist states in Central and Eastern Europe) or migrated from the GDR to the FRG no later than at the age of 15 years.

6 We excluded from the analysis cases with either twins at first (second) birth or a small time span between the births, so that the supposed conception of the next child coincides with the birth month of the previous child.

Process time starts with the birth of the previous child, i.e. from the first (second) child when estimating the second (third) birth rate. The first four years after the preceding birth are grouped in one-year intervals, followed by two two-year intervals. Starting from the 9th year after the birth of the previous child, process-time is not further differentiated due to the small number of cases with intervals of 9 years and more between successive births. Women who did not have the respective child at the date of the interview are censored nine months before the interview, but latest at the age of 45. Similar intervals are chosen for the time between the first two births; we include also mothers of twins in the first birth in our analysis of the transition to the third child (in contrast to Callens and Croux (2005) who explicitly excluded these cases from their sample).

Table 1 provides descriptive statistics for the independent variables used. For each of the variables, the number and the percentage of person-months are shown. For the time-constant variables, the table additionally shows the percentage of persons for which the variable equals one.

For the respondent's and her partner's education, we restrict the classification to school careers, without further differentiating between e.g. vocational training or university degrees. We classify educational levels as low ("Hauptschulabschluss" or no school leaving certificate), medium ("Realschulabschluss"), and high ("Hochschulreife"). While the mother's education variables are time variant, the respective variables for the partner change only in case of a new relationship. The partner's education variables indicate the level of education at the beginning of the partnership; in the majority of cases this is no problem, since in general long-term partnerships are not initiated in adolescent years. In cases where the partnership started before the partner graduated, we do not have any information about his level of education. We consider these cases with a separate dummy variable ("in school"). Additionally, we include a dummy indicating a missing value for the partner's education. For this case, we expect a lower third birth risk than for all levels of education, mainly because the lack of knowledge about the partner's education is a hint towards the poor institutionalization of the relationship.

To test for the union-confirmation effect of (additional) children we include dummies identifying step-families: In both models, a variable is included indicating that the mother has a partner different from the one at first birth. In the model for the third birth, an additional variable is included indicating that the mother has a partner different from the partner at second birth. In both variables, women without a partner are classified as "not having a different partner". The variables are expected to increase the risk of a third birth compared to women in persisting partnerships since the first birth. The lowest second/third birth rate, of course, is expected for women without a partner.

Unfortunately, occupational status is known only for the respondent, but not for her partner. As our observation period spans the second half of the last century when male part-time employment was rare, we can assume that the majority of partners were full-time employed. The risk of unemployment, in contrast, should be captured (in part) by the education variables. The mother's occupational status was classified as "not working"[7], "part-time employment" and "full-time employment".

7 We do not distinguish a group for women who are in school, since this status is rare after the birth of the first and second child.

Table 1: Distribution of the independent variables

	Second birth			Third birth		
	person-months	% of months	% of persons	person-months	% of months	% of persons
Time since previous birth						
<12 months	16,687	15.4		10,904	11.0	
12-23 months	14,725	13.6		10,669	10.8	
24-35 months	10,795	10.0		9,294	9.4	
36-47 months	8,341	7.7		8,227	8.3	
48-71 months	12,626	11.6		13,917	14.0	
72-95 months	9,676	8.9		11,474	11.6	
>95 months	35,548	32.8		34,572	34.9	
Interval between first und two births						
twins				23,364	23.6	0,21
8-23 months				26,733	27.0	0,29
24-35 months				17,743	17.9	0,18
36-47 months				17,643	17.8	0,17
48-71 months				11,125	11.2	0,12
>71 months						
Woman's age at first birth						
<20 years	19,409	17.9	12.8	17,902	18.1	14.3
20-23 years	38,064	35.1	30.4	39,928	40.3	32.8
24-27 years	29,709	27.4	29.8	26,893	27.1	30.0
28-31 years	14,533	13.4	18.8	11,455	11.6	17.9
>31 years	6,683	6.2	8.3	2,879	2.9	0.05
Woman's birth cohort						
1944-1953	45,670	42.1	26.6	42,763	43.2	26.8
1954-1963	42,019	38.8	38.9	43,131	43.5	43.3
1964-1981	20,709	19.1	34.6	13,163	13.3	29.9
Woman's level of education						
high	14,663	13.5		14,499	14.6	
medium	38,857	35.8		35,056	35.4	
low	54,878	50.6		49,502	50.0	
Partner's level of education						
high	16,163	14.9		15,810	16.0	
medium	26,126	24.1		27,528	27.8	
low	46,381	42.8		43,462	43.9	
in school	6,144	5.7		5,872	5.9	
missing	1,132	1.0		537	0.5	
Woman's labor force participation						
non-working	47,668	44.0		51,929	52.4	
part-time employed	27,503	25.4		28,458	28.7	
full-time employed	33,227	30.7		18,670	18.8	
Sex of existing children						
first child male	51,045	47.1	48.6			
boy and girl				55,480	56.0	55.3
only girls				22,958	23.2	23.6
only boys				20,619	20.8	21.1

	Second birth			Third birth		
	person-months	% of months	% of persons	person-months	% of months	% of persons
Woman's siblings						
only child	17,664	16.3	14.2	12,144	12.3	12.9
one sibling	34,798	32.1	32.3	30,546	30.8	30.5
two siblings	26,913	24.8	24.5	23,916	24.1	24.5
three or more siblings	29,023	26.8	29.1	32,451	32.8	32.1
Having partner	95,946	88.5		93,209	94.1	
Different partner than at first birth	11,322	10.4		4,869	4.9	
Different partner than at second birth				3,224	3.3	
Number of persons	1,589			1,019		
Number of events	1,036			292		
Number of person-months	108,398			99,057		

4. Results

In Table 2 we display the results of the event-history analysis. Our findings indicate that age matters in several respects. Regarding the age of the second child (time since previous birth), we find the expected inversely U-shaped relationship, i.e. the third birth rate is highest when the second child is 2 to 3 years old and lowest when the second child is 8 years or older. The respective relationship between the first child's age and second birth rate is found as well, again with the highest birth rates when the first child is between 2 and 3 years old. Also the interval between the first two births makes a difference for the third birth as the transition to the third child is the less likely, the larger the interval between first and second birth is. Finally, the third birth rate declines with a woman's age at first birth, implying that women who have their first child before age 20 are most likely to have a third child. Second birth rate, on contrast, does not significantly decrease until the age of 32 years at first birth.

Women of the oldest birth cohort in the sample (1944-1953) have a significantly lower third birth rate than those of the youngest cohort (1964-1981), which is contrary to what one would expect according to official data. The estimated effect is of course net of other variables in the model. However, a positive effect for the youngest birth cohort is also found without control variables (results not shown). Nevertheless, the conclusion of a positive fertility trend would be misguided: On the one hand, the effect could be caused by sample selection as respondents of the youngest cohort were only in their twenties or early thirties at the time of interview, so that only the highly family oriented women of the youngest cohort had already two children at interview time. On the other hand, it might be owing to a bias in the data towards women with young children who are more likely to be interviewed because they spend more time at home and are therefore easier to contact. Thus, it might be the case that in the younger cohorts (but not in the older cohorts!) mothers, who have a third child and are therefore at home are more likely to be interviewed than mothers who decided against having a third child, resulting in an overestimation of progression to the next parity in these cohorts (Schröder 2010). Therefore, the cohort variable in our analyses should be seen only as a control for various selection effects.

Table 2: Effects on the transition to the second and third child for West German women (piecewise constant exponential models, relative risk effects)

	Second birth		Third birth	
Time since previous birth				
<12 months	ref.		ref.	
12-23 months	2.600***	(9.58)	1.342	(1.50)
24-35 months	2.722***	(9.39)	1.784**	(3.01)
36-47 months	2.090***	(6.02)	0.931	(-0.30)
48-71 months	1.277	(1.90)	0.928	(-0.35)
72-95 months	0.751	(-1.69)	0.467**	(-2.76)
>95 months	0.227***	(-8.54)	0.168***	(-6.32)
Interval between first two births				
8-23 months			ref.	
24-35 months			0.971	(-0.19)
36-47 months			0.803	(-1.17)
48-71 months			0.719	(-1.73)
>71 months			0.367***	(-3.66)
twins			0.578	(-1.15)
Woman's age at first birth				
<20 years	ref.		ref.	
20-23 years	1.047	(0.45)	0.693*	(-2.06)
24-27 years	0.984	(-0.16)	0.659*	(-2.09)
28-31 years	0.950	(-0.43)	0.646	(-1.85)
>31 years	0.593**	(-3.08)	0.364*	(-2.47)
Woman's birth cohort				
1944-1953	ref.		ref.	
1954-1963	1.302***	(3.31)	1.336	(1.93)
1964-1979	1.436***	(4.17)	1.598**	(2.67)
Woman's level of education				
high	ref.		ref.	
medium	0.753**	(-3.00)	0.628**	(-2.59)
low	0.735**	(-2.97)	0.720	(-1.66)
Partner's level of education				
high	ref.		ref.	
medium	0.800*	(-2.31)	0.565**	(-3.13)
low	0.767**	(-2.75)	0.678*	(-2.19)
in school	0.833	(-1.29)	0.574	(-1.90)
missing	0.463	(-1.84)	0.472	(-0.73)
Woman's labor force participation				
non-working	ref.		ref.	
part-time employed	0.734***	(-3.65)	0.682*	(-2.30)
full-time employed	0.687***	(-4.44)	0.881	(-0.71)
Sex of existing children				
first child male	1.049	(0.76)		

	Second birth		Third birth	
boy and girl			ref.	
only girls			1.336*	(2.04)
only boys			1.054	(0.34)
Woman's siblings				
one sibling	ref.		ref.	
only child	0.915	(-0.84)	1.354	(1.42)
two siblings	1.100	(1.12)	1.524*	(2.49)
three or more siblings	1.357***	(3.78)	1.500*	(2.54)
Having partner	7.365***	(7.81)	2.915**	(2.6)
Different partner than at first birth	1.255	(1.80)	2.194***	(3.63)
Different partner than at second birth			3.422***	(4.57)
Constant	0.001***	(-22.19)	0.003***	(-11.77)
Months	108,398		99,057	
Chi2(df)	946		275	

* p<0.05, ** p<0.01, *** p<0.001; z-scores for coefficients in parentheses.

Note: partner's education only if having partner (interaction term)

Regarding education and labor force participation, most of our hypotheses are confirmed. A high level of education both of the mother herself and her partner increases both birth rates. Interestingly, we do not find any difference between the low and medium level of education, both regarding the mother and her partner. This could be the case because we do not further differentiate between, e.g., types of vocational training. Our hypothesis regarding the missing information on the partner's level of education is not confirmed either, i.e. women with partners whose level of education they do not know or not specify in the survey have about the same higher parity birth rate as women with a partner with a low or medium level of education.

Working mothers are less likely to have a second and third child than housewives. For second birth rate, this can be said for both full-time and part-time employed women, while for third birth rate we do not find a significant effect of the mother's full-time employment. As discussed above, the reason might be that full-time working two-child mothers might have childcare arrangements (e.g. by grandparents living nearby) enhancing the compatibility of work and family, so that their opportunity costs are low and childbearing decisions are not restrained by their employment situation. Moreover, the fact that we find an effect of employment on the transition to second and third birth does not necessarily mean that women do not give birth to another child because they are employed. Quite the contrary, it is quite likely that women who decide not to have another child are more likely to take up employment than women planning to have another child (Schröder/Brüderl 2008).

We do not find an effect of sex preferences on the transition to the second child, i.e. the progression from the first to the second child is not influenced by the sex of the first child. However, we find a significantly higher third birth rate for women with two girls. In this case, the third birth rate is 37% higher than when the first two children are one boy and one girl. At first sight, this would seem to confirm preferences for a boy. However, then the third birth rate for a woman with two girls would have to be significantly higher than for a woman with two boys. This is not the case, as additional tests demonstrate (not shown). Therefore, we interpret the higher third birth rates of women with same-sex children as confirming our hypothesis that parents want to have children of both sexes.

Women with two or more siblings are found to have a higher probability to have a third child than women with only one sibling. This is consistent with our argumentation that individuals tend to reproduce family constellations they experienced themselves in the past. Second birth rates, though, are barely influenced by the number of siblings a woman has (except in the case of three or more siblings). An explanation for this phenomenon could be the existence of a two-child-norm which appeals also to women grown up in smaller or larger families.

The step-family effect is visible only for the third birth transition. For the second birth rate it does not matter if she has entered a new partnership since the first birth, whereas for the third birth rate both a partner change between first and second birth and a partner change after the second birth matter. This result is compatible with a union-confirmation effect in combination with a two child norm: with each new union the "count" starts anew. If there is a partner change after the first birth, a woman experiences a high second and third birth rate to complete the new two child union. The effect, however, is not visible in an analysis of the transition to the second child because women without a partner change also show a high second child transition rate. It becomes only visible in an analysis of third birth transitions. Analogously, women with a partner change after the second child should show higher rates for both third and fourth births. The effect should be visible for both transitions, because women without a partner change show very low third and fourth birth transition rates.

5. Conclusion

What factors influence the decision to have a third child? We try to answer this question by comparing the transitions from the first to the second and from the second to the third child. For this we analyze retrospective data from the German Family Survey (DJI Familiensurvey) 2000 for West German women from the birth cohorts 1944 to 1979 using event-history techniques.

In line with the existing literature, we find strong effects of timing of the first two births on third birth rate both regarding age at first birth and the spacing between births. Interestingly, the second birth rate is not reduced to a significant extent by the mother's age at first birth until the age of 32 years. In contrast, third birth rates are strongly reduced if the mother got her first child in her twenties or thirties. The same is true if the interval between first and second birth is beyond 6 years.

A number of factors are associated both with second and third birth rates, such as both partner's level of education and the mother's labor force participation after the previous birth. Working mothers show lower high parity birth rates, but the causality of this effect can be doubted. Rather, the mother's return to her job may be the result of a foregoing decision not to have another child (see Schröder/Brüderl 2008). More surprisingly, higher educated women have higher second and third birth rates. Some researchers interpret this effect as a selection effect (e.g., Kreyenfeld 2002). However, we would like to argue that a positive education effect is what a careful explication of family economic arguments would predict: After the first child most opportunity costs are already borne by the mother as, in particular in Germany before the year 2000, a career track was not easily compatible with parenthood and thus mothers may have selected into family-friendly jobs already

after the first child, so that an additional child would not increase opportunity costs largely. Thus, the decision for a second child is dominated by the income effect, which we argue to be positive for highly educated women.

In addition, we find some factors that are only relevant for third birth rates. Women with same-sex children are more likely to have a third child, which confirms the common hypothesis that parents have a preference for at least one child of each sex. Women descending from families with three or more children are more likely to have a third child, whereas the number of siblings is only of minor importance for second parity births. This can be interpreted as a hint that a two child norm influences mothers (also those without siblings) towards having a second child, whereas the decision to have a third child is influenced by the woman's tendency to reproduce the constellations of her family of origin. Finally, a stepfamily-effect is found for third, but not for second births, which can be explained with a union-confirmation effect in combination with a two child norm: with each new union the "count" starts anew.

Our investigation concentrates on socio-demographic characteristics. We would expect a number of additional "soft" factors to affect the decision for an additional child, such as partnership quality, characteristics of the existing children, medical complications at previous pregnancies, or social pressure. While our dataset has the advantages of covering a long observation period and containing a sufficient number of women with two or more children at late stages of their fertile years, of course retrospective information on "soft" factors is not included. The same is true for more detailed information about the partner: Covariates like the number of the partner's siblings, his age, and number and age of non-shared children should ideally be added to complete the picture. Long-term panel data collection efforts, like the German Family Panel (pairfam) (see Huinink et al. 2011), might allow to investigate higher parity transitions in more detail in the future.

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