Comparative Population Studies
Vol. 49 (2024): 403-436 (Date of release: 19.11.2024)

Relative Resources in Couples and Their Childbearing Behavior in the United States*

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Abstract: A growing body of research indicates significant variation in the fertility-education relationship by partner education across high income countries. However, little is known on the education-fertility-couple nexus in the US context. The present study fills this gap. It investigates linkages between married couples' relative socio-economic resources and their first and second birth transitions in the United States, using data from the National Longitudinal Survey of Youth 1979 (NLSY79) and a competing risk approach to model birth transitions and union dissolutions competing with first and second births independently. The study presents four findings. First, homogamous tertiary educated couples have the highest first and second birth rate, net of fertility preferences, indicating the relevance of resource pooling for family formation. Second, low-resource hypogamous and hypergamous couples have lower birth rates than most other pairings, underscoring that linkages between heterogamy and family formation may vary by the absolute level of the partners' resources. Third, family income mediates first birth rate differences between homogamous highly educated couples and most other pairings. Lower first birth rates of hypogamous large distance couples, compared with homogamous tertiary educated couples, however, appear in part rooted in higher union dissolution rates. Fourth and finally, the higher second birth rate of homogamous highly educated couples was not mediated by any of the tested socio-economic mechanisms. More research is needed to investigate the mechanisms underlying this birth rate pattern found throughout high income societies.

Keywords: Fertility · Couples · Education · Employment · Income · Union dissolution · United States

* This article belongs to a special issue on "Changes in Educational Homogamy and Its Consequences".

URL: www.comparativepopulationstudies.de
DOI: https://doi.org/10.12765/CPoS-2024-16
URN: urn:nbn:de:bib-cpos-2024-16en7

1 Introduction

The relationship between fertility and education has received much attention in population science. The fertility postponement and sub-replacement fertility that emerged across high income countries in the second half of the 20th century coincided with an increase in women's participation in higher education and the labor market. Fertility declines were subsequently attributed to female education expansion, and, in consequence, studies focused on understanding the fertility-education link mainly from the perspective of women (*Gustafsson* 2001; *Kravdal/Rindfuss* 2008; *Rindfuss et al.* 1996). Men or couples were much less frequently studied (for reviews, see *Balbo et al.* 2013; *Vasireddy et al.* 2023). However, around 95 percent of births occur to co-residential couples, with little change to this proportion over time (*Andersson* 2023; *Perelli-Harris et al.* 2012). This points to the relevance of the couple as unit of analysis for studying fertility dynamics and fertility-education linkages. Indeed, a growing body of literature documents meaningful variation in the link between one's education and fertility tempo and quantum by the educational attainment of the partner.

Studies on the education-fertility couple nexus largely examine transition rates to first, second, or subsequent births using individual level data. They indicate that the combination of both partners' education is consequential for couples' childbearing trajectories. For instance, couples with two tertiary educated partners postpone the first birth the longest and significantly longer than couples with one tertiary educated partner only, at least in some contexts (*Bagavos* 2017; *Nitsche et al.* 2018). Moreover, these homogamous tertiary educated couples tend to subsequently have higher second and third birth transition rates in many, but not all examined contexts (*Bueno/García-Román* 2021; *Dribe/Stanfors* 2010; *Nitsche et al.* 2018; *Trimarchi/Van Bavel* 2020). Moreover, in Finland, homogamous tertiary educated couples contribute the largest share of births to the completed cohort fertility of the 1969-75 birth cohort (*Andersson et al.* 2024). However, educational combinations, or pooling, seems less relevant for childbearing among lower educated couples: across Europe, there seem to be no differences in birth rates between homogamous and heterogamous couples comprised of lower and medium educated individuals (*Nitsche et al.* 2021). This underscores the relevance of not only examining partners' relative education (homogamous versus heterogamous) in the context of childbearing, but also of distinguishing between the levels of their combined education (high, medium, low). Despite these emerging patterns, various open questions on the fertility-education-couple nexus remain.

First, studies have almost exclusively examined European societies; much less is known on the fertility-education-couple nexus in other world regions, including North America. One study using US National Survey of Family Growth (NSFG) data documents that fertility intentions of tertiary educated women who already have a child are higher when their partner is tertiary educated as well, compared to tertiary educated women with a lower educated partner and all other educational pairings (*Morales* 2020). While this finding is line with educational pairing differences in

fertility behavior that were found in other contexts, birth rates by education pairing in the US context have not been investigated.

Second, the mechanisms underlying the variation in birth transitions by educational pairings remain unclear. Education is closely linked to other socio-economic resources and one's socio-cultural origin. However, no clear evidence has yet emerged on whether partners' absolute and relative income, gendered work or care arrangements, or other factors underpin educational pairing differences in fertility. Studies which have investigated these mechanisms indicate complex relationships with employment, income, and educational fields that vary across social contexts (*Osiewalska* 2017; *Trimarchi/Van Bavel* 2020).

Third, studies on birth rate differences often employ event-history methodology, censoring couples who separate before experiencing a birth. After a union dissolution, couples therefore no longer contribute to the denominator of the estimated hazard rates, implying that higher birth rates of certain educational pairings may in part be an artifact of some couples' lower union separation rates and ensuing longer exposures to the risk of joint reproduction.

The present study examines first and second birth transition rates by couples' educational pairings in the United States, using data from the National Longitudinal Study of Youth (NLSY79), representing the 1957-65 US birth cohort, and Cox regression models. It extends the literature by offering evidence on the education-fertility-couple nexus in the United States, a populous high-income context with an early onset of female education expansion. Moreover, it investigates whether the emerging variation in first and second births by educational pairings in the US is mediated by couples' labor market work arrangements, absolute or relative income resources, or the female partner's attitudes toward gendered work divisions. Unlike many prior studies, it also controls for the woman's desired family size. Furthermore, it employs a competing risk approach and considers the link between educational pairings and union dissolution risks that occur in competition to first and second birth transitions. Finally, it measures educational composition by employing an educational pairings approach, forming all combinations of low (defined as 0-12 years of schooling), medium (defined as 13-15 years of schooling), and high (defined as 16+ years of schooling) education. This educational pairing specification using all combinations of the partners' low, medium, and high education has been commonly employed in the literature (*Nitsche et al.* 2018; *Osiewalska* 2017; *Trimarchi/Van Bavel* 2020). It is akin to a full interaction of both partners' education. This allows for assessing couples' joint education from various angles: their absolute joint education, their relative (gendered) education, and their educational distance among the subset of heterogamous couples. Furthermore, this specification is well suited to contrast homogamous tertiary educated couples to other educational pairings, particularly those comprised of one tertiary and one less educated partner.

2 Couples and fertility: theoretical considerations

2.1 Absolute education – pooling of resources

One pathway through which couples' educational pairings have been theorized to impact fertility behavior is via their joint absolute level of present and projected future resources. *Oppenheimer's* work (1988, 1994, 1997) stressed the relevance of partners' pooled resources for their family trajectories and production. She emphasized the individual importance of each spouse and their interactions within the marriage, arguing that the spouses' "collaborative" roles in making contributions to the economic wealth of the marriage are essential to understanding couples' family production, including their childbearing behaviors (*Oppenheimer* 1994: 333). Both partners' resources contribute to the well-being of the family, and each partner's socio-economic contributions can buffer the couple against unforeseen threats such as unemployment or ill health, thereby reducing risk and uncertainty and offering a more conducive environment for childbearing. The pooling argument implies higher birth transition rates with increases in the partners' additive resources for either birth transition. It also implies that couples who acquire the highest level of education may postpone the first birth until they have completed their education. However, they may then catch up with and perhaps even exceed the first birth rates of couples with lower pooled resources over the course of their relationship. Hence, the higher the partners' combined resources, the more conducive to childbearing their union is theorized to be. Accordingly, tertiary educated homogamous couples would be expected to have the highest birth rates.

2.2 Relative education – specialization, bargaining, and gendered dynamics

In contrast, the New Home Economic approach theorized a joint utility function of the family, which is maximized when both partners specialize in different roles, with one (traditionally the male partner) being the breadwinner in the labor market and the other (traditionally the female partner) being the primary caretaker of children and the household (*Becker* 1981). This approach assumes mutual agreement about gendered work divisions and fertility desires among partners and disregards potential bargaining dynamics within the couple. It implies higher birth rates among hypergamous couples because women's lower earning potential and opportunity costs when interrupting labor market work to take care of offspring are assumed to stimulate family formation in a specialized role set-up. The same applies to couples with male breadwinner work configurations, where the male partner works and the female partner does not (regardless of the couples' educational pairing), or couples who are supportive of traditional gendered work division attitudinally.

However, empirical research shows that, on average, there is considerable disagreement in spousal fertility preferences (*Testa* 2012; *Thomson et al.* 1990; *Voas* 2003), suggesting that fertility is negotiated between partners. *Blood* and *Wolfe* (*Blood Jr./Wolfe* 1960) argued that the partner with more resources holds greater

negotiation power. Several studies emphasize that bargaining over fertility may be a crucial element of the fertility decision making process (*Bauer/Jacob* 2010; *Brodmann et al*. 2007; *Neyer et al*. 2013). As more and more women enter university, gender ratios in higher education are shifting and hypogamous couples are becoming more common (*Esteve et al*. 2016; *Van Bavel* 2012). Despite women's advancement in education and the labor market, they still perform most of the domestic work, with changes to this gender imbalance being rather slow (*Bianchi et al*. 2012; *Mandel/Lazarus* 2021; *Treas/Tai* 2016). Several authors argued that fertility will be low as long as the "gender revolution" is "stalled," because women will not be willing to engage in the second shift of domestic work (*Goldscheider et al*. 2015; *McDonald* 2000). According to these arguments, hypogamous couples (i.e., the female partner being more highly educated than the male partner) and female breadwinner couples may be a preferential set-up for first and second births, because the female partner may be able to successfully negotiate for fairer gendered work divisions. This argument also implies that couples' more egalitarian domestic work divisions will stimulate first or second birth transitions.

2.3 Doing and un-doing gender

Housework is still considered the woman's responsibility, despite rapidly increasing gender equality in the public sphere, according to the doing and undoing gender approach (*Lorber* 2000; *West/Zimmerman* 1987). In practice, women in the US today indeed still do the majority of domestic work (*Bianchi et al*. 2012; *Sullivan et al*. 2018). In consequence, women can be expected to do the majority of domestic work as part of their gender display, even in couples where the female partner outearns the male partner or has higher earning potential, as is likely in educationally hypogamous couples. Moreover, gender structure theory suggests there is no gender neutrality of partners' economic resources, including any potential bargaining power stemming from them (*Dominguez-Folgueras* 2022). Instead of bargaining for equal domestic work divisions on the basis of their higher resources, women in hypogamous couples may therefore engage in gender-deviance neutralization, by picking up more domestic work, rather than less (*Sullivan/Gershuny* 2016; *Treas/Drobnič* 2010). This may lead to a poor work-life balance and relationship dissatisfaction and imply lower rates of first and especially second births.

2.4 Educational distance – cultural considerations

Yet another perspective points out the relevance of the partners' educational distance. The cultural matching perspective operationalizes education as a proxy for variation in social and cultural background, values, and *habitus* (*Bourdieu* 1984; *Kalmijn* 1994; *Schwartz* 2010). Not necessarily heterogamy per se, but especially large distances in heterogamous partners' education (e.g., low-high education pairings) may thus signal heterogamy along socio-cultural dimensions, such as religion, nationality, social value orientation, or cultural practices. These "mismatches," in turn, may destabilize the relationship and lead to (sooner) union dissolution or refraining

from childbearing within this union due to lower relationship satisfaction, lack of joint social networks, etc. This distance hypothesis is gender neutral. Both first and second birth rates are expected to be lower in large-distance education unions, regardless of who is more and less educated. The lower fertility of these couples is theorized to operate in part but not only via higher union dissolution rates.

2.5 Prior studies

Prior studies have tested these hypotheses across various societies. They offer empirical support for the pooling hypothesis in many contexts. Some support was also found for the specialization model. Higher second or third birth rates of homogamous tertiary educated couples were observed in Spain, Sweden, Belgium, Austria, Finland, Germany, and in a pooled sample from across Europe, compared with couples with one tertiary and one lower educated partner, and with couples in which neither partner has tertiary education (*Bueno/García-Román* 2021; *Dribe/Stanfors* 2010; *Nitsche* 2017; *Nitsche et al.* 2018; *Nitsche et al.* 2022; *Trimarchi/Van Bavel* 2020). Moreover, parenthood occurs at later ages when both partners have tertiary education across a European sample and in the Netherlands (*Corijn et al.* 1996; *Nitsche et al.* 2018). In Finland and Flanders, the male partner's education did not influence first birth timing beyond the female partner's education (*Corijn et al.* 1996; *Jalovaara/Miettinen* 2013).

There are exceptions to the additive educational pooling finding: A study on Greece finds the highest cumulative number of children among homogamous low educated couples, while homogamous highly educated and hypogamous couples had the lowest number of children (*Bagavos* 2017). In a sample of low educated people across 22 European countries, educational pairings did not significantly predict second or third birth transitions. Here, all couples involving at least one low educated partner had significantly lower birth rates compared with the highly educated homogamous couples, which supports the educational pooling hypothesis within highly educated but not within low educated couples (*Nitsche et al.* 2021). This finding points to the relevance of the absolute levels of each partner's education for resource pooling, underscoring the importance of examining all educational pairings separately, including by educational level among homogamous couples.

Some support for the specialization model was found across Eastern Europe, indicated by higher second birth rates among hypergamous couples (*Trimarchi/Van Bavel* 2020), whereas hypogamy was linked to lower second birth rates in Austria and Bulgaria, and across Europe generally (*Nitsche et al.* 2018; *Osiewalska* 2017).

Couples with large distances in education have been examined less often. Studies using data from Finnish registers found that they had similar second birth rates as other heterogamous couples do (*Nitsche et al.* 2022), but also have especially high divorce risks (*Mäenpää/Jalovaara* 2014). Educational heterogamy has also been linked to higher risks of union dissolution in various other studies and contexts, including the United States (*Schwartz* 2010; *Theunis et al.* 2018).

Absolute joint education, especially the joint education of couples involving one or two tertiary educated partners, has thus emerged as particularly relevant for couples' childbearing. Heterogamy was linked with higher union dissolution risks.

2.6 The US context

The US is characterized by an absence of comprehensive family policies such as maternity leave, parental leave, or comprehensive public childcare (*Aisenbrey et al.* 2009; *Mandel/Shalev* 2009). Furthermore, 75 percent of mothers return to the labor market within six months of the birth (*Aisenbrey et al.* 2009). In this relative absence of policies designed to support working families, the meso-level of partners' own resources, childcare arrangements, and support of each other's careers may be even more relevant for childbearing behaviors than in countries with more extensive public resources supporting families with young children. Thus, the US is an interesting case for examining fertility transitions through the lens of partners' joint absolute and relative resources.

2.7 Hypotheses

Based on the discussion above, the following four hypotheses are derived.

H1 (Pooling): First and second birth transition rates will be higher the higher the partners' additive resources are, all else equal.

Education enrolment will depress first and second birth rates. Couples with the highest level of education may postpone the first birth due to longer education enrolment but will eventually catch up and perhaps surpass the birth rate of lower educated couples. Furthermore, controlling for the couple's absolute financial resources will mediate the link between education pairings and birth rates. Absolute financial resources may, however, not fully mediate the link between higher additive education and birth rates because education may imply additional resources beyond current finances, e.g., future income potential, non-monetary resources such as health insurance, unemployment insurance, or social networks, including the resources of both partners' families of origin.

H2 (Specialization): First and second birth rates will be highest among educationally hypergamous couples and male breadwinner couples, all else equal.

Educationally hypergamous couples will have the highest first and second birth rates. Higher birth rates of hypergamous couples may be mediated by these couples' male-breadwinner-type work arrangements. Moreover, male breadwinner couples and couples with a male full-time and a female part-time worker are expected to have the highest birth rates, due to their family specialization, regardless of educational pairing effects.

H3a (Bargaining): First and second birth rates will be the highest among educationally hypogamous couples and female breadwinner couples, all else equal.

According to the bargaining argument, hypogamous unions may be conducive to childbearing, net of fertility preferences and economic resources. Potentially more egalitarian divisions of housework, negotiated via the woman's higher relative earnings, may mediate such an effect. Ideally, gendered domestic work divisions would be measured directly to test this mechanism. However, housework time measures are not available in the NLSY79. Attitudes toward the gendered division of housework are therefore used as a proxy measure because they have been shown to predict actual domestic work divisions (*Nitsche/Grunow* 2016). Because educational hypogamy may not necessarily translate into higher income or bargaining power for the woman, female breadwinner arrangements or her relative income may instead be positively related to first and second birth rates. This positive effect of relative income may furthermore vary with the absolute level of family income – it may be stronger among couples in the upper third of the income distribution because more room for negotiation on how to arrange the family or spend excess income may be possible once basic needs are met. Increases in the female partner's relative income may thus give her greater bargaining leverage in higher income couples specifically.

H3b (Doing gender): First and second birth rates will be lowest among educationally hypogamous female breadwinner couples, all else equal.

Competing with H3a, birth rates in couples with a woman who is more highly educated than her male partner may be the lowest. As discussed, women in hypogamous couples may have poorer work-life balance, which may lead to lower relationship satisfaction and imply lower rates of first and especially second births. Female breadwinning arrangements may mediate lower birth rates of hypogamous couples or be negatively associated with first and second birth transition rates in and of themselves.

H4 (Distance): First and second birth rates will be lowest among couples with one low (0-12 years) and one highly (16+ years) educated partner, all else equal. These couples will also exhibit higher union dissolution rates.

As discussed, couples with large educational distances are hypothesized to be less likely to transition to a first or second birth and more likely to separate due to a lack of shared social and cultural practices, background, and resources.

3 Method

3.1 Data

The data for the analyses come from the NLSY79, a panel study of individuals born between 1957 and 1965. The first wave was collected in 1979, when respondents were aged 14-22. The NLSY79 is a household panel. It provides (limited) information on all household members living with the main respondents in all waves. Since 1979, interviews were conducted annually between 1979 and 1994, and every two years thereafter. The survey is ongoing, and the waves until 2010 are included in the current analysis. Respondents roughly reached age 50 in 2010, hence the end of their reproductive lifespan. Most of the respondents' first and second births took place during the 1980s and 1990s, though, so the more recent waves are of little relevance for the analyses. The strengths of the NLSY79 are its detailed information on the relationship history of primary respondents (and partly of those of their partners), its detailed fertility history information, and detailed employment histories. Additionally, the birth cohort design allows investigating one birth cohort in depth with a large enough sample size. Some aspects of the employment history were collected in a (retrospective) weekly format (employment status, work hours), but many other variables (education, income) are only available annually. For the present analyses, all covariates are used in their yearly format (rather than the weekly). The NLSY provides month/year dates for all major life events, such as marriage, divorce, and the birth of children. Socio-economic information on the spouses of main respondents was collected in detail from the beginning of the survey, but while educational attainment was always collected for all household members, there is no information on income, occupation, or hours spent in the labor market for *cohabitating* partners before 1994.

Including cohabiting couples before 1994 is therefore not feasible due to the missing values on the cohabiting partner's income and labor supply variables – a point in time at which the first birth had already occurred for many respondents. Besides the limited information on cohabiting partners, another drawback of the NLSY79 is that there is no information on the division of household labor, or on the number of children a spouse might have had from prior relationships. Variables on respondent's attitudes toward gendered work divisions and responsibilities are, however, available, and were measured at three points in time (1979, 1982, 2006). One of these items measures if the respondent endorses a shared division of household labor between men and women, serving as a proxy for the gendered division of household labor in the present analysis. These value items are only available for respondents; hence, I can only measure attitudes of females, as the sample is restricted to female main respondents.

3.2 Sample

The full NLSY sample consists of 12,686 respondents, alongside the information on their household members. The NLSY cautions that the fertility histories of

male respondents are not as accurate as those of female respondents. I therefore restricted the sample to female respondents, and further to those women who were childless at the time of their first marriage (N = 2,768). Hence, only first marriages of female primary respondents who were without a birth at the time of their first marriage are included in the analytic sample. The male spouses, however, may have been married before. It is also possible for them to have fathered a child before entering the marriage under analysis, since this information is not available in the data. Furthermore, only white women are included in the sample. Initial results show that the relationship between relative resources and first and second birth transitions may differ between white, Black, and Hispanic Americans (models not shown), but the sample sizes for Black and Hispanic women are too small for meaningful analyses. Therefore, I estimated separate models for the three ethnic groups and will include only the results for white women (regardless of their partner's race).

This results in a sample size of 2,768 white women at risk for first birth within their first marriage. Missing values on the relevant covariates, including missing values that result from using lagged covariates (due to a loss of the first time period at risk) further reduce the sample. The final sample size is 1,067 couples during their first marriages in the risk set for the analysis of first birth, with 535 first birth events, and 158 union dissolution events. For the analysis of second birth, only couples with white female respondents who had their first birth in their first marriage (regardless of whether the birth was observed or occurred before the start of the panel) enter the risk set, resulting in a sample size of 1,295 couples at risk. There are 689 second birth events and 102 union dissolutions. Further descriptive statistics of analytic samples 1 (first birth) and 2 (second birth) can be found in Tables 1a and 1b.

3.3 Dependent process and estimation strategy

In the analysis, time to event is measured in months, even though the covariates change in yearly intervals. Using detailed monthly information to measure union start and end dates and to estimate birth events has two advantages. First, it allows for modeling time to event in greater detail, and second, it results in a significantly reduced number of tied events (events occurring at the same point in time), which is important given that the Cox model uses the partial likelihood estimator. The Efron method for tied events is used. Given the precise monthly timescale of events in the data, the Cox proportional hazards model, which can operate on a continuous time scale, is preferrable over a piecewise constant or discrete time approach, because it can estimate the birth transitions by pairings with much greater precision. This is relevant in this sample, because birth transitions occur in quick succession because the sample is rather homogeneous.

For modeling the transition to first birth, the dependent process is time measured in months, from the month of marriage to the occurrence of a first birth. In some couples, spouses do not yet cohabitate at the time of marriage. In these cases, the date of origin changes to the interview time at which the spouse was first present in the household. Couples can exit the risk set through three events. The first is the event of interest, the first birth, the second exit is via censoring (panel attrition or

Tab. 1a: First birth/union dissolution sample descriptives (couple-years)

	Frequency	Percent	Min	Max	Mean	S.D.
Enrolment						
Respondent not enrolled	36,023	90.95				
Respondent enrolled	3,583	9.05				
Education						
Both 0-12	15,061	38.03				
F 0-12/M 13-15	2,907	7.34				
F 0-12/ M 16+	1,509	3.81				
F 13-15/M 0-12	3,428	8.66				
Both 13-15	2,263	5.71				
F 13-15/M 16+	1,691	4.27				
F 16+/M 0-12	2,111	5.33				
F 16+/M 13-15	2,867	7.24				
Both 16+	7,769	19.62				
Desired number of children						
0 children desired	4,303	10.86				
1 child desired	4,115	10.39				
2+ children desired	31,188	78.75				
Work arrangements						
Male breadwinner	3,441	8.69				
Female breadwinner	1,107	2.80				
F full time, M part time	1,684	4.25				
M full time, F part time	6,184	15.61				
Both full time	25,930	65.47				
Both don't work	464	1.17				
Continuous variables						
F logged income			0.00	12.54	8.39	2.98
M logged income			0.00	12.64	9.29	2.45
Logged family income			6.99	13.87	10.44	0.78
F share of income			0.00	100.00	34.87	21.85
F age at union			13.00	44.00	22.99	4.89
F age at union			15.00	60.00	26.26	6.71
Housework attitude			1.00	4.00	3.15	0.95
Women's place home attitude			1.00	4.00	1.84	0.99
Working wife useful attitude			1.00	4.00	2.61	0.86
Traditional roles best attitude			1.00	4.00	2.15	0.85

Note: F=female, M=male

Source: National Longitudinal Study of Youth 1979 (NLSY79), own estimations

being in the first marriage but event-free until the last observation), and the third is the dissolution of the first marriage in competition to the first birth. Since a union dissolution is a competing event for leaving the risk set, a competing risk approach is used. For easier interpretation of the coefficients of the covariates on the birth

Tab. 1b: Second birth/union dissolution sample descriptives (couple-years)

	Frequency	Percent	Min	Max	Mean	S.D.
Enrolment						
Respondent not enrolled	50,273	94.70				
Respondent enrolled	2,814	5.30				
Education						
Both 0-12	25,396	47.84				
F 0-12/M 13-15	3,811	7.18				
F 0-12/ M 16+	1,992	3.75				
F 13-15/M 0-12	5,260	9.91				
Both 13-15	2,815	5.30				
F 13-15/M 16+	2,498	4.71				
F 16+/M 0-12	2,304	4.34				
F 16+/M 13-15	1,957	3.69				
Both 16+	7,054	13.29				
Desired number of children						
0 children desired	2,022	3.81				
1 child desired	7,555	14.23				
2+ children desired	43,510	81.96				
Work arrangements						
Male breadwinner	9,115	17.17				
Female breadwinner	1,215	2.29				
F full time, M part time	1,448	2.73				
M full time, F part time	11,060	20.83				
Both full time	28,993	54.61				
Both don't work	526	0.99				
Continuous variables						
F logged income			0.00	12.49	7.48	3.68
M logged income			0.00	12.64	9.43	2.27
Logged family income			4.22	13.87	10.39	0.82
F share of income			0.00	100.00	27.73	21.85
F age at union			14.00	40.00	21.41	3.56
M age at union			15.00	48.00	24.44	5.01
Housework attitude			1.00	4.00	3.17	0.84
Women's place home attitude			1.00	4.00	1.82	0.89
Working wife useful attitude			1.00	4.00	2.55	0.84
Traditional roles best attitude			1.00	4.00	2.17	0.81

Note: F=female, M=male

Source: National Longitudinal Study of Youth 1979 (NLSY79), own estimations

hazard, I estimate separate Cox proportional hazard models for the event of first birth (treating union dissolutions as right censored) and for the competing event of union dissolution (treating birth events as right censored), as suggested by *Cleves et al.* (2008) and *Allison* (2010). The same strategy is used for the models estimating

second births. Here, observation time starts with the birth of the first child. Since the focus of the paper is on birth transitions, and not union dissolution, the model results for union results will be presented only briefly.

A stepwise modeling strategy was employed. Educational pairings are modeled first and basic controls added thereafter. Next, work arrangements, absolute income, relative income, and gender attitudes are modeled separately. Finally, a full model with all covariates is estimated.

3.4 Covariates

Most covariates are time-varying measures. While birth and relationship histories are available on a monthly time scale, covariates are only measured yearly (or bi-yearly) on interview dates. All time-varying covariates, including the educational variables, are lagged by one period (i.e., one year), and therefore measured at or before conception.

Education is time-varying and measured as highest year completed. I settled on a three-category specification for both the respondents' and their spouses' educational attainment. It follows the standard educational US groupings: (1) less than high school education or high school education (0-12 years), (2) some college education (13-15), or (3) completed college education or higher (16+ years). The models contain a full set of interactions between the respondent's (i.e., female partner) and their spouse's (i.e., male partner) education. Hence, each possible pairing of education is reflected in a separate indicator variable. Couples in which both spouses have 0-12 years of education serve as the reference group. Enrolment in education is time-varying and unfortunately only available as a variable for respondents, not spouses. Since enrolment can be expected to lead to a postponement of pregnancy and birth, it is included in all models as a dummy variable and indicates respondents' enrolment in either college or high school.

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. The partners' work statuses are interacted, resulting in four possible working status indicator variables: 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 measured differently for respondents and spouses. For respondents (i.e., women), a variable indicates the number of hours worked in the last calendar year. For spouses (i.e., men), average hours worked per week in the last calendar year is used. I multiply this value by 52 to have a roughly comparable indicator for men's and women's hours worked. Due to issues with multicollinearity, it was not feasible to include the work-hours variable in a continuous format. Therefore, I use four indicators, indicating whether (1) both work full time (defined as working 35 hours per week or more), (2) the woman works full time and the man part time (part time is here defined as working less than 35 hours per week), (3) the man working full time and the woman part time, or (4) both work part time. Both partners working full time serves as the reference category.

Income measures are also time-varying. The models contain logged measures for female yearly income from wages and salaries, male yearly income from wages and salaries, and the yearly joint family income. There is also a measure for the woman's share of the total family income, which is measured as the percentage which the woman 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; here, her share was set to 100 percent. In addition, the woman's income share was interacted with tertiles of family income, which designate the lower, middle, and upper third of the log-family income distribution.

The partners' ages at marriage are the only non-time-varying covariates included in the models as mean-centered variables. The number of children desired is included as a time-varying categorical covariate and is only available for respondents (women), not for spouses (men). However, this question was asked in only two surveys; in 1979 and 1982. The 1979 value was filled in for the 1980/81 surveys and the 1982 value for all subsequent surveys. It is coded in three categories: no children desired, one child desired, two or more children desired, which serves as reference category. Finally, the NLSY asked respondents for their values regarding gender roles. They are measured on a scale of 1-4 (strongly disagree, disagree, agree, strongly agree). Four measures are included into the analysis: (1) "a woman's place is in the home," (2) "a working wife feels more useful," (3) "traditional husband/wife roles are best," and (4) "men should share housework." These variables were used as linear predictors.

Year fixed effects (i.e., calendar year dummies) were included in all models but are not shown in the model output due to space considerations.

4 Results

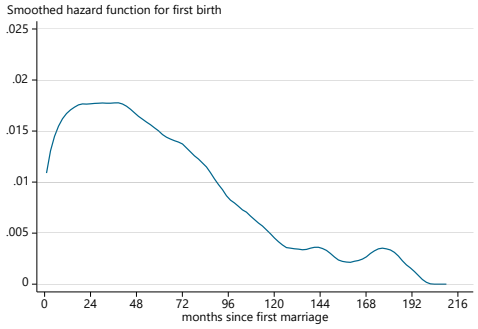
4.1 Cause specific hazards

Panels A-D in Figure 1 show cause-specific hazard functions for first and second birth events and for the competing risks events of union dissolutions among the couples. These hazards are estimated based on the full analytical sample, and include all cases from the sample, including those with missing values on covariates which are omitted from the models. For both risk sets, birth events are much more likely to occur than union dissolution events. Please note, though, that those union dissolutions only refer to dissolutions which occur in competition to birth events, hence after the marriage but before the first birth (Panel B) or after the first birth but before the second birth (Panel D). Union dissolutions which occur after the second birth are not reflected. The first birth hazard (Panel A) is highest (approx. .018) within 18-48 months after the first marriage and declines rapidly thereafter. The competing hazard of union dissolution is distributed more evenly across time; it hovers around .005 in the first twelve years (144 months) of marriage and declines even further thereafter.

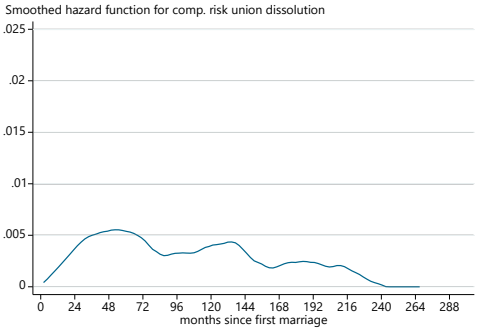
The hazard of the second birth is distributed somewhat differently; it remains at zero during the first ten months after the first birth due to the duration of a potential

Fig. 1: Hazard functions

Panel A – first births since first marriage, per month

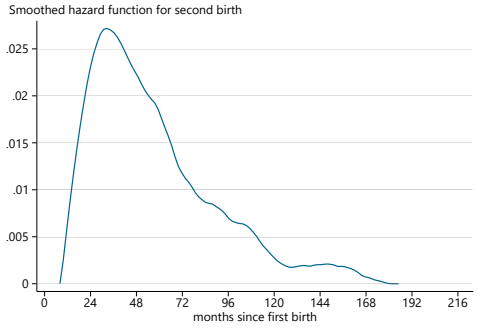


Panel B – union dissolution since first marriage (before first birth event), per month

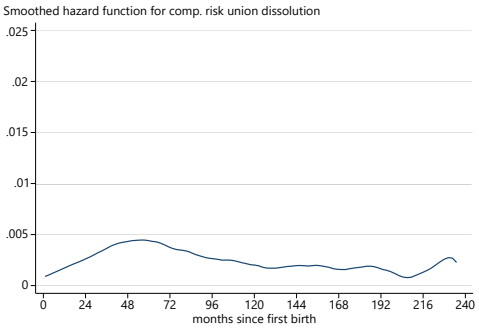


Source: NLSY79, first birth sample, own estimations

Panel C – second births (since first birth), per month



Panel D – union dissolution after a first birth (before second birth event), per month



Source: NLSY79, second birth sample, own estimations

second pregnancy. After ten months, the second birth hazard increases rapidly and peaks at approx. 36 months at .025. It rapidly declines after three years, to under .005 nine to ten years after the first birth. The hazard for the competing risk of union dissolution is highest at about four years after the first birth (.005) but generally low and remains well below .005 for most of the time. In sum, union dissolutions after marriage but before a birth in competition to birth events are rather rare, specifically after a first birth has occurred. While the birth hazard varies strongly over time, the dissolution hazard remains rather flat over the years.

The Cox model assumes proportional hazards among relevant groups (here: educational pairings). I tested the proportionality assumption by including the pairings as time-varying covariates in the models ("tvc" command in Stata 18). All time-varying covariates were insignificant when controlling for year fixed effects. This indicates proportionality of hazards among the sub-groups, thus, that the proportional hazards assumption is not violated. Plotted hazards by subgroup

indicate some variation, especially for the first birth. However, the overall trend is very similar across groups (figures not shown but available upon request), further supporting proportionality of first birth hazards after marriage and second birth hazards after the first birth across the educational pairings.

4.2 First births

Table 2 shows stepwise results for the Cox proportional hazards model estimating first birth transitions. Model 1.1 shows several significant contrasts between the educational pairings and the reference group (both 0-12 years of education). Couples with two college educated spouses and with a college educated man married to a woman with some college education (13-15 years) have significantly higher first birth hazards than the reference group (both 0-12 years) ($p <= 0.05$). Indeed, birth hazards increase almost linearly as the couples' pooled educational capital increases. This finding offers support for the pooling hypothesis (H1), and for the specialization hypothesis (H2), but only among hypergamous couples with high joint human capital (man: college / woman: 13-15 years).

Both large distance type couples (one partner 0-12, the other 16+ years of education) stand out, as they are the only ones who have lower first birth hazards than the reference group, although these contrasts remain statistically insignificant. However, further testing reveals significant first birth rate differences between the pairing of two college educated spouses and either of the large distance couples ($p <= 0.05$). This offers some support for the large distance hypothesis (H4).

Stepwise models add further evidence in support of these findings. Increases in the logged family income (Model 1.4) accelerate the transition to first birth and render the contrasts between the reference group and the homogamous highly educated pairing and that of a college educated man and a woman with some college education insignificant. However, contrasts between the highly educated homogamous pairing and the large distance couples remain significant, at least marginally (he col/she 0-12 $p <=. 01$, she col/he 0-12 $p <=.10$). Thus, the difference in first birth rates between homogamous college educated couples and the reference group (or the hypogamous large distance pairing) seems partly mediated by the higher pooled financial resources these couples hold. However, this does not apply to the contrast between the highly educated homogamous pairing and the hypergamous large distance couple; their birth rate remains significantly lower. This goes against the specialization hypothesis (H2) among large distance couples.

Model 1.5 shows a significant association between the woman's income share and the first birth hazard. Increases in the income share accelerate the first birth among the two upper family income tertiles, but depress it among couples at the lower end of the income spectrum. This finding offers some support for H3a with respect to relative income, which states that bargaining or more gender-egalitarian domestic work sharing may occur as the woman's income share rises, leading to higher birth rates. However, in this case, increases in the woman's income share are associated with increases in first birth rates only among couples in the middle and upper income tertile. In contrast, among couples in the lowest income tertile,

Tab. 2: Cox Hazard models of first birth

Variables	Hazard ratio (SE)						
	1 Baseline	2 Basic control	3 Works status	4 Absolute income	5 Relative income	6 Gender attitudes	7 Full model
Education							
Enrolled	0.728*	0.759^	0.762^	0.758^	0.745^	0.766^	0.764^
	(0.114)	(0.119)	(0.120)	(0.120)	(0.118)	(0.121)	(0.122)
ShF 0-12/M 13-15	1.233	1.240	1.259	1.206	1.257	1.239	1.240
	(0.207)	(0.209)	(0.213)	(0.204)	(0.212)	(0.210)	(0.211)
F 0-12/ M 16+	0.647	0.633	0.642	0.598^	0.613	0.62 9	0.598^
	(0.193)	(0.190)	(0.193)	(0.180)	(0.184)	(0.189)	(0.180)
F 13-15/M 0-12	1.075	1.015	1.022	1.015	1.015	1.026	1.040
	(0.191)	(0.183)	(0.184)	(0.183)	(0.183)	(0.186)	(0.189)
Reference: both 0-12							
Both 13-15	1.292	1.179	1.185	1.170	1.190	1.187	1.202
	(0.230)	(0.213)	(0.215)	(0.212)	(0.216)	(0.216)	(0.219)
F 13-15/M 16+	1.560*	1.446^	1.473*	1.359	1.438^	1.449^	1.413^
	(0.293)	(0.280)	(0.286)	(0.265)	(0.279)	(0.281)	(0.280)
F 16+/M 0-12	0.900	0.839	0.835	0.813	0.803	0.848	0.817
	(0.203)	(0.196)	(0.195)	(0.190)	(0.189)	(0.199)	(0.193)
F 16+/M 13-15	1.327	1.166	1.194	1.113	1.148	1.175	1.139
	(0.250)	(0.226)	(0.233)	(0.217)	(0.224)	(0.230)	(0.225)
Both 16+	1.430**	1.335*	1.341*	1.243	1.311^	1.350*	1.288^
	(0.181)	(0.184)	(0.186)	(0.174)	(0.183)	(0.190)	(0.186)
Basic controls							
F age at union		1.041	1.040	1.024	1.031	1.042	1.021
		(0.029)	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)
M age at union		0.945***	0.945***	0.941***	0.943***	0.945***	0.940***
		(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
0 children desired		0.350***	0.351***	0.360***	0.350***	0.354***	0.358***
		(0.087)	(0.087)	(0.089)	(0.087)	(0.088)	(0.089)
1 child desired		0.530**	0.534**	0.525***	0.525***	0.535**	0.532**
		-0.103	-0.104	-0.102	-0.102	-0.104	-0.104
Reference: 2+ children desired							
Work status							
Male breadwinner			0.968				1.524
			(0.169)				(0.576)
Female breadwinner			0.700				0.815
			(0.239)				(0.322)

Tab. 2: Continuation

Variables	Hazard ratio (SE)						
	1 Baseline	2 Basic control	3 Works status	4 Absolute income	5 Relative income	6 Gender attitudes	7 Full model
Reference: both full time							
Both don't work			0.431				
			(0.259)				
F full time, M part time			0.764				0.872
			(0.173)				(0.202)
M full time, F part time			0.994				1.064
			(0.120)				(0.136)
Absolute income							
F income				1.000			1.068
				(0.019)			(0.056)
M income				1.004			0.985
				(0.023)			(0.027)
Family income				1.329**			1.197
				(0.117)			(0.134)
Relative income							
F share of family income					0.993*		0.993
					(0.003)		(0.005)
Reference: F share*33%							
F share*66%					1.007*		1.004
					(0.003)		(0.003)
F share*100%					1.011**		1.006
					(0.004)		(0.005)
Gender attitudes							
Men should share housework						0.975	0.956
						-0.074	(0.073)
Women's place is in the home						0.996	1.005
						(0.079)	(0.080)
Working wife feels more useful						0.998	1.004
						(0.052)	(0.053)
Traditional husband/wife roles best						1.026	1.028
						(0.072)	(0.072)
Number of observations	39665	39665	39665	39665	39665	39665	39665

*** p<.001, ** p<.01, * p<.05, ^ p<.1, F=female, M=male

Source: National Longitudinal Study of Youth 1979 (NLSY79), own estimations

increases in the woman's relative income are associated with a lower first birth rate, offering some support for H3b.

4.3 Union dissolutions as a competing risk to first births

Table 3 shows the stepwise model results for union dissolutions as a competing risk to a first birth. In Model 2.1, union dissolutions hazards are lower among couples with a college educated woman and a spouse with some college education compared to the reference group ($p < 0.10$). This marginal significance disappears once basic controls for the spouses' ages at union formation are added. Nonetheless, hypogamous large distance couples have significantly higher union dissolution hazards compared with couples with a college educated woman and a man with some college education (woman: 16+, man: 13-15) ($p <= 0.05$). This contrast remains significant regardless of which additional variables are added in the stepwise models. Hypogamous large distance couples also have a higher union dissolution risk than homogamous college educated couples do, but the difference is not statistically significant. All other educational pairing contrasts remain insignificant.

In sum, hypogamous large distance couples indeed have a higher union dissolution hazard before the first birth than other types of couples involving a highly educated woman. These differences in union dissolution hazards may be partly responsible for the differences in first birth hazard between the educational pairings involving a highly educated woman. Note that increases in the woman's absolute and relative income accelerate union dissolution before a first birth occurs independently of the educational pairings.

4.4 Second birth

Stepwise model results for second births hazards are presented in Table 4. Educational pairings significantly relate to second birth hazards. First, couples with more pooled resources – i.e., all pairings with combinations of college and some college education – have significantly higher second birth hazards ($p <= 0.10$ or 0.05) than the reference group does (both no college education). This finding lends support for the pooling hypothesis (H1). Second, birth hazards of college educated men are significantly higher when their spouse is highly educated as well, compared with hypergamous large distance couples ($p <= .05$). Women with some college education have higher birth rates with a spouse with at least the same educational level compared with a less educated spouse ($p <= 0.01$). This finding suggests a depressed second birth rate among large distance couples, offering further support for H4. College educated women married to a man with some college education have higher second birth rates than the reference group and than hypogamous large distance couples do. This offers some support for H3a, but only when the hypogamous couple has a high level of joint education. In contrast, the significantly lower second birth rate of hypogamous couples with lower joint educational resources (e.g., the woman having some and the man no college education) compared to homogamous and hypergamous couples involving a woman with 13-15 years of education offer some

Tab. 3: Cox Hazard models of first union dissolution

Variables	Haz. ratio (Std. err.)						
	1 Baseline	2 Basic control	3 Works status	4 Absolute income	5 Relative income	6 Gender attitudes	7 Full model
Education							
Enrolled	0.886	0.808	0.844	0.851	0.881	0.713	0.775
	(0.251)	(0.232)	(0.243)	(0.245)	(0.254)	(0.208)	(0.229)
F 0-12/M 13-15	1.113	1.060	1.022	1.023	1.000	1.104	1.031
	(0.329)	(0.319)	(0.308)	(0.308)	(0.302)	(0.333)	(0.315)
F 0-12/ M 16+	0.917	0.879	0.842	0.789	0.803	0.848	0.769
	(0.395)	(0.380)	(0.364)	(0.343)	(0.350)	(0.369)	(0.339)
F 13-15/M 0-12	1.006	1.007	1.012	1.009	1.001	0.948	0.954
	(0.310)	(0.319)	(0.321)	(0.319)	(0.319)	(0.305)	(0.309)
Reference: both 0-12							
Both 13-15	1.127	1.336	1.280	1.291	1.236	1.285	1.179
	(0.361)	(0.434)	(0.417)	(0.419)	(0.403)	(0.420)	(0.388)
F 13-15/M 16+	0.898	1.016	1.083	0.947	0.918	0.975	0.914
	(0.367)	(0.427)	(0.456)	(0.400)	(0.387)	(0.411)	(0.393)
F 16+/M 0-12	1.326	1.600	1.633	1.596	1.369	1.524	1.362
	(0.451)	(0.562)	(0.576)	(0.563)	(0.493)	(0.538)	(0.499)
F 16+/M 13-15	0.422^	0.541	0.524	0.474	0.457	0.537	0.453
	(0.220)	(0.286)	(0.277)	(0.252)	(0.244)	(0.284)	(0.242)
Both 16+	0.813	0.980	0.982	0.885	0.864	0.947	0.773
	(0.212)	(0.273)	(0.273)	(0.251)	(0.244)	(0.266)	(0.227)
Basic controls							
F age at union		0.882**	0.868**	0.851**	0.864**	0.872**	0.838***
		(0.041)	(0.042)	(0.042)	(0.041)	(0.042)	(0.042)
M age at union		1.087***	1.092***	1.089***	1.095***	1.091***	1.096***
		(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
0 children desired		0.986	0.977	0.989	1.006	0.924	0.961
		(0.265)	(0.263)	(0.266)	(0.272)	(0.254)	(0.264)
1 child desired		0.699	0.730	0.743	0.722	0.638	0.656
		-0.213	-0.223	-0.227	-0.220	-0.197	-0.204
Reference: 2+ children desired							
Work status							
Male breadwinner			0.523^				1.062
			(0.180)				(0.760)
Female breadwinner			0.262				0.128^
			(0.265)				(0.140)

Tab. 3: Continuation

Variables	Haz. ratio (Std. err.)						
	1 Baseline	2 Basic control	3 Works status	4 Absolute income	5 Relative income	6 Gender attitudes	7 Full model
Reference: both full time							
Both don't work			0.386				
			(0.397)				
F full time, M part time			1.412				1.279
			(0.474)				(0.448)
M full time, F part time			0.731				0.929
			(0.175)				(0.238)
Absolute income							
F income				1.094*			1.046
				(0.042)			(0.104)
M income				0.956			0.934
				(0.036)			(0.045)
Family income				1.271			1.406
				(0.221)			(0.325)
Relative income							
F share of family income					1.011*		1.014^
					(0.005)		(0.008)
Reference: F share*33%							
F share*66%					0.998		0.993
					(0.005)		(0.006)
F share*100%					1.009		1.000
					(0.006)		(0.008)
Gender attitudes							
Men should share housework						0.913	0.890
						-0.131	(0.128)
Women's place is in the home						1.068	1.095
						(0.152)	(0.157)
Working wife feels more useful						0.937	0.940
						(0.087)	(0.088)
Traditional husband/wife roles best						0.648**	0.658**
						(0.089)	(0.090)
Number of observations	39606	39606	39606	39606	39606	39606	39606

*** p<.001, ** p<.01, * p<.05, ^ p<.1, F=female, M=male

Source: National Longitudinal Study of Youth 1979 (NLSY79), own estimations

Tab. 4: Cox Hazard models of second birth

Variables	Haz. ratio (Std. err.)						
	1 Baseline	2 Basic control	3 Works status	4 Absolute income	5 Relative income	6 Gender attitudes	7 Full model
Education							
Enrolled	0.849	0.828	0.835	0.831	0.809	0.829	0.824
	(0.160)	(0.156)	(0.158)	(0.157)	(0.153)	(0.157)	(0.157)
F 0-12/M 13-15	1.176	1.193	1.169	1.180	1.200	1.161	1.148
	(0.177)	(0.180)	(0.177)	(0.179)	(0.182)	(0.176)	(0.175)
F 0-12/ M 16+	0.903	0.946	0.933	0.924	0.920	0.969	0.949
	(0.228)	(0.239)	(0.236)	(0.234)	(0.233)	(0.245)	(0.241)
F 13-15/M 0-12	0.780	0.750^	0.732^	0.740^	0.759^	0.727^	0.722*
	(0.126)	(0.122)	(0.119)	(0.121)	(0.124)	(0.119)	(0.119)
Reference: both 0–12							
Both 13-15	1.405*	1.364*	1.333^	1.360*	1.370*	1.328^	1.315^
	(0.214)	(0.211)	(0.207)	(0.211)	(0.213)	(0.206)	(0.205)
F 13-15/M 16+	1.386^	1.284	1.292	1.267	1.284	1.218	1.217
	(0.272)	(0.255)	(0.257)	(0.253)	(0.256)	(0.243)	(0.245)
F 16+/M 0-12	1.324	1.149	1.080	1.128	1.134	1.125	1.050
	(0.281)	(0.248)	(0.234)	(0.245)	(0.248)	(0.243)	(0.231)
F 16+/M 13-15	1.647**	1.558*	1.536*	1.531*	1.528*	1.551*	1.491*
	(0.315)	(0.303)	(0.300)	(0.300)	(0.300)	(0.304)	(0.296)
Both 16+	1.640***	1.535***	1.477**	1.491**	1.478**	1.495**	1.411*
	(0.206)	(0.198)	(0.192)	(0.201)	(0.196)	(0.197)	(0.197)
Basic controls							
F age at union		1.067**	1.068**	1.068**	1.068**	1.069**	1.071**
		(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)
M age at union		0.952***	0.953***	0.951***	0.950***	0.955***	0.954***
		(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
0 children desired		0.589*	0.616^	0.595*	0.599*	0.638^	0.672
		(0.152)	(0.159)	(0.153)	(0.154)	(0.166)	(0.175)
1 child desired		0.309***	0.730	0.308***	0.305***	0.312***	0.311***
		(0.057)	(0.223)	(0.057)	(0.056)	(0.057)	(0.057)
Reference: 2+ kids desired							
Work status							
Male breadwinner			0.876				0.635^
			(0.097)				(0.151)
Female breadwinner			0.292*				0.324*
			(0.147)				(0.171)

Tab. 4: Continuation

Variables	Haz. ratio (Std. err.)						
	1 Baseline	2 Basic control	3 Works status	4 Absolute income	5 Relative income	6 Gender attitudes	7 Full model
Reference: both full time							
F full time, M part time			0.550^				0.622
			(0.170)				(0.194)
M full time, F part time			1.096				1.081
			(0.100)				(0.111)
Absolute income							
F income				1.001			0.969
				(0.012)			(0.033)
M income				1.033			1.002
				(0.024)			(0.025)
Family income				1.007			0.965
				(0.077)			(0.086)
Relative income							
F share of family income					0.993*		0.995
					(0.003)		(0.004)
*Reference: F share*33%*							
F share*66%					1.004		1.003
					(0.003)		(0.004)
F share*100%					1.009*		1.008^
					(0.004)		(0.005)
Gender attitudes							
Men should share housework						1.218**	1.213**
						(0.082)	(0.082)
Women's place is in the home						1.062	1.058
						(0.070)	(0.070)
Working wife feels more useful						0.882**	0.883**
						(0.040)	(0.041)
Traditional husband/wife roles best						1.126*	1.122^
						(0.068)	(0.069)
Number of observations	53087	53087	53087	53087	53087	53087	53087

*** p<.001, ** p<.01, * p<.05, ^ p<.1, F=female, M=male

Source: National Longitudinal Study of Youth 1979 (NLSY79), own estimations

support for a lower birth rate of hypogamous couples (H3b) among low-resourced couples.

Third, various significant relationships between the other covariates and second birth hazards emerge in the stepwise models. However, none of these mechanisms mediate the educational pairing links with second births hazards. Female breadwinner couples and couples in which the woman works full time and the man part time have significantly lower second birth hazards, further rejecting the bargaining hypothesis (H3a) and offering support for the "Doing Gender" hypothesis (H3b). Increases in family income positively predict the second birth hazard, offering more support for the pooling hypothesis (H1). Increases in the woman's relative income have a small but significantly positive association with the second birth rate among the highest income tertile, while depressing the second birth rate in the lowest income tertile. This further lends some support for the bargaining hypothesis (H3a) among high-resource couples and the "Doing Gender" hypothesis (H3b) among low-resource couples. Finally, the wife's egalitarian attitude toward housework sharing positively predicts second births, offering further support for H3a. Conversely, egalitarian attitudes toward women's labor market work lowers the second birth rate, and traditional attitudes towards gender roles increase the second birth rate, giving some support to H2.

4.5 Union dissolution in competition to second births

Estimates for the competing risk model for union dissolutions which occur after the first birth are shown in Table 5. Homogamous college educated couples display a marginally significantly lower dissolution rate than the reference group. Again, this contrast becomes insignificant as control variables are added. No other educational pairing contrast or other predictors of interest significantly predict union dissolutions that occur in competition to a second birth. Thus, educational pairings emerge as relevant predictors of union dissolution that occur before parenthood occurs, but no longer after a couple became parents.

5 Discussion and conclusion

Using data from the NLSY79 and Cox proportional hazard models, this paper aimed at understanding the relationship between educational pairings in couples and their first and second birth hazards among married white couples in the US. Four major conclusions can be drawn.

First, I find strong support for the pooling hypothesis (H1). The first birth rate increases with increasing joint education; it is highest among homogamous tertiary educated couples and couples with a man with completed college education and a woman with some college education. Couples were at risk for childbirth starting at the time of their union formation, and models controlled for both partners' ages at union formation. These results therefore do not focus on the age at first birth and its postponement from a life course perspective, as prior studies did, and the

Tab. 5: Cox Hazard models of second union dissolution

Variables	Haz. ratio (Std. err.)						
	1 Baseline	2 Basic control	3 Works status	4 Absolute income	5 Relative income	6 Gender attitudes	7 Full model
Education							
Enrolled	0.353	0.346	0.348	0.355	0.354	0.352	0.360
	(0.256)	(0.250)	(0.252)	(0.257)	(0.257)	(0.255)	(0.262)
F 0-12/M 13-15	1.492	1.688	1.683	1.689	1.674	1.726	1.728
	(0.496)	(0.571)	(0.572)	(0.574)	(0.567)	(0.586)	(0.590)
F 0-12/ M 16+	0.873	0.959	0.960	0.986	0.974	0.946	0.986
	(0.527)	(0.586)	(0.587)	(0.604)	(0.595)	(0.577)	(0.605)
F 13-15/M 0-12	0.833	0.934	0.933	0.928	0.896	0.959	0.931
	(0.319)	(0.361)	(0.362)	(0.361)	(0.352)	(0.373)	(0.368)
Reference: both 0-12							
Both 13-15	1.634	1.829	1.860^	1.813	1.803	1.825	1.843
	(0.594)	(0.676)	(0.692)	(0.673)	(0.668)	(0.678)	(0.692)
F 13-15/M 16+	1.450	1.675	1.688	1.679	1.669	1.763	1.827
	(0.713)	(0.834)	(0.844)	(0.838)	(0.833)	(0.885)	(0.924)
F 16+/M 0-12	0.290	0.333	0.329	0.330	0.312	0.342	0.320
	(0.298)	(0.344)	(0.340)	(0.342)	(0.325)	(0.354)	(0.334)
F 16+/M 13-15	0.855	1.040	1.053	1.045	1.006	1.048	1.074
	(0.631)	(0.776)	(0.789)	(0.785)	(0.757)	(0.784)	(0.814)
Both 16+	0.351^	0.443	0.444	0.455	0.432	0.454	0.469
	(0.215)	(0.277)	(0.279)	(0.289)	(0.274)	(0.285)	(0.301)
Basic controls							
F age at union		0.931	0.931	0.932	0.929	0.932	0.932
		(0.055)	(0.055)	(0.055)	(0.055)	(0.055)	(0.055)
M age at union		0.965	0.965	0.966	0.966	0.964	0.967
		(0.029)	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)
0 children desired		0.936	0.934	0.929	0.942	0.864	0.867
		(0.572)	(0.573)	(0.569)	(0.581)	(0.533)	(0.541)
1 child desired		1.184	1.192	1.206	1.202	1.183	1.221
		(0.304)	(0.308)	(0.312)	(0.310)	(0.305)	(0.318)
Reference: 2+ kids desired							
Work status							
Male breadwinner			0.928				1.403
			(0.245)				(0.870)
Female breadwinner			0.970				0.861
			(0.707)				(0.725)

Tab. 5: Continuation

Variables	Haz. ratio (Std. err.)						
	1 Baseline	2 Basic control	3 Works status	4 Absolute income	5 Relative income	6 Gender attitudes	7 Full model
Reference: both full time							
F full time M part time			0.631				0.601
			(0.461)				(0.445)
M full time, F part time			0.943				1.002
			(0.240)				(0.281)
Absolute income							
F income				1.015			1.049
				(0.030)			(0.094)
M income				0.989			0.986
				(0.045)			(0.052)
Family income				0.932			0.863
				(0.161)			(0.180)
Relative income							
F share of family income					1.001		0.998
					(0.006)		(0.009)
*Reference: F share*33%*							
F share*66%					1.003		1.005
					(0.008)		(0.008)
F share*100%					1.003		1.005
					(0.010)		(0.011)
Gender attitudes							
Men should share housework						0.891	0.893
						(0.145)	(0.146)
Women's place is in the home						0.807	0.803
						(0.138)	(0.139)
Working wife feels more useful						1.095	1.093
						(0.135)	(0.136)
Traditional husband/wife roles best						1.098	1.106
						(0.172)	(0.175)
Number of observations	53087	53087	53087	53087	53087	53087	53087

*** p<.001, ** p<.01, * p<.05, ^ p<.1, F=female, M=male

Source: National Longitudinal Study of Youth 1979 (NLSY79), own estimations

results are not directly comparable to them. Rather, they offer evidence on the first birth hazard over the course of the first marriage, which in this US sample is highest when both partners have at least some college education. Second birth rates were also highest among couples with two college educated partners. Taken together, these findings corroborate results from prior studies in several other contexts: Resource pooling of two tertiary educated partners seems to provide a conducive environment for (continued) childbearing in highest-income countries, including in the US (*Bagavos* 2017; *Bueno/García-Román* 2021; *Dribe/Stanfors* 2010; *Nitsche et al.* 2018; *Trimarchi/Van Bavel* 2020). A strength of the present study is that, unlike most prior research, it controls for the respondent's number of desired children. Hence, higher birth rates of couples with high pooled educational resources likely don't hinge on different preferences regarding envisioned family size. Rather, the partners' combined education may impact couples' decision-making on whether they transform their fertility desires into concrete pregnancy plans, as fertility intentions in the US have been shown to be highest among homogamous tertiary educated couples (*Morales* 2020). This suggests that tertiary educated individuals feel most inclined to realize their fertility desires with a partner who is also college educated, or that homogamous highly educated couples perceive themselves to be in a more favorable position to form or expand their family than heterogamous couples with only one tertiary educated or jointly lower educated partner(s) do. Interestingly, respondents in the study on fertility intentions were born between 1965 and 2000, hence, after the 1957-64 NLSY79 birth cohort examined in this study (*Morales* 2020). Further research on cohort differences in the educational pairing-fertility link are needed to examine whether tertiary educated homogamous couples indeed consistently have, or intend to have, higher second birth rates across various birth cohorts.

Second, the link between educational heterogamy and birth rates seems to depend on the partners' absolute levels of education, more specifically, if the heterogamous couple included a tertiary education partner or not. Little support was found for the specialization hypothesis (H2). If present, it only applied to highly resourced hypergamous couples. Jointly college educated hypergamous couples (men with 16+ years, women with 13-15 years) had higher first birth rates than the reference group of homogamous high school educated couples, and than the lower resourced hypergamous large distance couples (men with 16+ years, women with 0-12 years). This offers some support for the specialization hypothesis (H2) regarding first births.

Some support was also found for the bargaining hypothesis (H3a), but again only among highly resourced couples, in terms of joint education levels and household income tertile. Jointly college educated hypogamous couples (men with 16+ years, women with 13-15 years) had higher second birth rates than the reference group and than the lower resourced hypogamous large distance couples (men with 16+ years, women with 0-12 years). This offers some support for the bargaining hypothesis (H3a) regarding second births, but only among hypogamous couples with a woman who completed college.

In contrast, hypogamous couples with lower joint educational resources (women with 13-15 years, men with 0-12 years) had the lowest second birth rates of all

couples. This offers some support for the "Doing Gender" hypothesis (H3b), which stated that hypogamous couples would have the lowest second birth rates due to their mismatch with prevailing gendered norms, but this applied only among low resourced hypogamous couples.

Taken together, these findings on heterogamous couples underscore that associations between heterogamy and birth rates seem to depend on a couple's joint absolute level of resources. Higher resourced heterogamy appears conducive to first births, while low resourced heterogamy does not. Hence, future work should consider absolute joint resources when studying the link between heterogamy and childbearing. This finding contributes to an ongoing debate on how partners' absolute and relative resources can be best operationalized in research on homogamy and heterogamy and its linkages with family dynamics (for an overview of this debate, see *Blossfeld et. al* 2024 in this special issue). The finding could also be interpreted as further evidence for the pooling hypothesis (H1) – among heterogamous couples, the higher the joint pooled educational resources, the higher the birth rate, especially with respect to second births.

Third, both hypogamous and hypergamous large distance couples had the lowest first birth rates, and significantly lower second birth rates than homogamous highly educated couples, offering support for H4. Among tertiary educated people, the low education of a spouse seems to lower the chance of a joint first birth, regardless of gender. Competing risk models show that hypogamous large distance couples had higher union dissolution rates compared with other couple types involving a college educated woman. The low birth rate of hypogamous large distance couples seems thus partly driven by higher separation rates of this type of couple before having a first child. Note that once a first child is born to large distance couples, their union dissolution rate decreases. Prior research has demonstrated higher union dissolution and lower childbearing rates among heterogamous couples, as well as lower union dissolution rates after parenthood across high income countries (*Hart et al.* 2017; *Saarela/Finnäs* 2014; *Schwartz* 2010; *Theunis et al.* 2018). *Mazzeo et al.* (2024) in this special issue, for instance, find that marriages in which wives have more education than their husbands have higher union dissolution rates in the West German birth cohorts 1951-60 and 1961-70. Hence, their parallel finding pertains to roughly the same birth cohort as the US NLSY79 cohort examined in this study. However, they do not investigate the hypogamy-union dissolution link by couples' number of children. It may therefore be fruitful to pay more attention to the intersection of educational pairings and parenthood status when studying union dissolutions in the future.

Fourth and finally, this study also tested the mechanisms through which educational pairings and birth rates may be linked. For first births, high family income emerged as a relevant mechanism underlying the higher birth rate of homogamous highly educated couples. However, it did not fully explain why college educated individuals with a low educated spouse had a lower birth rate, especially in the case of hypergamous large distance couples. The income variables also did not mediate second birth rate differences between highly educated homogamous couples and other couples. Mechanisms underlying first and second birth rate

differences between educational pairings thus seem to vary, and they may even vary between educational pairings concerning the same birth transition. While economic aspects and "socio-cultural" distance appear to play a role for couples' differences by educational pairing to start a family together, second birth rate differences in educational pairings seem to be underpinned by other aspects. Further research is needed to investigate underlying mechanisms beyond the socio-economic variables tested here. This study indicates that neither absolute or relative income, nor labor market work divisions, nor gender attitudes can help us understand why second birth rates of homogamous highly educated couples are higher compared to other educational pairings. Further factors that could be worth considering include relationship satisfaction, the partners' social networks and support, resources accessible via families of origin, housing conditions, health and health care access, or psychological factors such as stress resilience and conflict resolution skills.

This study has limitations. It focuses on a very specific sample, namely first marriages involving a white woman in the US NLSY79 birth cohort. It remains unclear whether similar patterns apply to other ethnicities, other birth cohorts, cohabitations that do not result in marriage, and second or subsequent unions in the United States. Moreover, births that occurred before the start of the panel in 1979 among this cohort of women were excluded from the sample because the partners' covariates were not recorded. This excludes about 25 percent of first and 10 percent of second births to NLYS79 women. Hence, this analysis may systematically exclude women who had their first child at very young ages, and therefore potentially underestimate first birth rates of lower educated couples, who tend to have children earlier in the life course. Furthermore, this study does not investigate lifetime fertility. This would involve measuring fertility across multiple unions and their educational pairings and how these unions' fertility outcomes contribute to completed fertility. One recent study on Finland indicates that educational pairings are also important for a deeper understanding of completed cohort fertility. Here, the highest proportion of births was attributed to homogamous tertiary educated couples, further underscoring the relevance of understanding why this educational couple type appears to reproduce at higher rates than others (*Andersson et al.* 2024). Finally, hazard rates do not distinguish between tempo and quantum effects. More research is needed to differentiate timing versus quantum of the educational pairings on all birth orders.

In summary, considering the educational composition of a couple adds important insights to the fertility-education link. This study indicates that, first, homogamous highly educated couples have the highest first and second birth rates, providing evidence for the relevance of resource pooling for family formation. Second, the link between educational heterogamy and birth rates hinges on the partners' absolute education levels, while hypogamous and hypergamous couples with large educational distances have lower birth rates than most other pairings do. Third, family income mediated first birth rate differences between homogamous highly educated couples and most other pairings. Lower first birth rates of hypogamous large distance couples, however, appear in part rooted in higher union dissolution rates of this couple type. Fourth, the higher second birth rate of homogamous

highly educated couples was not mediated by any of the tested socio-economic mechanisms.

Finally, there are four aspects to consider when operationalizing couples' joint education: their absolute joint (pooled) education, their relative education (homogamy vs. heterogamy), the gender composition among heterogamous couples (hypergamy vs. hypogamy), and the distance of the educational attainment among heterogamous couples. All four aspects were relevant for couples' birth transitions in this study.

While this study adds further evidence to the emerging finding of higher birth rates among homogamous tertiary educated couples in high income countries (especially concerning second births), it may be premature to interpret the findings as a causal effect of a couples' education composition on fertility. This study offers comprehensive life history data, a clear temporal ordering of potential cause and outcome, and the results are consistent with prior research. The underlying mechanisms of the educational pairing findings regarding first births were successfully examined (indicating that educational "effects" are rooted in economic circumstances and differences in union dissolution rates) but remained in large part elusive regarding second births. Furthermore, due to data limitations, not all births and unions of this birth cohort were observable. The results therefore may be rooted in unobserved heterogeneity, for instance regarding the selection into partnerships or into tertiary education. More research is needed to understand which specific characteristics of tertiary educated homogamy protect couples from union dissolution and stimulate their fertility. While causal effects of educational attainment and its pooling in couples may indeed emerge, especially concerning second births, this study can only document associations and does not speak to causality.

Acknowledgements

This study was supported with funding from the German Research Foundation (DFG) under grant agreement 459056529. Additional support was provided from the Australian National University via the ANU Future Scheme Grant to Natalie Nitsche. I would like to thank Hannah Brückner for her invaluable feedback on earlier versions of this study.

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Date of submission: 28.05.2023 *Date of acceptance: 12.09.2024*

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Comparative Population Studies

www.comparativepopulationstudies.de

ISSN: 1869-8980 (Print) – 1869-8999 (Internet)

Published by
Federal Institute for Population Research (BiB)
65180 Wiesbaden / Germany

Managing Publisher
Dr. Nikola Sander