Educational Homogamy and Childbearing: A Cohort Study on the Changing Relationship between Relative Resources in Couples and Their First and Second Birth Transitions

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February 2014

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ABSTRACT

Recently, an increasing number of studies have investigated childbearing behavior from a couple-perspective, and integrated both partners and their characteristics and interactions into the analyses. So far, the focus has been either on understanding how the gendered division of domestic work may affect birth hazards, or on how educational assortative mating relates to birth rates. No study has yet integrated both approaches simultaneously, which is important since it has been shown that the division of household labor in couples can itself be dependent on the partners' relative earnings or education. This paper contributes to the literature by investigating how relative socio-economic resources such as educational pairings and relative income while controlling for the gendered division of domestic work relate to the first and second birth hazards in Germany, and if and how these relationships have changed over birth cohorts. Indeed, the results indicate significant effects of educational pairings on first and second birth hazards; in particular, highly educated homogamous couples have higher second birth hazards than couples with less education or than couples with a highly educated wife and a husband with less education (1966-75 cohort). Furthermore, no effects of relative earnings on birth hazards have been found. The findings also suggest change in the relationship between the division of domestic work and birth hazards. An increase in his contribution to housework is associated with a higher transition rate to parenthood in the youngest birth cohort (1976-85) only, while it increases the second birth hazard in the middle cohort (1966-75).

INTRODUCTION

Recent changes in fertility trends across the advanced world have been well documented. The postponement of first births, rising levels of childlessness and a decline in the average number of children per woman have led to below replacement period and cohort total fertility rates in many nations in Europe and beyond (Kohler et al. 2002, Billari and Kohler 2004). Those changes in the timing and quantum of fertility, i.e. in when and how many children are born over an individual's life, have been going hand in hand with significant increases in the participation of women in higher education and the labor market. Therefore, numerous studies have investigated this important inter-relation between women's educational attainment and careers on the one side and their childbearing behavior on the other side, both on the individual and on the aggregate level. The focus has, however, overwhelmingly been on understanding fertility trajectories from the perspective of the woman only. Most studies that investigate the relationship between childbearing behavior and education or employment have done so from her perspective, focusing on the individuals level, without taking the (male) partner into consideration (for example

Blossfeld and Huinink 1991, Brewster and Rindfuss 2000, Kravdal and Rindfuss 2008, Matysiak and Vignoli 2008, Stange 2011).

More recently, however, theoretical approaches and empirical studies have increasingly been published which emphasize that the fertility decision making process takes place, more often than not, within couples, and is likely complex (McDonald 2000 & 2013; Corijn et al. 1996; Dribe and Stanfors 2010; Torr and Short 2004; Cooke 2004 & 2009; Rijken and Thomson 2011; Neyer, Lappegard and Vignoli 2013; Thomson 1997; Thomson & Hoem 1998; Jansen & Liefbroer 2006; Testa 2012). This literature argues that both partners and the interaction between them need to be included into the analyses of fertility intentions and childbearing behavior. This approach implies that a joint utility function of both partners, which was embraced by economic models of the family and assumes mutual agreement between spouses in terms of gender role and fertility preferences, may be outdated and subsequently empirically models the behavior, characteristics, and interactions of both members of couples as they pertain to fertility outcomes. Oppenheimer's work may have influenced this new direction of thinking. Her articles from 1988 and 1994, for example, have questioned the specialization and trading model in its entirety and emphasized that a new analytical model of marriage needs to be developed, which ought to focus more on the roles of each spouse and their interactions within the marriage, specifically with regards to economic production and the spouses 'collaborative' roles in making contributions to the economic wealth of the marriage (Oppenheimer 1994, p. 333). At the same time, the availability of empirical data has improved. Specifically, longitudinal surveys with information on all household members have become increasingly available.

Despite the recently increasing amount of studies which investigate childbearing behavior from a couple perspective open questions remain. For example, some of the studies employing a couple perspective have focused on understanding if and how relative resources such as relative education of the partners (educational homogamy, hypergamy or hypogamy) are significantly related to fertility transitions (Dribe and Stanfors 2010; Bauer and Jacob 2010, Wirth 2007). This literature stresses that fertility may be bargained in couples, and that the relative resources of the partners plays a role for the decision-making power among them (Bauer and Jacob 2010), or that the relationship between education and fertility in women's lives can only be fully understood when the education of her partner is taking into account (Dribe and Stanfors 2010). Indeed, these

pieces show that educationally homogamous couples have a higher transition rate to parenthood in Germany (Bauer and Jacob 2010) and that highly educated homogamous 'power couples' have a greater likelihood of experiencing second births than other couples in Sweden (Dribe and Stanfors 2010). Other pieces have investigated the question of whether the gendered division of household chores and how couples divide childcare amongst themselves for their first child predicts the occurrence and timing of a second birth, reasoning that second birth hazards may go up as the couple split the 'second shift' more evenly and the double burden of employment and domestic work decreases for women (Torr and Short 2004, Henz 2008, Cooke 2004 & 2009, Brodmann et al. 2007). A somewhat unrelated literature which studies the division of housework as a dependent process has, however, shown that the division of domestic work in families can be subject to change over time between partners and may depend on the partners' relative socio-economic resources, such as their educational parings, themselves (Geist 2009, Evertson and Nermo 2004 & 2007, Grunow et al. 2007). It appears, therefore, important to include both measures, those of relative socio-economic resources, as well as measurements for the gendered division of household labor into couple level analyses of childbearing behavior to understand in greater detail which of those aspects are significantly linked to couples' fertility once the other mechanism is controlled for, and if, as suggested by prior literature, this may differ with regards to the transition to parenthood and higher parity births.

In addition, it appears necessary to investigate whether in the relationship between these couple dynamics and couples' childbearing behavior may have changed over time. The relative share of women's socio-economic resources in marriages, for instance income, has substantively changed over the last decades (Sorensen and McLanahan 1987), as has the gendered division of household labor, even if change in this domain has been somewhat slower (Bianchi et al. 2000). At the same time, educational and employment opportunities for women have increased, in particular in advanced nations. Also, it has empirically been shown that the effect childbirth has on the division of household labor in Swedish couples has changed from the 1990s to the 2000s (Dribe and Sasnfors 2009). This indicates that social change with regards to gender roles and with regards to couples' responses to a first child may be rather fast. It is, hence, plausible to expect that, for instance, the bargaining position which comes with a high relative income or high educational attainment, or the importance of a partner who shares household chores for women's childbearing consideration, have changed over time. For example, from a macro level

4

perspective, if the share of women with economic independence in a population increases to a sizeable proportion and these women demand more participation of their male partners in domestic work, men may become more willing to increase their time in housework, since fewer and fewer potential partners with more traditional gender role preferences may be available on the mating market (Breen and Cooke 2005). This implies, on the micro level, that her relative earnings or labor market standing within her partnership would have a differential effect on her bargaining power, depending on the distribution of women's economic independence within the population. A differential relationship between relative resources and bargaining power over birth cohorts is thus plausible. However, a study that addresses more comprehensively how relative socio-economic resources (such as educational attainment, work status, income) as well as the partners' distribution of household labor and care work relate to childbearing behavior and how this relationship changes over time is still missing from the literature. The present paper tackles both of these open questions and investigates the relationship between relative levels of education, employment status, working hours, and earnings among married and cohabiting couples and their first and second birth transitions in Germany. At the same time, the richness of the used data permits to model the gendered division of household labor and relative time spent with child care (for modeling the second birth transition), and to control for her fertility desires. In order to investigate whether the relationship between relative resources in couples and their childbearing behavior may have been subject to change over time, a birth cohort perspective (women's birth cohorts while controlling for his age) is employed, covering three birth cohorts born between 1950-1985 (1950-65, 1966-75, 1976-85). The data come from the German Socio-Economic Panel (SOEP), a large longitudinal household survey with yearly waves which was started in 1984 and Cox regression models are employed.

COUPLES AND FERTILITY: THEORETICAL CONSIDERATIONS

A large array of theories geared at explaining childbearing behavior and fertility change have been formulated, among them demographic transition theory (Thompson 1929, Caldwell 1976), economic theories (Becker 1981, Mincer 1963, Easterlin 1975, Butz and Ward 1979), ideational explanations (Knodel and van de Walle, 1979, Lesthaeghe & Surkyn 1988), and social network approaches (Bongaarts and Watkins 1996, Sandberg 2005, Diaz et al. 2011). While the relevance

of relationships, and hence the contribution of both partners to the decision-making about childbearing in general and the conception of a pregnancy in particular, has been acknowledged in many of those approaches, the unit of analysis in the mentioned theories has remained on the singular individual level, most often that of the woman, sometimes that of the male partner. The processes within the actual unit in which fertility decisions are made more often than not, however, namely the couple with its 'dyadic nature' (Testa 2012) and the interaction of the partners, have not usually been modeled explicitly. In the economic approaches, for instance, it has been assumed that a joint utility function of the household, or among the partners or spouses, exist. For example, Becker, in laying out the 'economic theory of the family', has theorized that the joint utility function of the family, or the gains to marriage, is maximized when both partners specialize in different gender roles, with one (usually him) being the breadwinner in the labor market and one (usually her) being the primary caretaker of children and the household (Becker 1993, p. 30ff.). Here, it has rather been assumed that there is mutual agreement about gender roles and fertility desires among partners; dynamics or bargaining different positions within the couple have not been modeled explicitly. Additionally, the availability of empirical data likely played a role for the focus on women as the primary unit of analysis in fertility research, since data which provides information on his and her characteristics, desires and childbearing behavior has not been widely available. Many representative fertility surveys have gathered data on women only. This focus may have, in turn, been inspired, in addition to financial and logistical constraints, by the aforementioned theoretical considerations, as well as by the general gendered social perspective of childbearing and childrearing being female domains, which has prevailed in the second half of the 20th century in most advanced societies, but appears now to be subject to social change.

The recent 'couple-centered' approaches make several arguments for why both partners are relevant for understanding childbearing behavior. For example, empirical research has shown that, on average, there is considerable disagreement in spousal fertility preferences (Thomson et al. 1990, Voas 2003, Rosina and Testa 2009). In turn, power dynamics in the couple, based on their relative resources such as education or earnings, may matter for negotiations regarding fertility decisions. Blood and Wolfe (1960) have argued that the partner with more resources is outfitted with greater negotiation power. Several recent studies emphasize that bargaining over fertility, for example on the base of relative resources, may be a crucial element of the fertility

decision making process (Brodman et al. 2007, Bauer and Jacob 2010, Neyer et al. 2013, Bauer and Kneip 2013, Berninger 2013). Additionally, it has been theorized that gender equity on the couple level matters for women's fertility decisions and couples' fertility outcomes. McDonald (2000a & 2000b) argues that while women today can participate equally in education and the labor market in advanced nations, gender symmetry is not yet achieved with respect to the division of labor market work and unpaid household work within the family. Nurturing and housework have traditionally been and are often still today women's responsibilities. But since women have made considerable gains in self-control over their reproduction, some women will in consequence to this "uneven and stalled revolution" (England 2010) choose to limit their fertility in order to be able to fully participate in education and the labor market (McDonald 2000b:436f., 2000a:5). McDonald further hypothesizes that conflicting levels of gender equity in families and family policies versus social other institutions such as education and labor market institutions within a society are responsible for the fertility decline to much below replacement levels in many countries of the Western world (2000a:1), such as Germany. In other words, when there is good access to education and employment but at the same time institutional support for traditional gender roles within families, for instance via low childcare provision, short school hours, and financial policy incentives to care for children at home, women will feel pressured to make a choice between childrearing and career. McDonald thus theorizes that for fertility decisions, both gender equity and relative resources on the couple level as well as gender equity and gender relevant social policies on the societal level, and the interaction of those 'micro' and 'macro' elements, matter. Others have pointed out that as more and more women enter universities, gender ratios in higher education are shifting. This change in the gender distribution of highly educated individuals in populations of advanced countries has been argued to likely have profound implications for educational assortative mating (Van Bavel, 2012). To date, however, little is known about how this shift in gender ratios influences family formation. These shifts may have, however, produced changes in educational assortative mating or relative earnings in couples over time, or may have lead to changes in how relative educational attainment and work roles of spouses and partners play out with respect to bargaining power and in turn childbearing behavior over time. Against this background, it is plausible to expect that relative resources between partners may not only be relevant for negotiating fertility in couples, but also that power balances that are produced by relative resources in couples have shifted over

time due to changes in gender ratios in educational attainment and gainful employment, the changing employment possibilities women encounter in the labor market, and the subsequent shifts of available partners in the mating market (Breen and Cooke 2005).

There are several possible pathways through which relative resources can relate to childbearing behavior in couples.

With regards to *education*, it can be argued that among highly educated homogamous couples both partners have invested large amounts of resources in their education, can expect higher wages, and would therefore have higher opportunity costs after the birth of a child, specifically the partner who takes time off to care for the infant. It thus, according to the classical economic model of the family, could be expected that homogamous couples with high education postpone the birth of a first child, in comparison to couples in which only one of the spouses is highly educated, or in comparison to couples in which both partners have lower educational attainment (Wirth 2007: 174). Caring for an infant and young child in its first years after the birth is highly gendered process in Germany, with usually the mother being the one to stay home with the infant. This is reflected in the fact that Germany has within the developed world comparatively low labor force participation rates of mothers of children under three and exhibits persistent traditional gender roles (Aisenbrey et al. 2009). Hence, from an economic theory of the family perspective, it can be expected that a postponement of the first birth would also take place if she has high education and he has lower education, because she, in those cases, may be the primary breadwinner of the family but would possibly still be expected to leave her employment in order to care for the infant.

On the other hand, based on the bargaining approach, it can be argued that in unions in which both spouses are highly educated, or in which she is more highly educated than he is, her negotiation power is generally strong, compared to other types of couples. In such unions, she hence may be better able to negotiate for circumstances which help to alleviate the burden of combine childrearing with gainful employment. This can entail, for example, the negotiation of a fair distribution of household labor with him, but also negotiating that financial resources are spent on enlisting paid help for cleaning and household chores, or for babysitters or more high quality child care, or a negotiation of a fair division of paid work in the labor market (instead of assuming the role of the primary caregiver). This may specifically be the case in unions of two

8

highly educated spouses, since structural assimilation theory posits that education and the educational system foster the adaptation of universalistic and democratic ideas (Gullickson 2006). Accordingly, it can be argued that highly educated men may be more perceptive to a change in gender roles toward more gender equity in the division of paid and domestic work within their own unions. Since the burden of household chores usually increases after the birth of a first child (Dribe and Stanfors 2009), it has been argued that how housework and childcare is organized amongst the partners or within the household may be more relevant for considerations of whether and when to have a second birth, since women may postpone having more children if they perceive combining the rearing of the first child with a work life as too strenuous (Cooke 2004, Brodmann et al. 2007). It is therefore possible that couples with two highly educated partners, or couples in which she has more education than he has, have higher second birth hazards. In sum, in case the educational symmetry, specifically among highly educated couples, solely operates through negotiating a more even distribution of domestic work, the time to a second birth should mainly be affected by the division of household labor. This coefficient should hence be significant, while the educational pairings would be insignificant. But a different scenario is possible too. As mentioned above, in order to combine childrearing with paid employment, the support and gender role expectations of her partner toward her having children and a career may play a greater role in her decision to have a second child sooner instead of postponing the second birth. This includes the attitude of her partner toward her taking an 'untraditional' mother role, which would be supportive of ideas such as placing the children in non-familial care, outsourcing domestic work, encouraging her labor force attachment or full time hours etc. In this scenario, the measurement for the division of housework and childcare between the spouses would not be the main mechanism through which educational pairings and birth hazards are linked, and should thus be statistically insignificant. It is also a possibility that both scenarios apply simultaneously.

While there has been some empirical evidence for a negative relationship between *income* and fertility in developed nations on the macro level (Jones et al. 2008, Jones and Tertilt 2008), the direction and strength of this relationship has not yet been fully understood. Theoretically, in a longstanding debate, it has been argued both for a negative relationship between income and fertility timing or lifetime fertility, for example due to higher opportunity costs of high earning parents, due to tradeoffs between the quality and quantity of children, or due to increases in costs

9

for children as parents' incomes go up, as well as for possible positive relationship (Jones et al 2004, Becker and Lewis 1973, for a review see: Balbo et al 2013). Empirical evidence on the micro level has been ambiguous. It shows on the one hand that there is a considerable motherhood wage penalty (Gangl and Ziefle 2009) and that postponing a first birth can increase earnings for women with high educational attainment in fields with high expected starting wages (Van Bavel 2010). Other research has, however, shown, that the association between her wages and the transition to parenthood is only negatively significant for single mothers, but insignificant for married women in Norway (Kravdal 1994), while a recent study found positive income effects on first birth hazards for her but not his income within newly formed unions in Finland, with no interactive income effects being present (Jalovaara and Miettinen 2013).

From the relative resources perspective, however, a positive relationship between her relative income contribution to the household income and birth transitions can be expected, in relationships with two working partners. If her relative contribution to the income is high, then she may have greater negotiation power in general, and over household expenditures in particular. For consideration of whether to have one (additional) child sooner, this may be specifically important in unions where the division of house- and care work is unequal with her doing most of the work, because here she can bargain for market solutions such as cleaning services or a nanny. This relationship may also differ by the absolute level of household income as such services may play a more important role in higher income households.

There is increasing evidence that the *division of household labor* has changed in couples in recent decades. The contribution of men to housework has increased, while that of women has decreased (Bianchi, Robinson and Milkie 2006, Bianchi et al. 2000). Also, a study shows that in Swedish couples, the gendered response to increases in household demands after the birth of a first child has changed significantly from 1990 to 2000, with the division of household labor being more equal between the partners in 2000 than only 10 years earlier (Dribe and Stanfors 2009). As mentioned above, given educational expansion and increases in women's labor force participation, it is therefore possible that the relationship between relative resources or the division of household labor on the one hand and childbearing behavior on the other hand has changed in couples, as might have gender roles and gendered expectations towards partners. For example, it was less common among the older cohorts for men to pick up a large share of the

housework, at least in the US (Bianchi et al. 2000). Women therefore may not have expected their partner to contribute a large share of domestic tasks early in the union, so that the gendered division of household labor may not have been an important factor for many women with regards to the first birth decision. But since the burden of domestic work increases after a child is added to the family (Hochschild 1989), among these cohorts, the help the husband contributed to child care and domestic tasks after the first birth may indeed have played a role for women's decision-making toward how quickly they would add a second child to the family. In younger cohorts, however, as gender roles are changing, young women may expect their male partners to take on more of the domestic work at the outset of the union, before they have children. It is hence possible that among these more recent birth cohorts, a significant relationship between his contribution to domestic work and birth hazards, if present at all, has shifted from the timing of the second to the first birth transition.

Furthermore, some studies on the relationship between relative socio-economic resources and the division of household labor in couples have pointed out that the division of domestic work can depend upon the distribution of relative socio-economic resources among partners. Grunow et al. (2007) have found that the division of household labor changes over the life course, and that it is due to changes in relative socio-economic resources among partners when men take up more housework over time. However, these couples were the exception, and most couples did follow a more gendered pattern over time. Evertsson and Nermo (2004) have found for Sweden that when women increased their relative resources, their share of housework went down, while they detected a curvilinear pattern of this relationship in the US. The gendered distribution of housework was the most equal in couples with equal income, but gender atypical combinations in the labor market (wife out-earns husband) were associated with gender-typical behavior in the household and a more unequal division of household labor with the female spending more time with household tasks (2004:1284). Another study on Germany has also shown that, among partnered women, increases in her income are associated with decreases in her time spent with housework, albeit to a lesser extent among full time workers and in East Germany (Geist 2009). These findings underscore the importance of including both relative socio-economic resources as well as the division of household labor when examining how gender equity in couples relates to birth hazards.

HYPOTHESIS

In accordance with the previous discussion, it is hypothesized that relative educational attainment and relative income are significantly linked to the timing of births in couples. The first hypothesis says that birth hazards increase as her relative education increases, and may be elevated specifically among homogamous couples where both partners are highly educated. It is expected that this relationship may be stronger with regards to second birth hazards. Second, increases in her relative income are expected to be positively associated with birth hazards. This effect is hypothesized to be stronger among families with higher levels of household income. Third, it is hypothesized that the division of household labor does not significantly relate to birth hazards once relative socio-economic resource are controlled for (or if so then possibly in addition to relative socio-economic resources.). This is motivated by the rationale that educational symmetry rather relate to faster birth transitions through his support for a non-traditional mother role or her ability to negotiate for outsourcing domestic tasks and childcare. Fourth, it is expected that the association between relative resources and birth outcomes changes over birth cohorts. As an ever increasing proportion of women obtains higher education and female labor force participate increases, women's bargaining position within couples may have been strengthened due to their increasing opportunities in the labor market, and their resources may weigh more heavily with regards to power balances in couples over time[1]. So it could be expected to see relative resources being related more significantly or more strongly to birth hazards among younger cohorts. Also, if there is an independent effect of the division of household labor on birth hazards, it is possible that it occurs mainly among the cohorts who initiated their childbearing in the most recent one or two decades (women born after 1970). This is because as the contribution of men to housework has increased, it may be expected more strongly by young women, and may play a greater and independent role for women's decision-making about having an (additional) child sooner rather than postponing a potential birth in the youngest cohort specifically.

PREVIOUS LITERATURE: CHILDBEARING BEHAVIOR FROM A COUPLE PERSPECTIVE IN GERMANY

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[1] The labor force participation of women in Germany has steadily been increasing over the last decades; it was 52.8% in 1980, 63.6% in 2000, and 71% in 2011 (Us Census Bureau 2012; Statistisches Bundesamt 2012)

There are, to the best of my knowledge, currently four studies available that have examined the role of relative socio-economic resources or the gendered division of household- or care work among couples for childbearing behavior in Germany. Two studies focus on the former (Bauer and Jacob 2010, Wirth 2007), and two on the latter aspect (Cooke 2006 and Henz 2008). Cooke has focused directly on the question of whether the gendered division of household labor affects the transition to second birth using SOEP data (Cooke 2006). Her study shows that male breadwinner families are the most likely to experience a second birth, but also that a greater share of relative time spend with child care of the first child by the male partner increases the odds of having a second child (2004:1251). While this study controls for educational attainment, and income of each spouse, no interaction terms are included, hence, the study does not speak to the question of if and how relative socio-economic resources or educational pairings may be behind the effect of the division of housework or child care measure. Henz, using the German Family Survey, did examine the transition to first births from the same gender equity perspective, by creating categories of housework division regimes ('equal', 'conservative' etc.). The study uses logistic regression and finds that male breadwinner families with the female doing the majority of the housework were much more likely to experience the birth of the first child (2008: 1485), but also controls for her and his absolute socio-economic resources only, not for the relative resources. Bauer and Jacob have, on the other hand, examined the relationship between relative levels of educational attainment and the couples' parenthood status (2010). They use data from the German microcensus, which means that the fertility measures are not directly sampled but derived from the household composition. Also, this data source does not provide data on time use. The findings show on the one hand, that the women's education has a stronger influence on the timing of a first birth than the educational attainment of the male partner (Bauer and Jacob 2010:50). But they also find that educationally homogamous couples have a higher likelihood of becoming parents than hypogamous or hypergamous couples (ibid.). Wirth has compared the level of childlessness in couples with two highly educated partners and contrasts those highly educated couples with couples in which only one partner has at least a university degree, for birth cohorts born in the 1950s and 1960s. She finds that couples in which the female has a higher level of education than the male partner remain childless most often, followed by highly educated homogamous couples (Wirth 2007: 188). Furthermore, she finds cohorts effects, with younger cohorts of highly educated women remaining childless more often (ibid.). Wirth

also uses the cross sectional micro census data. While these studies examine the link between either the division of household labor or educational pairings on either birth timing or birth probabilities, a comprehensive study which includes several measures of socio-economic relative resources and the division of household labor in couples and examines first and second birth transitions using the same indicators and methodological approach is still missing from the literature, in general and for Germany in particular.

DATA AND SAMPLE

The data for the analyses com from the German Socio-Economic Panel (SOEP) and span the waves of 1984-2010[2]. The German SOEP is a longitudinal household survey with waves collected yearly since 1984. The start sample in 1984 consisted of a little less than 6,000 West-German households (ca. 12,000 individuals), including an oversample of 'foreigners' (first and second wave immigrants without German citizenship). Over the years, several refreshment samples have been added, amongst other a sample of East-German households in 1990. For the purpose of this paper, the samples of 'foreigners' and 'immigrants' have been excluded. Attrition varies by subsample, but roughly speaking, about 50% of households were still being interviewed after 15 years (Spiess and Kroh 2008). The SOEP provides detailed information on fertility-, relationship- educational-, and work-trajectories, and also includes questions on time use and fertility desires, making it an excellent sample to address the research question.

Couples were selected into the estimation sample based on several conditions. They needed to be living in one household, either married or cohabiting. Only couples in first marriages were selected for the sample, and the women (not the men, though) needed to be childless at the first interview, or be on parity one for the sample on second births. Also, couples were only included when her age at the union formation was 40 or younger (no restriction on his age). Three birth cohorts were formed, based on the year of birth of the women: 1950-65, 1966-75, and 1976-85. The sample selection varies depending on the cohorts, in order to allow for changing social circumstances over time. For the oldest cohort, only married West German couples were

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[2] The estimations are based on the Scientific Use File of the SOEP. This is a slightly reduced sample covering 95% of the original full SOEP sample and is distributed to researchers located outside of the EU.

selected, since there are only few cohabiting couples in that group. The middle cohort likewise consists only of married couples but also includes East Germans. The youngest cohort includes both married and cohabiting West and East German couples. It is possible that relative socio-economic resources and the division of domestic work relate to birth timing differently with respect to couples who cohabit and married couples, for instance because legal responsibilities toward each other differ in marriages and cohabitations. The same may be true for East Germans, as behavior and gender roles relating to childbearing and employment differed in the former GDR and FDR. Attempts to estimate separate models for these groups, however, resulted in too small sample sizes to carry out separate analyses. Therefore, interaction effects between the indicators of interest and cohabiting or East German status have been estimated, but were largely insignificant and therefore dismissed. After listwise deletion of missing values, this strategy yields a sample of 1231 couples at risk for a first birth of whom 491 experience a first birth event. For the analysis of the second birth transition, there are 1011 eligible couples and 480 observed second births.

Table 1 shows descriptive statistics of the final estimation sample (combined first and second birth samples), by person months. Since the SOEP is not a cohort study, obviously, the cohorts differ somewhat in terms of when during their lifespan they have been observed. Women in the oldest birth cohort were between 19 and 35 when they were first observed in 1984. This means that in this cohort, women who had their first or second birth later in life are likely to be overrepresented, since those women whose first (and second) births had already occurred when they were first observed cannot be included in the estimation. On the other hand, women in the youngest cohort were at most 35 during the most recent wave included in the analysis, meaning that women who have had children at younger ages are possibly overrepresented in this cohort. This situation is reflected in the decreasing average age at first birth in the cohort samples, ranging from 29 in the oldest to 25.6 in the youngest cohort, as well as in the decreasing ages at the begin of the union. The average age at first birth in (West) Germany was, however, 25 in 1980 and 29 in 2010 (online source 1[3]). While it is certainly not ideal that the cohort comparison is based on in part different life spans of the observed women, the models control for these demographic differences and more comprehensive data is, unfortunately, not available. The great

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[3] http://www.bpb.de/nachschlagen/zahlen-und-fakten/soziale-situation-in-deutschland/61556/alter-der-muetter

advantage of the SOEP is that the data are of high quality and the measures are consistent over time and therefore well comparable over cohorts. It is, however, necessary, to keep this background in mind when interpreting the findings of the models.

METHODOLOGICAL STRATEGY

Models & Dependent Process

For the analyses, Cox proportional hazard models are being estimated. The time to first and second birth is estimated in separate models. Time is measured on a monthly scale; even though most covariates only vary on the yearly level. Person months (instead of person years) are, however, the more appropriate time unit, because birth events[4] and begin and end dates of unions are measured in months, and a monthly set up can greatly reduce ties. For handling ties, the Efron method is used in Stata 11.

The time origin for the analysis of first birth transitions is the month of the marriage or union formation for cohabitors. Couples can leave the risk set either through the event of a first birth or through a union dissolution or by not being observed any longer. In the two latter cases, they are censored. Only very few union dissolutions occur after marriage but *before* the birth of a first child. Similarly, there are relatively few union dissolutions after the birth of the first but *before* the birth of a second child. Therefore, it was not possible to estimate competing risk models with this data or, in other words, to model the effect of the covariates of interest on the time to union dissolutions separately in the cohort design. Competing risk models using the full sample (all cohorts) to estimate the effect of relative resources and the division of domestic work on time to union dissolutions yielded no significant relationships, neither in the first birth nor in the second birth sample (models not shown). Therefore, it appears that censoring bias is no major issue here and straightforward event history models estimating the birth transitions only will be presented.

Covariates

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[4] For a small portion of the birth events (ca. 8%) only the year of birth, but not the birth month was available. In these cases, the month of June, as the midpoint of the calendar year, has been imputed as birth month.

Many of the covariates are time-varying. While birth and relationship histories are available on a monthly time scale, most covariates have been measured yearly with interview dates.

Education is time varying and has been measured as highest degree completed. After testing many different specification of education, I settled on a three category specification for both respondents' and spouses' educational attainment. While this is a rough simplification of the heterogeneous educational outcomes in Germany, it was necessary for being able to include her and his education plus their interactions into the models. The educational categories indicate having 1) compulsory education or less (which entails in Germany 10 years of schooling and offers a degree that enables students to take up an apprenticeship), 2) 'Abitur' (a high school degree equivalent which enables college entry) or a completed apprenticeship, 3) university education of all kinds. The models contain dummies for combinations of her and his education, with the category of both partners having 'Abitur' or apprenticeship (group 2) serving as the reference group. All time-varying covariates, including the educational variables, are lagged by one year. This strategy secures that relative resources are measured before or around the time of conception and not after the pregnancy was already established.

Enrollment in education is time varying and is available for both partners. It is a dummy variable that indicates enrollment in a university setting, apprenticeship, or high school. Since her enrollment can be expected to reduce the likelihood of pregnancy and birth, it is included in all models. His lagged enrolment was at first included as well, but only a very small proportion of men in the sample have been enrolled, specifically during the years of the events, leading to very large (positive) coefficient sizes in some models. His enrolment therefore was excluded from most models.

Work status is time varying and coded as a dummy variable, indicating current employment in the labor market versus non-employment, including inactivity and unemployment. His and her work statuses have been interacted, so that four possible working-status indicator variables have been formed: 1) dual earner couples (the largest group), male breadwinner couples, female breadwinner couples, and couples with two non-working spouses. Dual earner couples serve as the reference category.

Hours worked is time varying and, unfortunately, had to be reduced to full or part time work status because multicollinearity issues arose with the variables (and their interactions) that measured work hours continuously. Part time is defined as working 35 hours or less. Hence, four dummies indicate if both spouses work full time, both work part time, he works full time and she works part time, or she works full time and he works part time. Couples in which both work full time are the most prevalent in the risk set for first birth while couples where he works full time and she part time are most prevalent in the second birth risk set. This latter group serves as reference category in most models, but in some the groups he full time/she part time and both part time had to be combined due to small cell sizes.

Income measures are time varying. The models contain a measure for her yearly income from wages and salaries, his yearly income from wages and salaries, and the yearly family income (including transfers). All three income variables are entered into the models in form of their natural logs. Additionally, there is a measure for **her share of the total family income**, which is simply measured as the percentage which the woman's monthly earnings*13 (assuming 12 monthly salaries and a 13th 'Christmas'- or 'vacation'- salary which is common in Germany) contributes to the total (non-logged) yearly family income, ranging from 0-100. There were some instances in which the wages of the woman were larger than the yearly family income. For those cases, I did set her share to 100%. The share of the woman's income may have a curvilinear effect on birth hazards[5]. Therefore, a squared term and cubic term of her share of family income were included in the models. Those were, however, statistically not significant and therefore not included in the final models.

As discussed above, the effect of her relative income may differ with varying levels of the household income. Women's greater bargaining power, based on her larger contribution to the household income, may be used to negotiate market solutions with domestic help and childcare

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[5] A curvilinear relationship could be present if women who contribute a high share to the family income may be the main breadwinner and postpone the next birth due to expected opportunity costs with the birth of the child. At the same time, women with a very low share may not have enough bargaining power, and hence also postpone a (further) birth. Women who contribute about an equal amount to the family income may be the ones who have more bargaining power while their household is not being faced with loosing the main income after the birth of a (additional) child, hence their timing to the next birth might be accelerated.

more readily in more affluent households. Thus, a linear interaction term between her income share (measured in percent from 0-100) and the logged household income is included in the models.

The **division of household** labor is included as a ratio that indicates the percentage she contributes to the total amount of household labor that is done among the two spouses on a typical week-day. An increase in this variable indicates an increase in her contribution to the total amount of housework. The same concept is applied to the **ratio of the amount of childcare** provided by the two spouses (only for the analyses for second births) and the **ratio of repairs** done in the household by the spouses.

The models control for his and her **age at marriage/union formation** and **her age at first birth** (second birth models). An interaction of her and his age at marriage was found to be significant in some models and was therefore included, as were controls for survey year and the indicators for East German couples and cohabiting couples.

The SOEP does not include precise measures for fertility desires or intentions commonly collected by fertility surveys. Rather, it asks respondents to rate the 'importance' of several life domains on a scale from 1-4 (very important to not at all important). One question asks for the importance of children, and is included as a control for fertility desire into the models (her desires only). This question was not asked in all years, and the variable is constructed in such a way that the answer from the last previous interview is used for years in which this item wasn't sampled.

RESULTS

Sample descriptive are presented in table 1. The distribution of couples' educational pairings differs over the cohorts, specifically regarding couples' pairings which include a highly educated spouse, which is not surprising given educational expansion and the increasing influx of women into tertiary education. Over the cohorts, the proportion of hypergamous couples with a highly educated male spouse and a female spouse with medium education has declined from almost 13% to about 8.5%. The proportion of highly educated homogamous spouses is highest in the

19

middle cohort (1966-75) with 9.5%. It is only 5.8% in the youngest cohort (1976-85), possibly because educational trajectories are still in the process, which is reflected in a relatively high enrollment of female partners in this cohort with 3.6%. In Germany, the average age at university graduation is high in international comparison: It was between 27 and 28 in the years 2000 to 2006 (Statistisches Bundesamt 2008), which explains why changes in the assortative mating pattern in this youngest cohort may still be expected through educational upgrading. The proportion of hypogamous couples, with her having more education than him, is slightly larger in the younger cohorts. Five per cent of couples had a highly educated female spouse and a spouse with lower educational attainment in the 1950-65 cohort, which increased to almost 9% in the 1966-75 cohort and to about 6% in the youngest cohort.

Obvious changes are also present in the work related relative resources. The distribution differs notably in the youngest birth cohort in comparison to the two older ones. The proportion of couples with two working spouses is 68% in the oldest cohort, but only 64% and 58.5% in the two subsequent cohorts. The youngest cohort has the highest share of couples with both spouses not in the labor force (8.3%). Other differences are notable, too. The proportion of couples with 'female breadwinner' arrangements, in which only the female partner participates in the labor force, is highest in the youngest cohort (8.3%). Also, in this youngest cohort, there are more couples in which the female partner works full time while the male works part time (almost 3%), and the proportion of couples with a traditional arrangement, in which he works full time and she works part time, has declined over the cohorts from ca. 26% in the oldest cohort to 11.5% in the youngest cohort. Hence, clear differences toward a more gender egalitarian distribution in work arrangements are present in the youngest cohort, which matches up with the ongoing increase in female labor market participation in Germany. The cohorts have, however, in part been surveyed at differing points in their life course, which may account for at least a part the observed differences in work status combinations. The pattern of changing gender arrangements also emerges in the other indicators of gendered arrangements. Her contribution to the household income is highest among the 1976-85 birth cohort with almost 35%, an increase of 4 percentage points compared to the middle cohort born 1966-75. The housework ratio is also clearly different. In the two older cohorts, women contribute about 76% to the total amount of housework, in the youngest cohorts this has declined to 67%. Men also spend more time with a

first child in this youngest cohort, as the female partners' share of time spend with the child has decreased from 64% in the middle cohort to 57% in the youngest cohort.

Table 2 shows the model results for first birth transitions, for each of the three birth cohorts (separate models). While there are some significant associations between relative educational attainment as well as the division of household labor and first birth hazards, the coefficients for relative income and relative work arrangements are largely insignificant. Also, the findings vary across cohorts, as expected. In the cohort born 1950-65, the combinations of his and her education are significantly related to the first birth hazards; hence, how her education relates to how quickly a first birth occurs after the union formation appears to vary with his educational attainment, and vice versa, net of income, work arrangements, and the control variables. This applies specifically to couples with at least one highly educated spouse. The educational reference group in all models is couples with two 'medium' educated spouses; hence both have completed an 'Abitur', the high school degree that enables university entrance (but without further college or vocational training), or an apprenticeship. Compared to the reference group, hypergamous couples with a wife in the 'medium' educational group and a husband with college education, have a significantly higher first birth hazard, their first birth transition rate is twice as high. Furthermore, a Wald test shows that the difference in the first birth hazard between couples with a wife with medium education and a spouse with low education and a wife with medium education and a spouse with high education is also significant (p=0.0136), with the latter group having a higher first birth hazard. This means that the first birth timing for women with medium education significantly varies with the partner's education, and increases as his education goes up. Couples with a highly educated wife and a husband with medium or basic education also have a first birth transition rate about twice as high as the reference group. The first birth hazard for highly educated homogamous couples, however, is reduced in this cohort. The difference in the hazard rate between couples in this and the reference group is not significant, but a Wald test reveals that the difference in the first birth rate between highly educated women with a highly educated spouse and highly educated women with a spouse with less education is highly significant (p=0.0157). Thus, while for women with 'medium' education the first birth hazard significantly increases with increases in his education, it is the reverse for highly educated women, whose first birth hazard is reduced when his education increases in the 1950-65 birth

cohort. No significant educational effects are present in the middle cohort, born 1966-75. Here, female breadwinner couples, with a working wife and a husband not in the labor force, have a longer time to first birth, their first birth hazard is reduced by about 93% compared to couples with two working spouses. This finding rather supports the argument that opportunity costs for the potential mother may weigh heavily and lead to a postponement of a first birth when she is the only breadwinner in the family. In the youngest cohort, born 1976-85, couples with a highly educated male partner and a 'medium' educated female partner also have a higher first birth hazard compared to the reference group, but this coefficient is only marginally significant. Interestingly, however, there is a highly significant relationship between the relative time each partner spends with housework and the first birth rate; each additional percentage point she spends with household labor is associated with a 2% decrease in the first birth hazard. In addition, each percentage increase she spends with repairs in the household decreases the first birth hazard by 1%. Although these are small coefficients, they can amount to substantial effects with large differences in the division of domestic work between the partners. The control variables indicate that East German couples have as shorter duration to first births than West German couples, their first birth hazard is about twice as high. Not surprisingly, cohabiting couples postpone births longer than married couples, cohabiting couples have a significantly reduced first birth hazard, by about 70%. Interaction effects between the groups of East Germans and cohabitating couples on the one side and the relative resources on the other side were tested, but dismissed due to statistical insignificance.

The results for second birth hazards are shown in table 3 (separate models). Similar to the first birth models, significant relationships between educational pairings and now second birth transition rates are present, specifically in couples with one or two highly educated spouses, this time in all three cohorts. Relative income and work arrangements are again mainly insignificant. There are some effects of the division of housework, but in one cohort only.

In the birth cohort 1950-65, highly educated homogamous couples have a significantly shorter timing to a second birth; compared to the reference group, their second birth hazard is increased by 94%. However, according to a Wald test, there is no significant difference in second birth hazards for highly educated women with a highly educated spouse and for highly educated women with a spouse who has less education in this oldest cohort. Similarly, in the 1966-75 and

22

the 1976-85 cohort, homogamous highly educated couples have significantly higher second birth hazards compared to the reference group. Here, the coefficients indicate that highly educated women have increased second birth hazards when their partner is also highly educated, compared to highly educated women with a male partner with less education. This difference is highly significant for the 1966-75 birth cohort (Wald test p=0.0029), but misses statically significance in the 1976-85 cohort (p=0.1267). Additionally, in the two younger cohorts, couples with a highly educated male partner and a 'medium' educated female partner have significantly higher second birth rates compared to homogamous couples with 'medium' education.

Compared to couples with a male full time working partner and a female part-timer, couples with two full-time working partners have lower second birth hazard across cohorts, but only significantly so in the 1966-75 cohort. Here, the second birth hazard is decreased by about 60% among full time working couples. This, again, is rather support for the relevance of opportunity costs of the female partner, which may lead to the decision to postpone or forgo a second childbirth. Alternatively, it could signal a strong work preference of the female partner, even net of the perceived importance of children. Additionally, in the 1966-75 cohort, the division of housework, and the child care ratio are significantly related to the second birth timing, although the former one is significant among East German couples only. Here, each additional percentage increase in her contribution to housework is associated with a 2% decrease in the second birth rate, but no such effect is present among West German couples. On the other hand, each additional percentage increase in her relative time spent with the first child increases the second birth hazard, among all couples. Even thought the model controls for her perceived importance of children, this variable may reflect other preferences, for example how much she prioritizes spending time with children instead of time at work, which may also affect the second birth hazard, so that in this case the coefficient for the child care ratio would rather be spurious, and jointly determined with the second birth hazard by her work family preference. It could also be interpreted as an independent effect, and mean that, net of general fertility preferences, spending more relative time with the first child may lead to an increase in the desire to have a second child sooner among women.

DISCUSSION AND CONCLUSION

This paper engages with the question of if educational assortative mating and relative work-related resources such as work status, hours, or earnings within couples, as well as the gendered division of house- and care work are linked to their fertility outcomes in Germany, and whether this relationship has changed over recent birth cohorts. McDonald (2000) has suggested that gender inequity in couples both in the socio-economic realm as well as with regards to the gendered division of household labor may be a driving force behind low birth rates in developed countries, specifically in countries which feature a large degree of gender equality in access to tertiary education and the labor market. While previous literature has tested this hypothesis for Germany, only the gendered division of household labor as an indicator of gender equity in families was investigated systematically. This paper concentrates on examining if gender equity, measured as the relative socio-economic resources *and* the division of domestic work, is related to first as well as second birth hazards among couples. This approach is important and enriching because previous research has shown that the gendered division of household labor itself can be an outcome of relative socio-economic resources in couples (Geist 2009, Grunow et al. 2007). Leaning on McDonald, my general expectation was that women who are having an equal standing in terms of education and labor market participation or earnings relative to their spouses/partners may feel less pressured to give up their careers in the event of a child birth and may have more power to negotiate solutions that help them solve potential work family conflicts with their partner. Thus, couples with about equal resources among partners were hypothesized to have shorter transition times to first or second births.

More specifically, the first hypothesis stated that birth hazards increase as her relative education increases, and that the second birth transition rate may be higher in particular among homogamous highly educated couples. Indeed, the first main finding of the paper is that the relationship between her education and first or second birth rates differs significantly with changes in his educational attainment (and vice versa), at least in some cohorts, while her or his education alone, without modeling the interactive categories, do not significantly relate to birth hazards when estimated from the time of union formation to the first birth transition (or from the first birth to the second birth) in simpler models (models not shown). These educational effects are present while the division of household labor is controlled for; hence, relative education does not appear to relate to birth rates by operating through the division of house- or care work. The

specific hypothesis formulated above, however, was confirmed only partially and with variation regarding parity and birth cohort. With respect to the *transition to parenthood*, if the woman had relatively more education than her spouse, the time to first birth was indeed significantly shorter, but this applied only to highly educated women in the oldest cohort (1950-65). An educational 'advantage' of the female spouse was otherwise not associated with a higher first (or second) birth hazard. The first birth hazard was, quite to the contrary, rather higher among couples that featured a female partner with 'medium' education and a male partner with high educational attainment (1950-65 and 1976-85 cohorts). This pattern also applied to second births in the younger two cohorts; among women born after 1965, the pairing of her having medium education and him having college education was associated with an increase in the second birth rate, compared to couples with both partners having a medium level of education. Furthermore, and as expected, the *second birth* hazard was significantly higher in highly educated homogamous couples, compared to homogamous couples with 'medium' education only, across all birth cohorts. Among the cohort born 1966-75, highly educated women with a highly educated spouse had, in addition, a significantly higher *second birth* hazard than highly educated women with a lesser educated spouse. This pattern applied to the two other cohorts as well, but didn't reach statistical significance there.

The second hypothesis stated that increases in her relative income are expected to be positively associated with birth hazards. However, no empirical support for this hypothesis was found. Neither the partners' individual incomes nor her relative income was significantly related to first or second birth timing. Only the lagged log household income was positively related to first (but not second) birth rates in the two older cohorts, albeit only with marginal significance.

The third hypothesis addressed the gendered division of housework, stating that the division of household labor does not significantly relate to birth hazards once relative socio-economic resource are controlled for, or if so, then in addition to relative socio-economic resources. The model results indeed support this hypothesis for the most part, but also indicate changes across cohorts, the second set of main findings of the paper. Among the two older cohorts (1950-65, 1966-75), no significant effects of the division of housework or repairs on the first birth rate were present. However, among the youngest cohort (1976-85) increases in her relative time spent with housework and repair work were associated with a longer time to, or a postponement of the

first birth, while no significant effects of relative education were present. This finding indicates possible social change. It suggest that the relative time he contributes to domestic labor may be becoming more and more important for couples (or women's) decision about if and when to become parents. It may indicate that young women in today's Germany are more inclined to become mothers sooner when they feel more supported by their partner with domestic tasks, and may reflect a shift in gendered behavior, gender roles and the expectations of young women towards their partners. This is in line with the descriptive sample findings, which show that his contribution to domestic work is, on average, larger is in the youngest cohort. With regards to *second birth hazards*, only among East German couples in the middle cohort (1966-75) was an increase in his contribution to domestic work related to an increase in the second birth rate, but not among West German couples. The availability of childcare is still larger in East Germany (Geist 2009) and research has indicated that East German women return faster to employment after the birth of a child (Hofaecker et al. 2013), work full time more often, and that among partnered women, East German women did significantly less housework than their West German counterparts in the decade following reunification (Geist 2009). Also, East Germans have been shown to have more gender egalitarian attitudes toward women's labor force participation than West Germans, a difference that persists since the German unification (Lee et al. 2007). Given these persisting differences between East and West, it makes sense that the division of domestic work among partners relates differently to second birth hazards in the former East and West German areas. If East German women have a greater labor force attachment and encounter more supportive structures encouraging employment after having a first child, his contribution to domestic work may play a larger role in her considerations of a adding a second child to the family sooner instead of postponing a further birth. It is noteworthy, though, that this effect is present in addition to the significant effects of educational pairing on the second birth rate in the 1966-75 cohort, indicating that both relationship operate through different pathways. An increase in her share of time spent caring for the first child was, however, surprisingly associated with a higher second birth hazard, after relative socio-economic resources were controlled, possibly expressing preferences. This finding confirms earlier research which indicated that the second birth rate increases the more hours the woman spends with the first child, even though in this study, an increase in his relative time spend with a first child was associated with a higher second birth hazard in Germany (Cooke 2004) which cannot be confirmed by my findings.

The fourth hypothesis stated that the association between relative resources and birth outcomes changes over birth cohorts. As discussed above, the relationship between relative education and first birth timing has changed indeed, as has the relationship between the gendered division of domestic work and birth hazards. The finding that highly educated homogamous couples have higher second birth hazards is, however, rather constant across the cohorts. The same applies to the finding that, net of relative education and a net of a variety of controls, work arrangements between the partners and relative income seem not to relate significantly to either first or second birth rates.

While the findings on educational assortative mating and fertility, in light of controlling for the division of domestic work, are novel and important, the mechanisms behind the educational effects remain unclear and subject to further research. The finding that highly educated women born 1950-65 had higher transition rates to *parenthood* when their spouse was less educated than them rather than highly educated as well may be due to several circumstances. Highly educated women could indeed have had more power in this situation to negotiate arrangements with their spouses that made combining a child with employment more feasible. Or they may have felt less pressured to give up gainful employment with the birth of a child as they were the more educated partner, possibly with better career prospects, in the union. On the other hand, it is also possible that highly educated women who are married to a spouse with medium or low education in this cohort had lower career aspirations than highly educated women in homogamous unions and therefore had a faster first birth, a possible selection effect. Additionally, in this cohort, men had not yet been expected to pick up a (larger) share of domestic work. Hence, women who were highly educated and had a highly educated spouse with good career prospects may have rather refrained from childbearing or postponed the first birth more, due to lower *anticipated* help in house- and care work regarding the time after a potential childbirth, even thought the actual division of housework is insignificant in this model.

The perhaps most interesting result is the higher second birth hazard of highly educated homogamous couples. A variety of mechanisms may operate here, but have not been tested by the analyses in this paper and should be addressed by future research. This finding may be interpreted in terms of the bargaining approach, and could indeed imply that women with high levels of education are best able to negotiate helpful arrangements in reconciling work and career

with their partners when these are highly educated as well, for example outsourcing of domestic work. It is also possible that there is greater value consensus among highly educated couples with regards to gender roles, such that women who aspire to have a career and raise children may feel more supported in such an endeavor by a highly educated spouse. It is, however, also possible that anticipated career stability and projected future earnings play a role in the higher second birth hazards among those couples. This latter argument would also resonate with the finding that couples with a 'medium' educated female partner and a highly educated male partner had higher first and second birth rates than homogamous couples with medium education across almost all cohorts.

In sum, the paper shows that the relationship between education and fertility is, at least in Germany, more complex than previously assumed. Not only do her and his educational attainment both need to be taken into account to understand childbearing behavior, but the educational pairing of the couple seems to play a crucial role, specifically with regards to the timing of the fertility of highly educated women. This finding is particularly interesting in the German context, since childlessness in West Germany is high in general and even more elevated among highly educated women (Kreyenfeld and Konietzka 2007). Also, the models have shown that the relationship between the division of domestic work and first and second birth hazards is changing over cohorts, and that there still exist significant differences between West and East German couples. It appears therefore that relative socio economic resources in couples as well the gendered division of domestic work, which has been changing over recent decades in Germany and beyond (Craig and Mullen 2012, Bianchi et al. 2000), are crucial components in understanding couples' fertility timing, and should move more to the fore in future studies.

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32

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TABLES

TABLE 1: Descriptive Sample Statistics

Indicator	cohort 1 percent	cohort 2 percent	cohort 3 percent			
Education:						
she low/he low	1.84	3.3	1.66			
she low/he med.	6.19	8.24	8.93			
she low/he high	1.24	0.9	0.79			
she med./he low	4.29	6.37	6.29			
both medium	60.28	54.86	61.91			
she med./he high	12.85	8.11	8.44			
she high/he less	5.01	8.79	6.17			
she high/he high	8.3	9.44	5.81			
Work-related:						
both work	67.97	64.19	58.48			
she work/ he nilf[1]	6.67	4.23	8.31			
he works/she nilf[1]	23.31	28.4	24.93			
both nilf[1]	2.04	3.18	8.28			
both full time	40.07	42.42	42.26			
she ft[2]/he pt[3]	0.86	0.63	2.87			
both part time	1.16	1.1	1.88			
he ft[2]/she pt[3]	25.89	20.04	11.47			
she enrolled	0.25	1.36	3.64			
	cohort 1 mean	cohort 2 mean	cohort 3 mean	cohort 1 sd	cohort 2 sd	cohort 3 sd
his log income	7.15	7.22	6.39	2.14	2.01	2.79
her log income	5.37	5.04	4.99	3.20	3.37	3.30
log hh[4] income	10.63	10.58	10.21	0.91	0.91	1.34
her ratio hh[4] inc.	31.58	30.44	34.81	25.86	26.33	30.22
housework ratio	76.98	76.60	67.32	22.51	23.49	24.21
repair ratio	41.99	38.17	39.07	30.46	29.57	27.55
childcare ratio	62.13	64.34	57.10	19.01	19.16	16.24
her age at union	25.41	24.45	23.13	4.79	3.76	2.36
his age at union	28.55	27.51	26.97	7.06	4.89	4.71
Import. of childr.	1.98	1.72	1.75	1.05	0.86	0.83
age at first birth	29.32	27.79	25.66	4.39	4.51	3.25
Person months	43147	33507	12839			

[1] nilf = not in labor force [2] ft = full time [3] pt = part time [4] hh = household

TABLE 2: Cox Regression Results for First Births, for three separate birth cohorts

Independent Variables	Model 1: Cohort 1950-1965			Model 2: Cohort 1966-1975			Model 3: Cohort 1976-1985		
	β-Coeff.	S.E.	exp(b)	β-Coeff.	S.E.	exp(b)	β-Coeff.	S.E.	exp(b)
she low/he low	-0.67	0.60	0.51	0.74	0.46	2.10	*she low & he any:*		
she low/he med.	-0.01	0.29	0.99	-0.32	0.24	0.72	-0.51	0.58	0.60
she low/he high	0.02	0.59	1.02	0.31	1.02	1.36	n/a		
she med./he low	-0.47	0.40	0.63	-0.02	0.29	0.98	0.45	0.48	1.57
both medium		*Ref.*			*Ref.*			*Ref.*	
she med./he high	0.70*	0.29	2.02	0.25	0.24	1.28	0.58^	0.35	1.79
she high/he less	0.84*	0.37	2.33	0.05	0.29	1.05	0.22	0.47	1.24
she high/he high	-0.35	0.38	0.70	0.14	0.24	1.15	0.11	0.47	1.11
she work/ he nilf	0.14	0.69	1.15	-2.64*	1.34	0.07	-0.08	0.95	0.92
he works/she nilf	-1.23	1.04	0.29	0.29	2.47	1.33	-1.74	2.71	0.18
both nilf	-0.69	1.29	0.50	-3.08	2.74	0.05	-1.87	2.73	0.15
both fulltime	0.43	0.34	1.53	0.29	0.28	1.33	0.06	0.43	1.06
she ft/he pt	-0.05	0.86	0.95	0.18	0.58	1.20	-1.24	1.13	0.29
both parttime		*n/a*		0.93	0.76	2.52		*n/a*	
his log income	0.00	0.09	1.00	-0.32^	0.17	0.72	0.11	0.12	1.12
her log income	-0.20	0.17	0.82	0.09	0.41	1.09	-0.20	0.46	0.82
log hh income	0.32^	0.28	1.38	0.58^	0.35	1.79	-0.14	0.20	0.87
her ratio hh inc.	-0.06	0.06	0.94	-0.02	0.07	0.98	-0.07	0.07	0.93
her ratio*hhinc.	0.01	0.01	1.01	0.00	0.01	1.00	0.01	0.01	1.01
housework ratio	0.00	0.00	1.00	0.00	0.00	1.00	-0.02***	0.00	0.98
repair ratio	0.00	0.00	0.00	0.00	1.00	1.00	-0.01*	0.00	0.99
Control Variables									
she enrolled		*n/a*		-0.31	2.47	0.73	1.68	2.72	5.36
he enrolled		*n/a*		3.06*	1.33	21.39		*n/a*	
her age at union	0.24*	0.11	1.27	0.16	0.12	1.18	-0.40	0.35	0.67
his age at union	0.22*	0.10	1.25	0.15	0.10	1.16	-0.40	0.29	0.67
age interaction	-0.01**	0.00	0.99	-0.01^	0.00	0.99	0.02	0.01	1.02
year	-0.02	0.03	-0.02	-0.02	0.02	0.98	-0.14*	0.06	0.87
Import. of childr.	-0.97***	0.12	0.38	-0.50***	0.09	0.61	-0.64***	0.16	0.53
east		*n/a*		0.12	0.20	1.13	0.77**	0.27	2.16
cohabitation		*n/a*			*n/a*		-1.17***	0.27	0.31

*** p<.001 **p<.01 *p<.05 ^p<.1

Abbreviations: **nilf** = not in labor force, **ft** = full time, **pt** = part time, **hh** = household

TABLE 3: Cox Regression Results for Second Births, for three separate birth cohorts

Independent Variables	Model 4			Model 5			Model 6		
	Cohort 1950-1965			cohort 1966-1975			cohort 1976-1985		
	β-Coeff.	SE	exp(b)	β-Coeff.	SE	exp(b)	β-Coeff.	SE	exp(b)
she low/he low	-0.49	0.73	0.61	-0.68	0.47	0.50	*She low/he any:*		
she low/he med.	0.43	0.32	1.54	0.03	0.26	1.03	-0.17	0.51	0.85
she low/he high	-1.52	1.01	0.22	0.06	0.59	1.06		*n.a.*	
she med./he low	0.22	0.38	1.25	0.12	0.28	1.13	0.10	0.66	1.10
both medium		*Ref.*			*Ref.*			*Ref.*	
she m./he high	0.07	0.30	1.07	0.49*	0.23	1.64	1.04**	0.42	2.84
she high/he less	0.02	0.40	1.02	-0.31	0.31	0.73	0.17	0.67	1.18
she high/he high	0.66*	0.29	1.94	0.75***	0.22	2.12	1.52*	0.67	4.55
she works/he nilf	0.11	0.94	1.11	0.75	0.82	2.12	*both work:*		
he works/she nilf	-0.44	0.67	0.64	0.91	1.81	2.49	0.40	1.00	1.49
both nilf	-0.26	1.03	0.77	0.64	1.93	1.89		n.a	
both fulltime	-0.39	0.30	0.68	-0.89**	0.35	0.41	-0.70	0.48	0.50
she ft he pt	1.03	1.11	2.81		n.a.			n.a.	
both parttime		n/a		0.58	0.64	1.78		n.a.	
his log income	0.02	0.12	1.02	-0.02	0.10	0.98	0.09	0.08	1.09
her log income	-0.04	0.13	0.96	0.13	0.31	1.14	-0.18	0.20	0.84
log hh income	0.20	0.20	1.22	-0.04	0.13	0.96	0.06	0.09	1.06
her ratio hh inc.	-0.09	0.08	0.91	-0.10	0.08	0.91	-0.09	0.06	0.92
her ratio*hh inc.	0.01	0.01	1.01	0.01	0.01	1.01	0.01	0.01	1.01
housework ratio	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.01	1.00
hw ratio*east		n.a.		-0.02***	0.01	0.98		n.a.	
repair ratio	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.01	1.00
child care ratio	-0.01	0.01	0.99	0.01*	0.01	1.01	0.00	0.01	1.00
Control Variables									
she enrolled		n.a.		0.73	1.94	2.07	3.56**	1.38	35.04
he enrolled		n.a.			n.a.			n.a.	
her age at union	0.28**	0.11	1.32	0.26*	0.12	1.30	-0.55	0.42	0.58
his age at union	0.10	0.11	1.11	0.21^	0.11	1.23	-0.35	0.34	0.70
age interaction	-0.01	0.00	0.99	-0.01*	0.00	0.99	0.02	0.02	1.02
age at first birth	-0.17***	0.04	0.85	-0.08*	0.04	0.92	-0.11	0.10	0.90
year	0.03	0.03	1.03	0.01	0.03	1.01	0.14^	0.09	1.16
Imp. of children	-0.27^	0.16	0.76	-0.20^	0.12	0.82	-0.39	0.28	0.68
east		n/a		1.48**	0.60	4.37	0.07	0.31	1.07
cohabitation		n/a			n/a		-0.16	0.37	0.85

*** p<=.001 **p<=.01 *p<=.05 ^p<=.1

Abbreviations: **nilf** = not in labor force, **ft** = full time, **pt** = part time, **hh** = household