

# **Welfare State Context, Female Earnings and Childbearing**

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**Abstract:** This paper investigates the role of female earnings in childbearing decisions in two very different European contexts. By applying event history techniques to German and Danish register data during 1981-2001, we demonstrate how female earnings relate to first, second and third birth rates. Our study shows that female income is rather positively associated with fertility in Denmark, while the relationship is the opposite in West Germany. We interpret our finding against the background of social policies that encourage Danish women to get established in the labor market before having children, while German policies during the 1980s and 1990s rather discouraged maternal employment.

Keywords: Female Employment, Fertility, Welfare State

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## **1 Introduction**

In the not so distant past, female employment was viewed in the literature as a barrier to family formation. The major premises that underlie this view were the incompatibility of childrearing and employment and a gendered division of household activities. According to it, an increase in female education, income, and employment would result in lower fertility. Empirical studies of relationships during the 1960s and 1970s, when fertility in many countries declined in tandem with increasing female labor-force participation rates, lent support to this hypothesis. The evidence was overwhelming and for many scholars the negative correlation between female employment and fertility became a matter of fact (Spitze 1988: 606; Becker 1993: 140).

However, the idea that female employment is always a threat to reproduction has been disputed vigorously in more recent sociological and demographic literature. Proponents of comparative welfare state research have pointed out that policies that help mothers to combine work and family life in modern societies are also conducive to higher fertility (Bernhardt 1993; Rindfuss and Brewster 1996; McDonald 2000; Neyer 2003). Societies that support dual-earner families are most often more flexible and gender equal than male-breadwinner societies. Furthermore, the single-earner model has become a precarious family arrangement in times of growing labor market uncertainties and increasing family-dissolution rates. Societies that support maternal employment seem more apt to face the various challenges

posed by globalized economies than societies that support the role of mothers as housewives and care-givers (Esping-Andersen 1999; 2009).

These and many other considerations suggest that the welfare state shapes the conditions under which couples make their fertility decisions. How female employment affects reproductive choices depends on whether a woman is expected to be a care-giver, earnings-provider or both after childbirth. In “male-breadwinner regimes”, female employment or female earnings might be negatively related to fertility. In “dual-earner societies”, a sufficient female income may rather be a prerequisite for having children.

In this paper, we study how female earnings relate to fertility in the two very different welfare state contexts of Denmark and Germany. The two neighboring countries seem to be ideal test cases for studying how social policy contexts shape the association between female employment, income and fertility. While Denmark’s family policies have gradually shifted towards supporting maternal employment since the 1970s and 1980s, Germany’s family policies have continued to favor the housewife model. Given the contrasting welfare state setup, our main hypothesis is that female earnings support fertility transitions in Denmark, while they have the opposite impact in Germany. In order to test this hypothesis we make use of large scale Danish and German register data for the period 1981-2001. Since the demographic situation in the two parts of Germany is still very different, we will focus our attention on the western states of Germany, i.e., West Germany. Apart from differences by welfare state context, we also investigate how the income-fertility nexus varies by birth order, period and age. The paper is structured as

follows. In Section 2, we develop our main hypotheses and provide a brief overview of the institutional framework of Denmark and Germany. In Section 3 we describe the data and methods; in Section 4 we present the results of our event history analyses of the transitions to first, second and third births. Section 5 provides our conclusions.

## **2 The Income and Fertility Nexus**

### **2.1 The income and fertility relationship in economic models**

The relationship between income and fertility touches a core economic topic and it seems obvious to resume to economic theory when one studies the income and fertility nexus. Inherent in economic thinking is the idea that income and fertility would be positively correlated but that this correlation is overwritten by a “myriad” of confounding factors (Borg 1989: 301). The classical “confounder” in this context is child quality which is assumed to increase disproportionately with family income (Becker 1960). With his concept of “child quality”, Becker has provided an intuitive argument why previous studies had been unable to detect a positive relationship between income and fertility. However, for empirical researchers, this framework remained fruitless given that child quality is an item difficult to find an operational definition for in empirical research.

Another aspect that is highlighted in economic thinking is the role of women’s wages in childbearing decisions. Women’s wages are usually approached via the opportunity cost argument. Given that work and family life is not compatible and

assuming further that women shoulder the lion's share of childrearing tasks, higher female wages result into higher opportunity cost of childrearing, and thus, into lower fertility. If one considers further that educational homogamy is high in most societies (Blossfeld und Timm 2003; Domanski and Przybysz 2007), not accounting for this counterbalancing impact of female wages on childbearing would bias any analysis of men's and women's income on fertility.

Classical economic thinking has been powerful in conceptualizing the role of female and male income in childbearing decisions. It also has the merit of providing straightforward hypotheses on the income and fertility nexus. At the same time, this approach has been attacked for being inherently chauvinistic given that it starts off from the assumption of a more or less naturally given gendered division of labor. In defense of the economic model one must admit that economic bargaining theory deals with the division of household labor from a more dynamic gender perspective (Feiner et al. 1995). But interestingly, economists have never seemed to be particularly interested in the question how social context and social policy configuration affect gender equality and fertility.

## **2.2 Social policies and the income and fertility relationship**

In related sociological research, employment and fertility behavior are commonly framed in terms of life-course decisions. Having a child is a central life-course event which is influenced by other domains in the life course (Elder 1985, Mayer and Tuma 1990; Giele et al. 1998; Willekens 1999). Attention is also drawn to welfare state institutions and how they structure the modern life course (Mayer and

Schöpflin 1989). Scholars of comparative welfare research, like Esping-Andersen, have in common that they focus on the role of welfare state policies in shaping maternal employment, gender equality and fertility (Rindfuss and Brewster 1996; McDonald 2000; Neyer 2003; Esping-Andersen 1999; 2009). By encouraging or hindering women and mothers to participate in the labor market, social policies affect gender roles and in doing so they indirectly influence childbearing decisions and, consequently, a country's fertility levels. A key assumption is that only societies that enable mothers to participate fully in the labor force will have a possibility to maintain sustainable fertility rates (Esping-Andersen 1999: 70).

In our study, we base our argumentation on comparative welfare state research. We argue that the welfare state shapes the conditions under which couples participate in the labor market and build families. In countries that encourage women to work, the female income is a crucial part of the total household income. In these countries, women are likely to postpone childbearing until they have reached a sufficiently high income to support a family. In countries where social policies do little to facilitate maternal employment, there is less incentives for women to postpone childbearing until they have gained an income that is high enough to support family building. Career oriented women who belong to the group of high income earners might instead avoid parenthood altogether.

We test this hypothesis by studying how the relationship between female earnings and fertility behavior differs between Denmark and Germany. Due to its' specific demographic situation after German unification, we leave out the eastern states of Germany from our study. Let us first provide a basic demographic description:

West Germany and Denmark had both experienced steep fertility declines during the 1960s and 1970s (see Figure 1). In the early 1980s, the period Total Fertility Rate (TFR) in both countries reached 1.4 children per woman, which at that time were the lowest TFRs in any sizeable country in the world. By contrast, since 1983 Danish fertility rates have increased continuously. Today, Denmark together with France and the other Nordic countries experiences one of the highest period fertility rates in Europe. Meanwhile, West Germany's TFR developments have taken an entirely different turn. For close to four full decades, its TFR has remained amazingly stable at a level of only 1.3 to 1.4 children per woman.

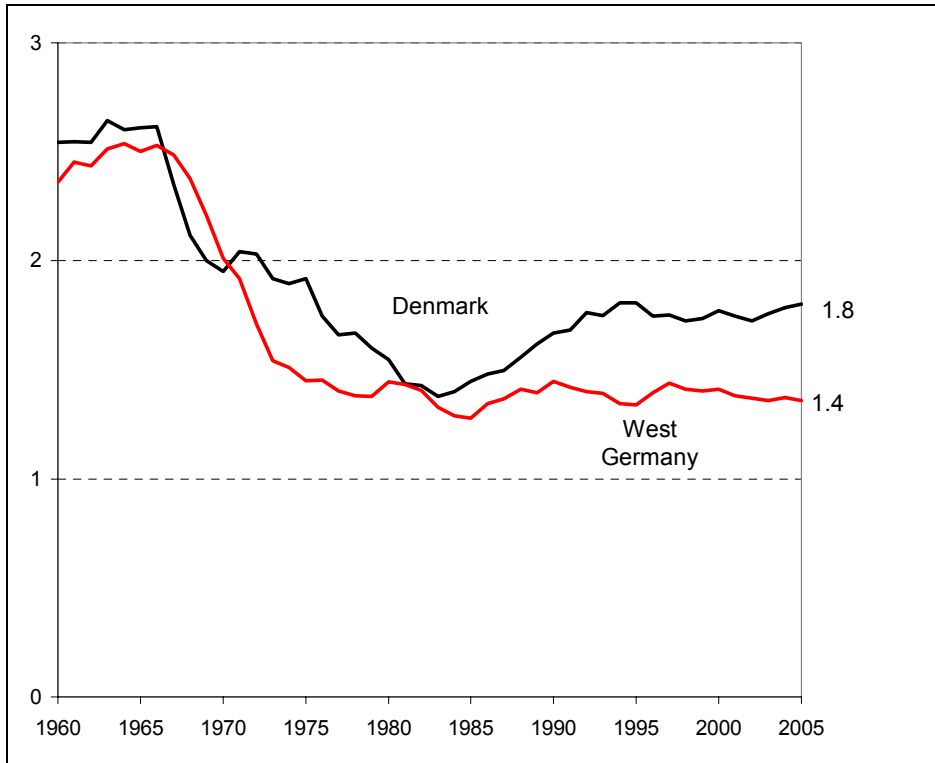
Even though period fertility measures are distorted by tempo changes in childbearing behavior, the difference in period TFRs between Denmark and West Germany gives a good account of how divergent fertility patterns in the two neighboring European countries are. Cohort fertility data underline the picture that fertility levels in the two countries are at opposite poles of the "European scale". While, for example, a Western German woman born in 1965 had 1.5 children on average, a Danish woman born in 1961 had 1.8 children (Statistisches Bundesamt 2009; Andersson et al. 2009). Similar differences are discernable in terms of permanent childlessness. In West Germany, about 22 percent of women aged 40-44 in 2006 were childless (Statistisches Bundesamt 2009). In Denmark, the ultimate level of childlessness for women born in 1955-59 was about 14 percent (Andersson et al. 2009).

Beyond these crude demographic differences, there are substantial differences in the social policy context of the two countries. Even though parental leave regulations

have been less comprehensive than in Sweden, Denmark's family policies are usually praised for its' family-friendliness (Abrahamson and Wehner 1995; OECD 2002). Similar to other Nordic countries, Denmark has radically reformed its' social policies and, for example, gradually expanded public day care and improved parental leave conditions. This enables women's swift return to the labor market after childbirth (Rostgaard et al. 1999; Pylkkänen and Smith 2003). In West Germany, on the other hand, family policies have been slow in catching up with the demands of working mothers. In particular, little effort has been made to support maternal full-time employment. Child care for children below age three has been scarce, for older children it has been restricted to providing slots in part-time care (Hank and Kreyenfeld 2003). Parental leave regulations have been criticized for the long periods of leave which, since 1992, offered parents a job-protected leave of a maximum duration of three years per child. Additionally, the tax system, public pension regulations and the health care system all provide benefits to married couples who pursue a traditional division of labor. It lasted until 2007 until Germany launched a major family policy reform, which moved this country's social policies closer in line with those of the Nordic countries (Henninger et al. 2008). For the time period that is investigated in our study, Germany is a clear prototype of a conservative welfare regime that discourages maternal employment.



Figure 1: Total Fertility Rate, Denmark and Western Germany, 1960-2007



Source: Council of Europe 2005; Statistisches Bundesamt (data provided upon personal correspondence to the Statistisches Bundesamt)

Note: West Berlin is excluded from the time series after 2000

### 2.3 Prior empirical findings

Existing evidence on relationships between labor-force participation, income and fertility in different countries is far from conclusive. Several macro-level studies have regressed TFR-values on GDP and/or aggregate measures of male and female wages (Butz and Ward 1979; Gauthier and Hatzius 1997). These studies provide no or contradictory evidence on the impact of wages or earnings on fertility. A recent study by Myrskylä et al. (2009) suggests a positive relationship between a country's Human Development Index and total fertility. Furthermore, macro-level data on total

fertility and female labor-force participation in countries in Europe reveals a change from a negative to a positive association between these two national indicators from the 1960s to the 1990s (Andersen 1999: 68; Ahn and Mira 2002; Billari and Kohler 2004).

At the micro level, there are several studies, in particular for Scandinavian countries, which have addressed the income and fertility relationship. Heckman and Walker (1990) used the Swedish Fertility Survey to show that raising female incomes during the 1960s and 1970s were negatively associated with first, second and third birth risks. Tasiran (1995) incorporated better individual-level data on female earnings to the same data set and rather found a positive impact of female income on first birth risks. Andersson (2000) used data on Swedish women's annual earnings during the 1980s and 1990s and found a strong positive association between earnings and first-birth risks, but only weak associations with second and third-birth behavior. Vikat (2004) reports very similar results for Finland. Using data for Norway and Finland, Rønsen (2004) finds, however, a negative impact of female wages on fertility. Rondinelli, Aasve and Billari (2006) use Italian data and report some negative effects of female wages on first birth rates, but hardly any effects for higher order births.

It seems that the evidence on the relationship between female earnings and fertility is mixed. However, differences in the empirical findings partially relate to different operational definitions of female income. Empirical studies which are more geared towards the economic model usually use predicted wages rather than observed earnings. Sociologists who are more interested in the interplay of different life-

course domains have used actual earnings in their models. Such studies may provide a more coherent picture of life-course dynamics. For the Nordic countries, they mostly show that female earnings and first birth risks are positively associated (Tasiran 1995; Andersson 2000; Vikat 2004).

With our study we aim at contributing to existing sociological literature on the linkage between different life-domains. Our focus is to look into the impact the employment and earnings of women have on their fertility. Our investigation goes beyond previous research in several ways. First, we provide a cross-country comparison. This comparison is motivated by the hypothesis that the income-fertility nexus varies by welfare state setting. Second, our study draws on highly reliable register data which span over two decades of time. Even though a considerable amount of register based research has been conducted for Nordic countries before, the possibility to conduct register based research for Germany has been very limited in the past. Therefore, this paper is the first one that draws on register data that compares fertility behavior in Germany with a Nordic country.

### **3 Data and Method**

#### **3.1 Method**

In terms of methods, we apply event history modeling. In the first birth model, process time is represented by woman's age. For second and third births, it is the duration since last birth. Time is measured in months. The major independent variable of interest in our modeling is the female income, measured as earnings

quintiles, and other information on woman's labor-market status; calendar year is a control variable. For higher order births, we also control for woman's age as a time-varying covariate (below is a more detailed account of how these variables are defined).

The objective of this study is not to provide a fully specified model that accounts for all confounding factors that might bias the female income and fertility relationship. Instead, we have a more amble ambition: We want to provide highly reliable first, second and third birth risks by female earnings, standardized for bare demographic variables. Obviously, such an approach can provide very different results than a model that tries to single out the net effect of female income on fertility by including a whole battery of control variables or applying some more complex causal modeling. Still, such an approach might be better equipped to disentangle the factual relationship between female earnings and childbearing behavior. Our approach provides us with straightforward "descriptive results" which are not distorted by possible collinearities with additional control variables. Certainly, our interpretation of results might sometimes be wrong because of the omission of some crucial controls. We are still confident that an accurate description based on high quality data on the associations between two crucial socio-demographic processes is a valuable contribution to demographic research.

### 3.2 Data

For Germany, we use data from the German Statutory Pension Insurance ('Deutsche Rentenversicherung Bund').<sup>1</sup> Data for Denmark come from its population register system where population data have been merged with data from various other administrative registers. We focus our analysis on women aged 20-44. The calendar period we cover is 1981-2001. In both data sets foreign nationals / foreign-born have been excluded<sup>2</sup>. For Germany, we also exclude all eastern German women.<sup>3</sup> Even though we have tried to make both data sets as comparable as possible there are certain peculiarities about each of the data sets that we need to draw the attention to.

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<sup>1</sup> The data extract that is used here is the 'Versichertenkontenstichprobe 2007' (Sample of the insured population records drawn in 2007). This sample is a one percent sample of the original pension records and it includes women from the cohorts born in 1940-1992. Data have been made available to us by the Research Data Center of the German Statutory Pension Insurance (Rehfeld and Mika 2006).

<sup>2</sup> In Germany, non-natives are normally classified by their citizenship, in Denmark and other Nordic countries they are more often defined by their country of birth. The reason that we exclude non-natives is that we do not want to consider the various confounding associations of international migration with childbearing behavior.

<sup>3</sup> An Eastern German woman is defined here in a very narrow sense as a woman who has ever been employed in the territories of what used to be the Democratic Republic of Germany. This is a rather narrow definition, because it also classifies all East to West migrants as East Germans. However, we had to follow this definition, because earnings information in the registers for the East German population has been subject to special regulations which require additional considerations.

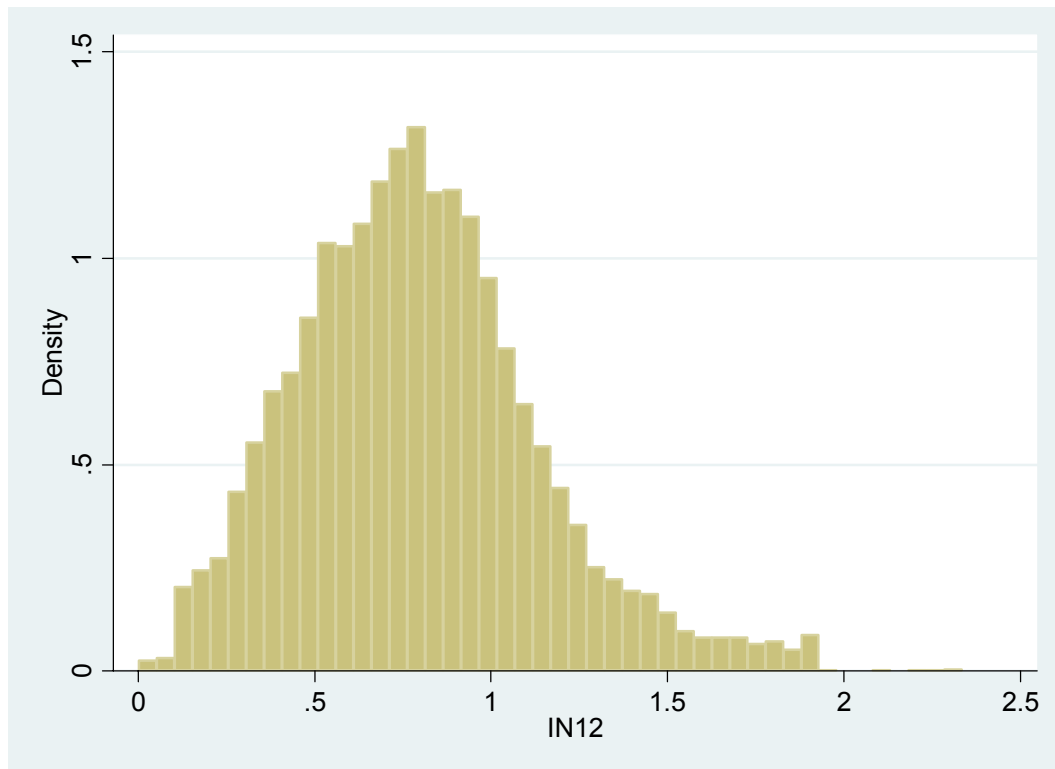
### *Characteristics of the German and Danish data sets*

The great merit of the German data set is that it contains accurate monthly information on the employment and income situation of all individuals since age 15. For female respondents, the data also include information on the dates of each childbirth (for details on how these data have been compiled for fertility analysis, see Kreyenfeld and Mika 2008). This is worth pointing out because German law forbids merging data from different sources and there is no other register data set for Germany that contains both complete fertility and employment histories. The reason that fertility data are contained in the pension register is that childrearing contributes to a person's pension rights. However, there are disadvantages to this data set that need to be mentioned, too. First of all, the data only include persons who are covered in the statutory pension insurance of Germany. This applies to more than 90 percent of the German population, but certain professions (such as farmers, self-employed or civil servants) are not included in the data set. Another disadvantage is that employment and income histories from the German pension registers only include episodes that are relevant for calculating pensions. These are periods of employment, unemployment, parental leave, some education and vocational training. Most educational episodes as well as periods when people had been inactive (for example because of being a housewife) are not included. This is a downturn for our analyses because we cannot always differentiate between educational participation and other types of non-employment.

In the German data, income information is recorded in terms of "earning points". Contributions that stem from an average-level income lead in general to a one-credit point in the pension record. The backbone of the calculation in the German pension

insurance is the individual contribution made to the pension record. The monthly contributions are measured at the end of each year against the average annual national earnings.<sup>4</sup> Figure 2 plots the annual earning points of employed women for 1995. As can be depicted from this graph, only a minority of women reach the average national income.

Figure 2: Distribution of (Annual) Earning Points, Western German Women, Ages 20-44 in 1995



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<sup>4</sup> There is an upper limit to the income considered for the statutory pension insurance, the so called “contribution assessment ceiling”. For female earnings this ceiling is, however, of minor importance since only few women reach such a high level of earnings.

As regards the Danish data, they cover the entire resident population in any given calendar year. A crucial difference from the German data set is that the income information for Denmark is only available on an annual basis, as this is what is collected in the taxation registers of this country. For a given year, we have information on the amount of taxable earnings a woman has received. Also different from the German data is that these earnings can also include transfer payments such as unemployment benefits, parental leave payments and other taxable allowances. In addition to the earnings status in a given calendar year, we have separate information on educational enrollment from the educational registers and on unemployment experience from Danish unemployment-insurance registers.

### *Variables*

The dependent variable in our models is the first, second or third birth event. Because the German data include monthly earnings information, we have backdated the date of each childbirth by nine months to guarantee that income is measured before any pregnancy. In the Danish data, we have information on annual earnings and use the earnings information of one calendar year to predict the birth risks during the subsequent year.

The major independent variable in our models is the female earnings which we have grouped into income quintiles. As a reference to define the quintiles, we used the



income distribution of women (with any earnings) aged 20-44 in 1995.<sup>5</sup> An alternative approach could have been to use the combined earnings distribution of women and men with earnings. However, we think our approach has bigger merits as the gender gap in earnings is quite large in both of the countries we study.

For Germany, we generated a combination factor of the activity status and the income variable. Women who are not employed are differentiated by whether they are in education (that contributes to pension rights), unemployed or whether they are involved in other unspecified activities. For the employed population, we distinguish the earnings quintile the woman belongs to. In the case of Germany, these quintiles only refer to a fraction of available women. Figure 3 displays the descriptive statistics of this variable by birth order. As can be depicted from Figure 3a, a minority of childless women are students or engaged in other activities. “Other activities” can be educational periods that do not count in the pension system. However, also periods when women resign from the labor market in order to be housewives are subsumed under this label. Since Figure 3a only covers childless women, one can assume that the large majority of women classified as “others” are students, the “housewife status” is rather uncommon for childless women. This is different when we turn to women with one or two children. A very large fraction of mothers is also engaged in “other activities”. Since educational participation after first childbirth is rare in Western Germany, one can conclude from this graph that a

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<sup>5</sup> Earnings information in the Danish data has been deflated. For Germany, no deflation was necessary because we did not use female income, but earning points which are not subject to inflation.

large fraction of Western German women is inactive in the labor-force after becoming a mother. During the 1990s this fraction was only marginally lower than during the 1980s.

For Denmark, we did not construct a combination variable of activity status and earnings. Instead, we grouped the entire female study population according to its earnings into the five quintiles we defined and used control dummies for whether a woman had been a student or unemployed during the same year. In practically all cases of unemployment and/or study activity during a year, women have some taxable earnings as well. Thus all Danish women contribute to the quintiles we have defined.

Figure 3a: Income Distribution, Western Germany, Childless Women

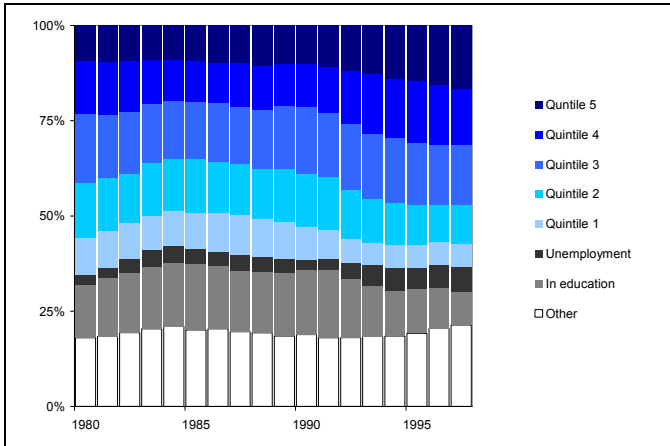


Figure 3b: Income Distribution, Western Germany, One-child Mothers

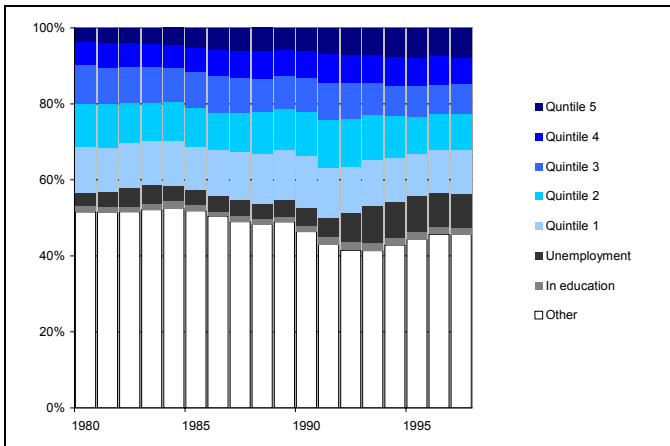


Figure 3c: Income Distribution, Western Germany, Two-child Mothers

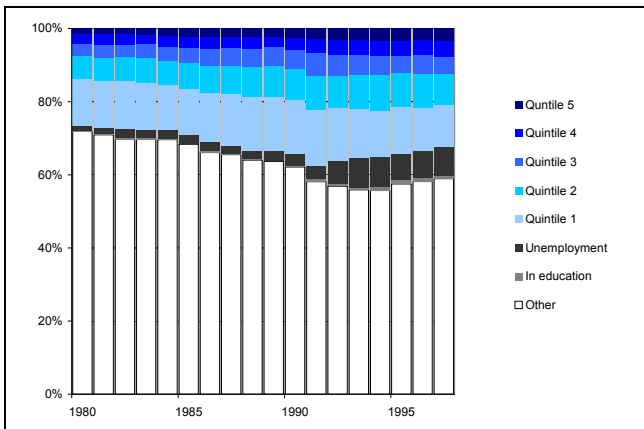


Table 1 provides an overview of the occurrences in terms of childbirths and exposure times of risk of giving birth, specified by the various categories of our earnings variable. As can be depicted from this table, there are much fewer events available in the German data set than in the Danish one. This is because we have (so far) only been able to access the scientific-use file of the German register data, which provides only a limited number of cases. This is particularly unfortunate for our study of third births where our data extract cover less than 1000 events of this kind. In future work, we will extend our analyses to the much larger available German register data set.

Table 1: Occurrence and exposure table: woman months under risk and childbirths

	first birth		second birth		third birth	
	exp	occ	exp	occ	exp	occ
<b>Germany</b>						
In Education	17%	285	2%	58	1%	8
Other	17%	514	43%	1,742	60%	697
Unemployment	4%	161	5%	150	3%	37
Quintile 1	8%	340	13%	368	15%	117
Quintile 2	11%	533	11%	203	8%	55
Quintile 3	14%	609	8%	143	4%	33
Quintile 4	14%	625	8%	128	4%	21
Quintile 5	14%	536	8%	115	3%	10
Missing	3%	119	3%	49	2%	7
Total	100%	3,722	100%	2,956	100%	985
<b>Denmark</b>						
Quintile 1	39%	87,320	18%	57,034	17%	25,629
Quintile 2	16%	70,749	19%	77,414	20%	27,586
Quintile 3	16%	108,636	24%	99,653	24%	31,068
Quintile 4	16%	117,210	22%	90,783	21%	23,799
Quintile 5	14%	84,508	17%	63,902	18%	18,063
Total	100%	468,423	100%	388,786	100%	126,145

Note: exp =exposure time under risk, in percent of all person-months; occ =occurrences of births

## 4 Results

### 4.1 Results for Germany

Table 2 gives the relative risks of first birth for German women. Model 1 covers all women who can have a first birth, Model 2a and 2b provide separate results by calendar-year periods, divided so that years before and after German re-unification are treated separately, and Model 3a and 3b give separate results for women below and above age 30. We first turn to Model 1. Our control variables provide the expected results: There is a bell shaped impact of age on first birth risks. Furthermore, first birth risks decline over calendar time. The model also demonstrates a strong negative impact of educational participation on first birth risks. Women who are in education have a 66 percent lower first birth rate than employed women with a low income. “Other activities” reduce first birth rates too, which speaks for the assumption that for childless women these periods are mainly educational episodes. Unemployed and low-income earners do not seem to differ in their first birth behavior. Furthermore, female income has a pronounced negative impact on first birth risks.

Model 2 addresses the question whether the impact of female earnings on first birth risks have changed over calendar time. The idea behind this assumption is that also in Germany the incompatibility of work and family life may have eased over time which would suggest that the correlation between female earnings and fertility could have changed direction from the 1980s to the 1990s. However, there is only mild support for this idea. The gradient in the female employment and first birth nexus is weakly negative for the 1980s while the gradient is more irregular for the later

period. There is neither much support for an interaction between age, female income and first birth risks. As can be depicted from Model 3, female earnings have a rather weak negative association with first birth risks at the younger ages and no impact at higher ages.

Table 2: Relative Risks of First Birth in Western Germany, Results from Piecewise Constant Event History Model

	Model 1 All	Model 2a 1981-1989	Model 2b 1990-2001	Model 3a 20-29	Model 3b 30-44
<i>Age</i>					
20-22	1	1	1	1	
23-25	1.45 ***	1.54 ***	1.43 ***	1.48 ***	
26-29	1.67 ***	1.51 ***	1.87 ***	1.74 ***	
30-33	1.33 ***	1.00	1.61 ***		1
34-37	0.56 ***	0.34 ***	0.77 ***		0.43 ***
38-44	0.09 ***	0.07 ***	0.11 ***		0.07 ***
<i>Income &amp; activity</i>					
In education	0.34 ***	0.34 ***	0.36 ***	0.34 ***	0.90
Other	0.71 ***	0.76 ***	0.68 ***	0.74 ***	0.62 **
Unemployment	0.89	0.91	0.89	0.97	0.59 *
Quintile 1	1	1	1	1	1
Quintile 2	0.99	0.88	1.10	1.00	0.95
Quintile 3	0.88 *	0.82 *	0.93	0.90	0.73
Quintile 4	0.89 *	0.87	0.92	0.89	0.88
Quintile 5	0.93	0.82 *	1.01	0.82 **	1.04
<i>Period</i>					
1981-1984	1	1		1	1
1985-1989	0.91 *	0.92		0.93	0.79 *
1990-1995	0.84 ***		1	0.80 ***	1.08
1996-2001	0.78 ***		0.89	0.68 ***	1.21 *

Notes: \*\*\* p<0.01; \*\* p<0.05; \* p<0.10

Table 3 displays the results for the transition to the second and third birth. For second births, we find a strong negative gradient in how female earnings are related to second birth rates. Note too, that women classified as “others” have highly elevated second birth risks. In most cases, they are likely to be women who are non-active in the labor force. The third birth model did not provide any statistically

meaningful results which we attribute to the small number of events in our data for Germany.

Table 3: Relative Risks of Second and Third Birth in Western Germany, Results from Piecewise Constant Event History Model

	Second birth		Third birth	
<i>Age of last previous child</i>				
0-1 years	1		1	
2-3 years	1.12	***	0.95	
4 years	0.75	***	1.07	
5-6 years	0.51	***	0.91	
7 years and older	0.22	***	0.56	***
<i>Age of woman</i>				
20-22	1		1	
23-25	1.19	***	0.62	***
26-29	1.32	***	0.59	***
30-33	0.98		0.38	***
34-37	0.57	***	0.20	***
38-44	0.13	***	0.04	***
<i>Income &amp; activity</i>				
In education	0.64	***	1.39	
Other	1.15	***	1.14	
Unemployment	0.90		1.05	
Quintile 1	1		1	
Quintile 2	0.81	***	1.16	
Quintile 3	0.71	***	1.26	
Quintile 4	0.69	***	1.10	
Quintile 5	0.67	***	0.65	
<i>Period</i>				
1981-1984	1		1	
1985-1989	1.13	**	1.38	***
1990-1995	1.07		1.14	
1996-2001	1.10	*	1.35	***

Notes: \*\*\* p<0.01; \*\* p<0.05; \* p<0.10

## 4.2 Results for Denmark

Table 4 presents the results for first births in Denmark. As expected, educational participation lowers first birth risks (Model 1). However, this only applies to educational participation at the younger ages (Model 3a). Unemployment is related to elevated first birth hazards at these ages (Model 3a) but has no effect on transitions to first-time motherhood at the higher ages (Model 3b). This is in line with our findings for Germany, where we also found that the impact of study enrollment and female unemployment on first birth rates differs by the age of woman (see Table 2). However, if one turns to the impact of female earnings, the results for Denmark are very different from the results for Germany. Table 4 reveals a clearly positive association between women's degree of annual earnings and the propensity to become a first-time mother. This result speaks for the idea that Danish women tend to postpone first time motherhood until they have reached a sufficient level of earnings. A comparison of patterns during the 1980s and 1990s reveals that patterns are very similar in the two decades (Model 2).

For second births, female earnings and birth rates are slightly positively associated with each other (see Table 5). However, when we turn to the third birth, the association becomes somewhat negative. Two-child mothers in Denmark who belong to the fourth earnings quintile have, for example, 20 percent lower third birth risks than those of the first quintile.



Table 4: Relative Risks of First Birth in Denmark, Results from Piecewise Constant Event History Model

	Model 1 All	Model 2a 1981-1990	Model 2b 1991-2000	Model 3a 20-28	Model 3b 29-43
<i>Age</i>					
20-22	1	1	1	1	
23-25	1.60	1.55	1.75	1.61	
26-28	2.25	2.00	2.76	2.34	
29-31	2.13	1.68	2.83		1
32-34	1.44	1.05	2.00		0.68
35-37	0.80	0.55	1.14		0.38
38-40	0.37	0.25	0.51		0.17
41-43	0.11	0.07	0.14		0.05
<i>Study activity</i>	0.72	0.72	0.73	0.66	1.03
<i>Unemployment</i>	1.32	1.38	1.25	1.41	1.01
<i>Earnings status</i>					
Quintile 1	1	1	1	1	1
Quintile 2	1.62	1.72	1.48	1.62	1.39
Quintile 3	2.09	2.10	2.00	2.05	1.88
Quintile 4	2.19	2.17	2.14	2.07	2.18
Quintile 5	2.21	2.10	2.17	1.80	2.31
<i>Period</i>					
1981-1985	1	1		1	1
1986-1990	0.95	0.96		0.92	1.13
1991-1995	0.99		1	0.89	1.40
1996-2001	0.96		0.95	0.80	1.50

Note: no significance levels are reported: as the analyses are based on the entire Danish population, practically any difference in relative risks is significant at a very low probability level

Figure 4 finally provides a graphical illustration of the German and Danish main results. As can be depicted from the graph, the association between female income and first time motherhood differs radically between the two countries. While Danish women seem to postpone first birth until they have reached a sufficiently high level of earnings, the association between female income and first birth risks is negative in West Germany. However, we do not find strong support for the claim that in

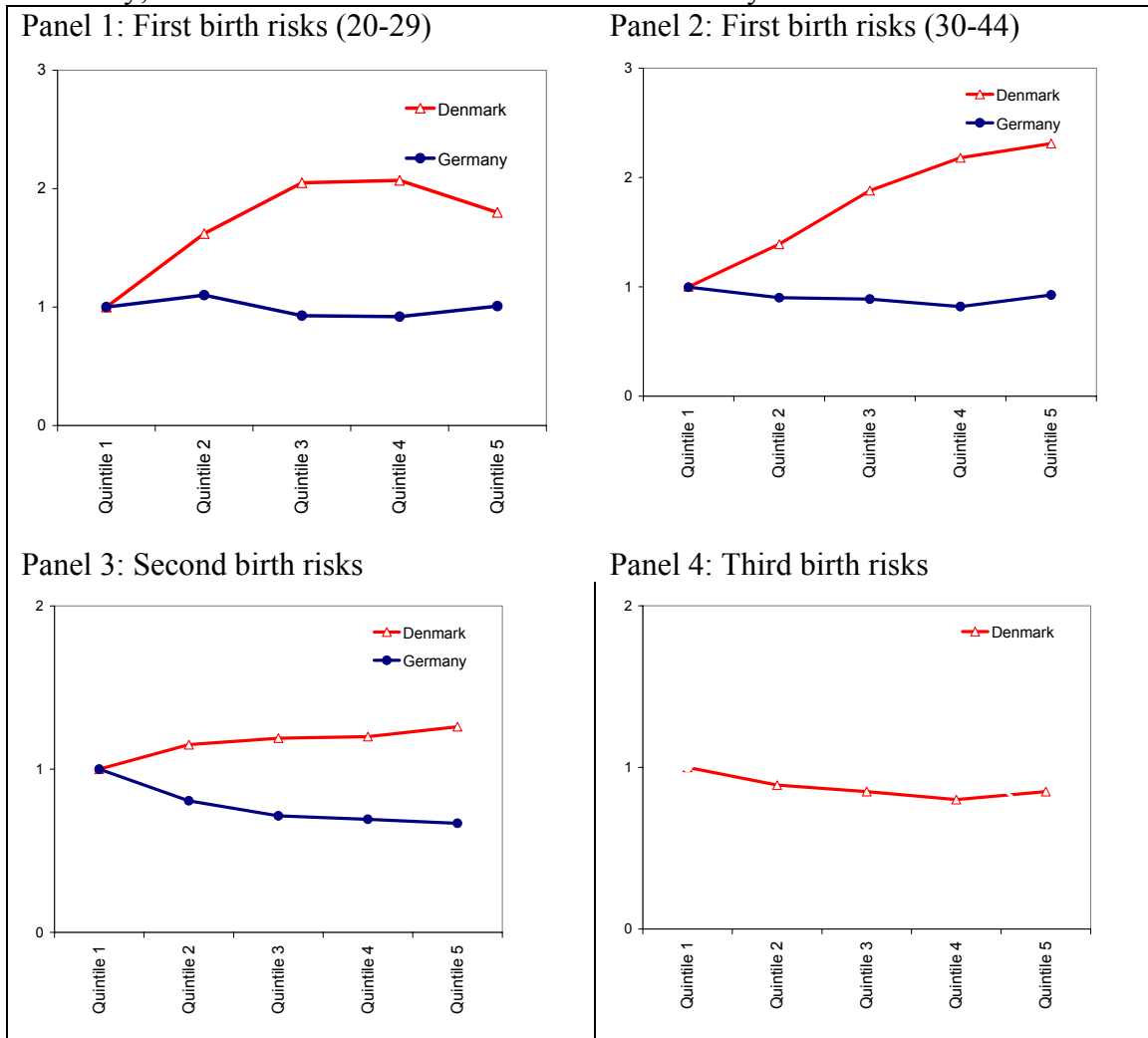
Denmark a high female income is a prerequisite for continuing to having a second or third child.

Table 5: Relative Risks of Second and Third Birth in Denmark, Results from Piecewise Constant Event History Model

	Second birth	Third birth
<i>Age of last previous child</i>		
0 years	0.03	0.05
1 year	1	1
2 years	2.33	1.54
3-4 years	2.35	1.69
5-6 years	1.32	1.46
7-9 years	0.71	1.01
<i>Age</i>		
20-22	1	1
23-25	0.97	0.77
26-29	1.05	0.57
30-33	0.98	0.45
34-37	0.66	0.29
38-44	0.27	0.11
<i>Study activity</i>	0.82	0.90
<i>Unemployment</i>	0.97	1.07
<i>Earnings status</i>		
Quintile 1	1	1
Quintile 2	1.15	0.89
Quintile 3	1.19	0.85
Quintile 4	1.20	0.80
Quintile 5	1.26	0.85
<i>Period</i>		
1981-1985	1	1
1986-1990	1.18	1.38
1991-1995	1.38	1.80
1996-2001	1.44	1.80

Note: no significance levels are reported: as the analyses are based on the entire Danish population, practically any difference in relative risks is significant at a very low probability level

Figure 4: Relative Risks of First, Second and Third Birth in Denmark and West Germany, Results from Piecewise Constant Event History Model



Notes: For full models, see Tables 2, 3 and 4. Since the results for the third birth model for Germany were statistically non-significant, we did not plot the rates in Panel 4 for Germany

## **5 Conclusion**

In this paper, we have used German and Danish register data to investigate the relationship between labor-market attachment, female earnings and fertility. We based our empirical research on the hypothesis that the welfare state shapes the earnings and fertility nexus. In countries like Denmark that support maternal employment, women will be more inclined to have children when they have got established in the labor market. In most cases, having own earnings that are sufficient to support a family would be a prerequisite for becoming a mother. In countries like (West) Germany, where women usually have to reduce their employment activities after childbirth, a sufficient female income is not a prerequisite for having children. Instead, one would assume that high income women would rather avoid parenthood, which would result in a negative relationship between female income and fertility.

Our empirical estimation provides strong support for our hypothesis. While we find a negative association between female income and first-birth risks in Germany, we find the opposite pattern for Denmark. In this Nordic country, first birth risks increase rapidly when women have reached the third income quintile. This provides strong support for the idea that a sufficient female earning situation is a precondition for forming a family in Denmark. However, for higher order birth no systematic pattern is discernable. In Denmark, women who belong to the lowest income quintile encounter reduced second birth rates. Apart from this, there does not seem to be a strong impact at all of female earnings on second birth risks. For third births, the association between female earnings and fertility even becomes slightly negative,

also in Denmark. Evidently, two-child mothers who reduce their labor-market activity are more inclined than others to aim at a relative large family size.

In short, our cross-country comparison provides compelling support for the notion that differences between countries in welfare state setup can translate into differences in fertility levels. In particular, our study demonstrates that contextual factors appear to be important in shaping how women's earnings and labor-market behavior are related to childbearing and family dynamics.

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