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Educational Hypogamy and the Transition to Parenthood: The Moderating Role of Union Duration

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Abstract

The increasing educational attainment of women has contributed to a growing prevalence of educationally hypogamous unions, in which women have higher educational attainment than their male partners. Previous research has produced mixed findings on the association between educational hypogamy and the transition to parenthood, and little is known about how this association varies across union duration. This study examines how the transition to parenthood differs between hypogamous and homogamous couples across union duration.

We use Austrian register data on 20,575 childless couples formed in 2011 and follow them over a ten-year period. We estimate discrete-time hazard models of the transition to first birth, accounting for union duration and sociodemographic differences between partners, and use a multiprocess modelling approach to account for selectivity related to union dissolution. The results show no overall fertility disadvantage for hypogamous couples. During the first years of the union, hypogamous couples have similar or slightly higher probabilities of first birth than homogamous couples. At longer union durations, however, the pattern reverses, with hypogamous couples displaying somewhat lower probabilities of first birth. Accounting for differences between partners in age, educational participation, immigrant status, and residential context does not substantially alter this pattern. The multiprocess model further indicates that selective union dissolution does not alter the observed differences in first-birth probabilities. Overall, the findings suggest that the association between educational hypogamy and fertility is modest and varies over the union duration, rather than reflecting a general fertility disadvantage among educationally hypogamous couples.

1. Introduction

Educational expansion observed in the last decades has proceeded more rapidly among women compared to men, which led to unprecedented changes in assortative mating patters (Esteve et al., 2016; Hirschl et al., 2023; Schwartz & Han, 2014). Among couples in which women and men have different educational levels, hypogamy—where women's educational attainment exceeds that of their partners—has become more common compared to hypergamy, where the man has the higher education. These changes raise an important question about their implications for family formation: does hypogamy shape couples' transition to parenthood?

Existing evidence provides no clear answer: Some studies suggest that hypogamous couples may be more likely to postpone the transition to parenthood (Bagavos, 2017) and to remain childless compared with homogamous couples (Osiewalska, 2017). Other studies do not find significant differences between hypogamous and homogamous couples in the transition to parenthood (Bueno & García-Román, 2021). Moreover, the association between hypogamy and fertility has been shown to vary across societal contexts and stages of the life course (Nitsche et al., 2018; Osiewalska, 2017). We argue that one reason for these mixed findings may be that differences between hypogamous and homogamous couples are not constant over the course of a partnership. In this study, we investigate the interplay between union

duration and the timing of transition to parenthood, comparing hypogamous couples with the most common educational pairing within heterosexual couples in Europe, i.e. educationally homogamous couples.

Despite the growing body of research on educational pairings and fertility, little is yet known about how the transition to parenthood differs between hypogamous and homogamous couples as the partnership progresses. This omission is important because union duration constitutes one of the central temporal dimensions of family formation, alongside partners' biological ages. In this paper, we provide theory-guided arguments explaining why different stages of a partnership, as captured by union duration, may have different meanings for hypogamous and homogamous partnerships. While union duration has been long regarded as one of the "clocks" in the transition to parenthood—next to biological age—we argue and provide empirical evidence for a different pace with which this "clock" may be ticking. This perspective connects research on educational sorting with work emphasizing the importance of partnership duration and stability for fertility, which has so far paid limited attention to educational pairings as a potential effect modifier (Kuang et al., 2025).

We investigate this argument using Austrian register data that follow couples formed in 2011 over the course of a decade. We apply discrete time hazard models that interact union duration with educational pairings. Building on research showing that partnership choices are selective, we further account for observed heterogeneity between partners in characteristics that may be associated with both educational pairing and fertility, including age, participation in education, country of birth, and place of residence prior to union formation (Corti, 2021). Further analyses control for selectivity that may arise from differential risks of union dissolution among homogamous and hypogamous couples. Having children makes partnership dissolution more difficult and costly, so couples are likely to take into account the likelihood of their relationship dissolving when making childbearing decisions (Berrington et al., 2015; Lillard & Waite, 1993). To account for this interdependence, we estimate a multiprocess model that jointly models the transition to first birth and union dissolution.

This study contributes to the literature in three ways. First, it introduces union duration as a key temporal dimension in understanding differences in transition to parenthood across educational pairings. Amid ongoing shifts in assortative mating patterns, it is essential to deepen our understanding of families characterized by asymmetric socioeconomic resources. Second, it accounts for observed heterogeneity between partners that may be associated with selection into different educational pairings, using detailed information on both partners and the differences between them. Third, it addresses selectivity arising from differential risks of union dissolution by jointly modelling the transition to first birth and union dissolution.

2. Theoretical background

Hypogamy and the transitions to parenthood

Several arguments suggest that educational hypogamy may be associated with a slower or less likely transition to parenthood than educational homogamy. Pessimistic accounts of hypogamy emphasize that such unions may be less harmonious because partners differ not only in their educational attainment but potentially also in core values, attitudes, and lifestyle preferences, while the status constellation within the couple may itself conflict with dominant gender norms (Steiber & Siegert, 2026). This can generate interpersonal tensions and threats to men's perceived masculinity, especially where male-breadwinner norms remain salient (Gonalons-Pons & Gangl, 2021; Tichenor, 2005). Previous research has associated such dynamics with lower relationship satisfaction, poorer female mental health, and higher union dissolution risks (Bertrand et al., 2015; Eeckhaut et al., 2013; Potarca & Rossier, 2022; Schwartz & Han, 2014). Uncertainty about the stability of the relationship may, in turn, make couples reluctant to undertake a highly consequential joint investment such as parenthood.

Resource differences provide a further reason for why transitions to parenthood may occur more slowly in hypogamous than in homogamous unions. For highly educated women, homogamous unions with equally highly educated men generally provide better opportunities for pooling resources than partnerships with less educated men. The greater combined resources of highly educated homogamous couples may facilitate the transition to parenthood in homogamous couples by easing the economic risks associated with having children (Nitsche et al., 2018; Van Bavel, 2012).

Persistent gender norms may further limit the extent to which women in hypogamous unions can translate their greater educational resources within the couple into bargaining power, and in turn, into more gender egalitarian arrangements within the household. Research on compensatory gender display suggests that couples who depart from conventional gender expectations regarding the partners' relative socioeconomic standing, may respond by reinforcing traditional behaviour in other domains, such as the division of unpaid work (Bittman et al., 2003; Gupta, 2007; West & Zimmerman, 1987). For highly educated women, such arrangements may increase the anticipated costs of motherhood and therefore reduce their propensity to have a child.

These arguments provide reasons to expect lower transition rates into parenthood among hypogamous than homogamous couples. They do not, however, imply that this difference should remain constant throughout the partnership.

Why hypogamy effects may change with union duration

Prior research suggests that intimate relationships often follow a staged trajectory. Early in the partnership, many couples experience a "honeymoon phase" characterized by high relationship satisfaction (Karney & Bradbury, 2020). This initial high tends to be followed by a decline of satisfaction levels as daily routines, fatigue and external stressors accumulate (Hatch & Bulcroft, 2004). At longer durations, relationships that persist tend to show signs of consolidation, including fewer disagreements, stronger perceptions of union stability, and increasing joint investments such as homeownership or shared financial arrangements (Hendershott et al., 2009; Trinh et al., 2023). Due to these changes over time in relationship quality and stability, union duration has been seen as one of the "multiple clocks" in

the process of transition to parenthood, next to partners' ages or calendar time (Rahnu & Jalovaara, 2023).

Hypogamy may interact with union duration in shaping childbearing decisions. Since educational hypogamy can be experienced by couples as a mismatch in values, attitudes and lifestyle preferences, especially at early stages of a partnership, hypogamy may be related to more intense conflicts and to more intense intra-couple bargaining about the division of household tasks. Such tensions may lower the likelihood of entering parenthood early in the relationship. However, for those couple who survive the early years and adjust to each other over time, initial differences may reduce over the further course of the relationship, leading to higher perceptions of union stability and an increasing propensity to engage in joint goals and investments, such as having a child together. Based on these arguments, we expect that a higher frequency of tensions between partners in hypogamous couples may lead to a postponement of childbearing at early stages of union duration, whereas at later stages of union duration we expect a convergence of first birth transitions between hypo- and homogamous couples.

Similar predictions can be derived from a bargaining perspective. Educational hypogamy can influence the transition to parenthood through partners' relative resources and outside options. Intra-household bargaining models posit that the partner with greater resources and better exit options holds more sway over decisions about the allocation of time and the adoption of joint projects, including childbearing (Agarwal, 1997; Becker, 1973). In hypogamous unions, women's higher relative education is linked to higher earnings potential, which can translate into greater bargaining power vis-à-vis their partners (Sullivan & Gershuny, 2016). Given the high opportunity costs of motherhood for highly educated women, this stronger bargaining position may enable them to delay the transition to parenthood until conditions are favourable—for example, until the couple has achieved sufficient economic security or negotiated a more egalitarian division of labour. In this view, again we would expect that hypogamy does not necessarily lower the overall chances of couples' parenthood, instead it leads to postponement of transition to parenthood. Overall, based on the arguments presented above, we formulate **Hypothesis 1**: At shorter union durations, hypogamy is associated with lower probabilities of transition to parenthood compared to homogamy, with differences decreasing as union duration increases.

Selection into hypogamous unions: an alternative prediction

The preceding arguments pertain to potential effects of the status differential within hypogamous unions per se. Partnership formation itself, however, is selective, and this selection can generate the opposite empirical pattern, i.e., a positive association between hypogamy and transitions to parenthood. In contexts of a reversed gender gap in education, highly educated women face a shortage of similarly educated male partners and may delay union formation until later ages (De Hauw et al., 2017; Van Bavel, 2012). When these women eventually enter lasting hypogamous unions, they are often older and have less remaining time to realize their fertility intentions, creating strong tempo pressures due to declining fecundity. Under these conditions, hypogamous couples may move more quickly into parenthood than comparable homogamous couples, especially if women are strongly family-oriented and have "lowered

the bar" in partner search to speed up family formation (Corti, 2021; Corti & Scherer, 2021), potentially at the cost of union quality.

Prolonged partner search may also generate positive selection of a different kind. Women who take longer to form unions (optimization strategy) may ultimately enter hypogamous relationships only when they find partners who are particularly well-matched in terms of commitment and shared family goals. Educational hypogamy would then not be associated with lower levels of compatibility on dimensions relevant to family formation. Instead, the hypogamous unions that form may be selectively characterized by a strong orientation toward long-term commitment and parenthood.

Both selection mechanisms imply that hypogamy among highly educated women can coincide with a compressed and accelerated transition to parenthood compared to homogamy. Following these arguments, we formulate **Hypothesis 2**: At shorter unions durations, hypogamy is associated with higher probabilities of transition to parenthood compared to homogamy, with differences decreasing over time.

Selection through union dissolution

The population of couples observed at a given union duration depends not only on which couples initially formed but also on which relationships have remained intact. This is particularly important when studying fertility because decisions about childbearing and union stability are interdependent (Berrington et al., 2015; Lillard & Waite, 1993). Under the assumption that hypogamous couples are more likely to experience tensions and conflict, they may face a higher risk of early separation. As time passes from union formation, the group of hypogamous unions is therefore likely to change, because couples with lowest relationship quality are likely to have broken up. Many of these dissolutions will occur before a transition to parenthood, thus leading to an underrepresentation of certain types of hypogamous unions in the empirically observed risk pool — especially at longer union durations. Because less stable hypogamous unions are more likely to dissolve early, the observed population of hypogamous couples at longer durations may be positively selected. This selection can obscure underlying disadvantages in simpler models, which only become visible once selection processes are explicitly accounted for. Based on this reasoning, we formulate **Hypothesis 3**: Differential selection through union dissolution masks part of the fertility disadvantage associated with hypogamy. After accounting for this selection, hypogamous couples are expected to exhibit lower probabilities of transition to parenthood compared to homogamy.

3. Previous research

Existing research suggests that the association between educational hypogamy and fertility differs by parity. For the transition to the first birth, findings are mixed. For instance, Bueno and García-Román (2021) examined how couple's relative education influences the transition to parenthood in Spain. They found no direct effect of educational hypogamy on first-birth transitions. Very small effects of assortative mating were reported also by Leesch and Hiekel (2026) for East and West Germany. Nitsche et al. (2018) also found modest effects for a sample of 24 European countries, with hypogamous

couples slightly more likely to delay the transition to parenthood compared to highly educated homogamous couples. In a study focused on the United States, however, Nitsche (2024) found a significant educational pairing effects on the transition to first birth, with hypogamous couples showing lower first-birth probabilities than highly educated homogamous couples. A similar conclusion was reached by Osiewalska (2017) who found hypogamy to be negatively associated with entry into parenthood in Austria and Bulgaria (but not in France).

For higher order births, the pattern of results is more consistent, showing a disadvantage for hypogamy relative to highly educated homogamy (Bueno & García-Román, 2021; Nitsche, 2024; Nitsche et al., 2018; Trimarchi & Van Bavel, 2020). That is, across European and US studies, educational hypogamy is consistently associated with lower progression to second (and third) births compared to homogamy, especially among highly educated couples. These patterns support the notion that homogamous highly educated unions may provide especially favourable conditions for resource pooling and long-term family investment, while educational hypogamy is more often associated with constrained or reduced fertility, especially at higher parities.

Recent research has started to explore the heterogeneity of the effects of hypogamy on fertility. One key source of heterogeneity pertains to the societal context, which has motivated several cross-country comparisons. Nitsche (2020) found that in Western and Eastern Europe, hypogamous couples tend to have lower second-and third-birth rates than tertiary educated homogamous couples, whereas this pattern was not observed in the Nordic and Southern European countries.

While country-level conditions have been shown to moderate the association between educational pairings and fertility, the couple context could be another important source of heterogeneity. Nitsche (2020) investigated the moderating role of the age of partners within hypogamous couples, showing that while hypogamous couples tend to have relatively high first-birth rates at younger ages (23–26), highly educated homogamous couples overtake them at later reproductive ages (30–37). These findings point to distinct life course patterns in fertility behaviour across union types. Recent evidence from the United States underscores these dynamics. Nitsche (2024) found that fertility differences between educationally homogamous and heterogamous couples vary by the couple's overall resource level. Hypogamous couples with large educational distances were less likely to have children, partly because of higher risks of union dissolution prior to childbearing. Moreover, differences in second-birth rates between homogamous and heterogamous couples could only partly be explained by economic mechanisms (see also (Trimarchi, forthcoming), highlighting the need for further research into the underlying processes. An additional challenge in this literature is that educational pairings differ not only in terms of partners' relative educational positions but also in couples' overall educational resources. Consequently, it remains difficult to determine whether observed fertility differences reflect the gendered educational configuration itself or broader differences in resource endowments. While recent studies have started to address this issue (Trimarchi, forthcoming), little attention has been paid to how these associations vary across union duration.

Together, these studies suggest that fertility outcomes in hypogamous couples depend not only on the broader societal context but also on partners' combined resources, educational differences, and union stability. However, despite the theoretical significance of union duration for couples' outcomes such as relationship quality and stability (Karney & Bradbury, 2020), we still know little about how the passage of time within unions modifies the association between educational pairing and the transition to parenthood.

4. Research design

4.1 Data

This study utilizes Austrian register data from the Austrian Micro Data Center (Fuchs et al., 2024) to examine the relationship between educational hypogamy and the transition to parenthood. The dataset spans the period 2011–2021 and includes detailed information on individual characteristics, household composition, and changes in partnership and childbearing. We select all heterosexual partnerships that were newly formed in 2011—both marital and non-marital cohabiting unions. In our analysis, union formation is defined as the point at which two partners begin living together in the same household. Thus, union duration refers to the duration of residence.

Among these newly co-residing couples, we restrict the sample to unions in which the woman was aged 18–47 and had no children at the time of union formation. We further limit the sample to women who had completed at least secondary education. This choice follows from the construction of educational pairings: women with only elementary education are not at risk of educational hypogamy, because they can only form unions with partners whose education attainment is equal or higher than their own. By contrast, women with secondary education can enter homogamous, hypergamous, or hypogamous unions. Women who eventually complete tertiary education require particular consideration, because their educational pairing may change over time. Before graduating from university, a woman can for instance be classified as hypergamous relative to a tertiary educated partner, whereas upon graduation, the same union may become homogamous. We therefore account for changes in educational attainment when defining couples' educational pairings over the observation period.

We follow partnerships longitudinally from union formation in 2011 until 2021 to observe the occurrence or non-occurrence of a first births, controlling for time-varying characteristics of both the female and the male partner. Observations on partnerships are right censored if couples separate or if they remain childless by the end of observation period. The analytical sample includes 20,575 couples with 106,190 couple-year observations. Table 1 presents descriptive statistics for homogamous, hypogamous, and hypergamous couples.

Our central explanatory variable—the union type—is constructed based on the level of educational attainment of both partners. Educational attainment is categorized based on the International Standard Classification of Education (ISCED): secondary education (ISCED 2–4), and tertiary education (ISCED 5–

8). This variable is time-varying, allowing us to account for changes in union type as partners complete additional education. Based on these educational categories, our models include indicators for union type—that is, dummies for hypergamous and hypogamous unions.

We estimate discrete-time hazard models in which union duration serves as the underlying time scale. Union duration is measured in years, which starts when couples begin cohabitation or marriage (whichever comes first) and ends when couples separate or when the observation widow closes in 2021.

Our control variables include the age of both partners as well as the age difference between them. Age is grouped into six categories 18–25, 26–30, 31–35, 36–40, 41–45, and 46+. Accounting for gender differences in fecundity, for female partners, we combine ages 41–45 and 46+. We control for current participation in education for both partners, using a binary variable that distinguishes individuals who are enrolled in education from those who are not. We also control for both partners' country of origin, distinguishing between individuals born in Austria and those born abroad. To account for potential confounding effects of geographic context, we include a measure of urbanity that classifies municipalities as rural, town or city. All models include fixed effects for NUTS-2 regions. Additional specifications account more explicitly for the joint characteristics of the two partners, as explained in more detail in Section 4.2.

Table 1 presents descriptive statistics for the analytical sample by union type, presenting the distribution of the dependent and independent variables. Socio-demographic characteristics are measured at union formation in 2011, while first birth and union dissolution are observed over the subsequent follow-up period. Since our primary focus is on the comparison between homogamous and hypogamous couples, we discuss these groups in greater detail below.

At the descriptive level, homogamous and hypogamous couples differ only modestly in terms of first birth transition rates and average time to first conception. The proportion of hypogamous couples who become parents during the observation period is 2.5 percentage points higher than among homogamous couples, and their average time to first conception is about 4 months shorter. Hypogamous couples are also 3 percentage points less likely than homogamous couples to experience union dissolution during the observation period. Taken together, at this descriptive stage, we do not observe any substantial fertility (dis)advantage related to hypogamy.

Based on Table 1 we also see that homogamous and hypogamous couples are broadly similar in many socio-demographic characteristics, although some differences are noteworthy. The largest differences concern participation in education and residential context at union formation. Hypogamy is substantially less strongly associated with participation in education at union formation. Women in hypogamous couples are less likely to be students than women in homogamous couples, with a difference of 18 percentage points and the gap is even larger among men (24.5 percentage points). At union formation, hypogamous couples are also considerably less likely to reside in cities or urban areas (the gap amounts to 24 percentage points) and more likely to reside in rural areas. Differences in age and immigrant status are comparatively small. Hypogamous couples are slightly older at union formation and have somewhat

larger age differences between partners, while the proportion of couples with an immigrant partner is similar across the two union types. Most partners in both homogamous and hypogamous couples lived in the same type of area prior to union formation (59.6% and 62.9%, respectively). Taken together, these patterns suggest that educational hypogamy is associated with differences in couples' educational trajectories and geographical context at the time of union formation, underscoring the importance of accounting for these characteristics in the multivariate analyses.

Table 1
Descriptive statistics by union type

	Homogamous		Hypergamous		Hypogamous		Total	
	Mean/ %	SD	Mean/ %	SD	Mean/ %	SD	Mean/ %	SD
Union duration (years)	6.77	(3.82)	6.73	(3.86)	7.03	(3.75)	6.90	(3.79)
Age at union	26.94	(5.39)	27.37	(5.39)	27.43	(5.50)	27.24	(5.45)
Age difference (couples)	3.54	(3.46)	4.66	(3.84)	4.20	(3.84)	3.99	(3.72)
Age difference (couples), squared	24.47	(48.57)	36.39	(57.81)	32.35	(57.81)	29.73	(54.63)
Transition to first birth (%)	63.51		62.38		66.15		64.77	
Union dissolution (%)	47.10		46.99		44.26		45.61	
Time to first conception (years)	3.93	(2.98)	3.91	(2.95)	3.61	(2.89)	3.76	(2.93)
Immigrant, female (%)	10.82		13.23		10.52		10.90	
Immigrant, male (%)	10.03		13.28		12.15		11.45	
Couple immigrant status								
Both natives	82.76		78.02		81.50		81.65	
Female native, male immigrant	6.41		8.75		7.98		7.45	
Female immigrant, male native	7.21		8.70		6.35		6.90	
Both immigrants	3.62		4.53		4.17		4.00	

Note: The sample consists of couples in which the woman has at least secondary education, aged 18–47, who formed a partnership in 2011 and were childless at union formation. Socio-demographic characteristics are measured at baseline, i.e. at union formation in 2011. First birth and union dissolution are observed longitudinally over the follow-up period. Educational distributions reflect the definition of union types based on partners' relative educational attainment.

	Homogamous		Hypergamous		Hypogamous		Total	
	Mean/ %	SD	Mean/ %	SD	Mean/ %	SD	Mean/ %	SD
Student, female (%)	43.33		54.14		25.41		35.03	
Student, male (%)	39.42		32.73		14.91		26.00	
Couple student status								
Both non-student	45.55		37.47		66.41		55.65	
Female non-student, male student	11.12		8.39		8.19		9.33	
Female student, male non-student	15.03		29.80		18.68		18.36	
Both students	28.30		24.34		6.73		16.67	
Age categories, female (%)								
<=25	44.00		43.49		41.81		42.81	
26–30	33.70		32.73		34.68		34.12	
31–35	15.11		15.39		14.71		14.92	
36–40	4.97		5.30		5.43		5.24	
41–47	2.23		3.08		3.38		2.91	
Age categories, male (%)								
<=25	30.34		14.51		27.18		27.16	
26–30	32.49		39.32		34.10		33.99	
31–35	20.82		27.07		19.55		20.76	
36–40	9.30		10.65		9.74		9.66	

Note: The sample consists of couples in which the woman has at least secondary education, aged 18–47, who formed a partnership in 2011 and were childless at union formation. Socio-demographic characteristics are measured at baseline, i.e. at union formation in 2011. First birth and union dissolution are observed longitudinally over the follow-up period. Educational distributions reflect the definition of union types based on partners' relative educational attainment.

	Homogamous		Hypergamous		Hypogamous		Total	
	Mean/ %	SD	Mean/ %	SD	Mean/ %	SD	Mean/ %	SD
41–45	4.53		5.71		5.73		5.27	
46+	2.5		2.73		3.71		3.16	
Education level, female (%)								
Medium	55.09		100.00		55.91		59.85	
High	44.91		0.00		44.09		40.15	
Education level, male (%)								
Low	0.00		0.00		78.43		40.90	
Medium	55.09		0.00		21.57		32.29	
High	44.91		100.00		0.00		26.81	
Urban degree, female (%)								
Cities/Urban	66.81		68.30		42.42		54.23	
Towns/Suburbs	19.36		18.84		28.49		24.07	
Rural areas	13.83		12.87		29.10		21.70	
Residence before union								
Same type of area	59.60		61.04		62.91		61.47	
Female city, male town	8.09		8.49		7.03		7.58	
Female city, male rural	7.23		6.07		6.05		6.51	
Female town, male city	7.48		8.65		5.36		6.49	

Note: The sample consists of couples in which the woman has at least secondary education, aged 18–47, who formed a partnership in 2011 and were childless at union formation. Socio-demographic characteristics are measured at baseline, i.e. at union formation in 2011. First birth and union dissolution are observed longitudinally over the follow-up period. Educational distributions reflect the definition of union types based on partners' relative educational attainment.

	Homogamous		Hypergamous		Hypogamous		Total	
	Mean/ %	SD	Mean/ %	SD	Mean/ %	SD	Mean/ %	SD
Female town, male rural	4.75		3.09		7.46		6.00	
Female rural, male city	7.87		7.72		4.85		6.28	
Female rural, male town	4.97		4.94		6.34		5.68	
N (couples)	8,360		1,645		10,570		20,575	

Note: The sample consists of couples in which the woman has at least secondary education, aged 18–47, who formed a partnership in 2011 and were childless at union formation. Socio-demographic characteristics are measured at baseline, i.e. at union formation in 2011. First birth and union dissolution are observed longitudinally over the follow-up period. Educational distributions reflect the definition of union types based on partners' relative educational attainment.

4.2 Methods

We estimate discrete time hazard models with semi-parametric baseline hazard, specified as a series of year-specific dummies for each year of union duration. Instead of assuming proportional hazards, whereby transition to parenthood is determined by the union duration in the same way for hypogamous, hypergamous, and homogamous couples, we include an interaction between the baseline hazard and union type. In other words, we explicitly allow hypogamous unions to have a different route to parenthood compared to the other union types. The hazard model for transition to parenthood can be written as:

$$logit\ (h_{it}) = \sum {}_t\alpha\, {}_tD_t + \beta\, {}_1U_i + \gamma\, {}_2X_i + \sum {}_t\delta\, {}_t(D_t * U_i) + \epsilon\, {}_i$$

1

where D_t are year-specific dummies for each ear of union duration, X_i are women's and her partner's characteristics affecting transition to parenthood (time-constant and time-varying), whereas U_i denotes the union type.

Our further analyses control for heterogeneity among hypogamous unions due to within-couple disparities in the observed characteristics. Specifically, we include additional controls for a difference in partners age (and it's squared term to capture non-linearities), participation in education (to capture situations where one of the partners is still studying while another has already graduated), country of birth (to distinguish couples where the female partner is born outside of Austria and her partner has an immigrant status, or vice versa), as well as the place of residence before moving together (e.g. to distinguish couples where the female partner is in rural areas and her partner in the city). These

mismatches may overlap with educational hypogamy, and simultaneously either reduce transitions to parenthood (if the mismatch captures discrepancies in terms of norms and values) or “compensate” for educational mismatch (if lower education can be compensated by other endowments such as urban lifestyle). If such correlations are strong, the mismatches observed in our data may be potential confounders, therefore we include them in our analysis, extending the specification in model (1) with additional covariates.

In the third step, we test to what degree the differential propensity for union dissolution affects our estimates in model (1). We use a multiprocess hazard model where transition to parenthood is modelled jointly with the risk of separation, allowing error terms to correlate across equations. Both equations have the same specification, i.e. we allow for time-varying effects of union type by including its interactions with union duration and we include the same set of covariates. In both equations, we assume that the error terms are normally distributed, and we estimate the system of equations (3) as a seemingly unrelated bivariate probit model.

$$\begin{cases} \phi^{-1}\left(h_{it}^{P}\right) = \sum {}_{t}\alpha {}_{t}D_t + \beta {}_{1}U_i + \gamma {}_{2}X_i + \sum {}_{t}\delta {}_{t}(D_t * U_i) + \epsilon {}_{i} \\ \phi^{-1}\left(h_{it}^{S}\right) = \sum {}_{t}\alpha {}_{t}D_t + \beta {}_{1}U_i + \gamma {}_{2}X_i + \sum {}_{t}\delta {}_{t}(D_t * U_i) + \nu {}_{i} \end{cases}$$

3
Unlike in previous studies using recursive bivariate probit models (Balbo & Barban, 2014; Impicciatore & Billari, 2012), in our study the potential bias does not stem from the direct impact of union dissolution on childbearing. Since becoming a parent together with a partner from whom one has already separated is rare, we do not include the risk of separation directly into the equation for transition into parenthood. Instead, we assume that some factors, such as discrepancies in terms of norms and values, may lead to a postponement of childbearing and simultaneously raise the risk of union dissolution, which we expect to observe empirically as negative sign of the correlation between the error terms.

The results from all our main model are presented in the next section in the form of a figure presenting predicted probabilities of transition to first birth. Detailed results from all regressions are included in the Annex in Table 1, with the equation for union dissolution presented separately in Table 2.

5. Empirical results

In the first step, we explore how the risk of transition to parenthood differs across union duration, focusing on the disparities between hypogamous and homogamous couples. Although the models include all the three union types — homogamy, hypogamy, and hypergamy — our discussion focuses on the comparison of the first two, because our hypotheses concern primarily to differences between homogamy and hypogamy.

Figure 1 shows that during the first four years of the union, hypogamous couples have slightly higher rates of transition to parenthood than homogamous couples. The differences are small, amounting to

about 1–2 percentage points, and mostly fail to reach statistical significance. Thereafter, the transition rates converge between hypogamous and homogamous unions. At longer union durations, the pattern reverse compared to the early years: specifically around 8–9 years after union formation, hypogamous couples become less likely to make the transition to first birth than homogamous unions, with a difference of 3 percentage points. Overall, these results reject our Hypothesis 1 suggesting that at early union duration stages, hypogamy is related to lower probabilities of transition to parenthood compared to homogamy. Our findings offer instead tentative support for Hypothesis 2 stating that at early union duration stages, hypogamy is related to higher probabilities of transition to parenthood compared to homogamy, whereas these differences decrease over time. The lower risks observed among hypogamous couples at longer durations, however, indicate that the pattern is not simply one of convergence and suggest that the association between educational pairing and first-birth transitions may change direction over the course of the union.

Interestingly also, whereas the predicted probabilities remain at a relatively constant level among homogamous couples throughout union duration, the probabilities decline with union duration among hypogamous couples, approximately from year four onwards.

Source: Austrian register data.

In additional analysis, we investigate to what degree the estimates from Model 1 may be driven by selectivity of hypogamous unions due to mismatches other than educational ones. Our Model 2 (Table A1 in the Annex) incorporates variables that capture differences within couples in terms of age, educational participation, immigrant background as well as place of residence. The results show that these variables are related to transitions to parenthood. Age differences between partners encourages becoming a parent, but as disparities in age increase, this beneficial effect diminishes (as captured by the squared age). All other mismatches are negatively associated with transitions to first birth. However, controlling for these additional covariates does not change the estimates of main interest substantially, as both the effects of interactions between hypogamy and union duration remain almost identical across our specifications from Model 1 and Model 2.

Finally, we examine whether the observed differences between hypogamous and homogamous couples could be further explained by the higher instability of hypogamous unions. We estimated a multiprocess hazard model accounting for the joint determination of fertility and union dissolution (Model 3). We find that there are some unobserved factors that simultaneously raise the risk of union separation and decrease the chances to become a parent. This correlation is modest, with the coefficient measuring correlation of residuals across equations of -0.29. However, we also see that hypogamous couples do not exhibit higher propensity for divorce compared to homogamous couples, except for the very first year of union duration. Accordingly, the main results of interest from Model 3 remain similar to what we found out based on Model 1. Thus, we reject Hypothesis 3 stating that hypogamy becomes associated with lower probabilities of transition to parenthood compared to homogamy, if we account for differential risks of union dissolution among hypogamous and homogamous couples.

6. Discussion

This study examined how educational pairings and union duration jointly shape the transition to parenthood, using large administrative data from Austria and longitudinal analyses. Our theoretical framework proposed hypotheses of how the transition to parenthood in hypogamous couples operates as a process with a differential dynamic compared to homogamous couples. Both theoretical and empirical analyses considered two potential sources of selectivity of hypogamous unions. First, we considered observed mismatches between partners in characteristics other than education that may be associated with sorting into hypogamous unions and simultaneously affect transition to parenthood. Second, we considered selectivity arising from different risks of union dissolution, which may affect the composition of couples remaining together at longer union durations (Berrington, Perelli-Harris & Trevena 2015).

Our results show that the association between educational pairings and the transition to first birth varies over the duration of a partnership. Although some differences between hypogamous and homogamous couples are statistically significant, their magnitude is relatively modest. Overall, our findings suggest that educational hypogamy is associated primarily with differences in the timing of entry into parenthood rather than with a systematic fertility disadvantage.

Our analyses show that during the initial years of partnership, hypogamous unions have slightly higher rates of transition to parenthood than homogamous unions, after which the transitions rates first converge and later show the opposite pattern. We further investigated whether differences observed across union duration could be accounted for by observed heterogeneity between partners in characteristics associated with sorting into different educational pairings. Accounting for differences in age, current enrolment in educational, immigrant background, and place of residence did not substantially alter the pattern. Thus, while selection into hypogamous unions remains a plausible explanation for the small early advantage of hypogamous couples, our analyses do not directly identify the underlying selection mechanisms. One possible mechanism, suggested by previous research, is that highly educated women who prioritise family formation may trade off prolonged partner search against finding a partner with matching educational attainment (Corti, 2021; Corti & Scherer, 2021). We also examined whether the observed patterns of transition to parenthood among hypogamous and homogamous couples could be explained by differences in union stability. Although the multiprocess model indicates that unobserved factors associated with a higher risk of union dissolution are also associated with lower probability of transition to parenthood, accounting for this interdependence does not substantially alter the differences between hypogamous and homogamous couples. Moreover, hypogamous couples do not generally exhibit higher dissolution risks than homogamous couples. Thus, selective union dissolution does not appear to explain the observed modest differences in first-birth probabilities across union duration.

Overall, our results call for adding more nuance to the pessimistic hypogamy narrative, which suggests that hypogamous unions are less harmonious than homogamous ones, substantially lowering the

chances for becoming a parent. Contradicting the pessimistic hypogamy narrative, we find no general fertility disadvantage among hypogamous couples. If anything, hypogamous couples display a small temporary advantage at early union durations, while at longer durations the pattern reverses. Importantly, these differences remain modest and are not substantially altered by accounting for observed differences between partners or selectivity related to union dissolution. This gap becomes apparent at longer durations, with predicted first-birth probabilities for hypogamous couples lower than for homogamous couples between years 6 and 9.

Our analysis points to several directions for future research. First, studies of educational hypogamy and fertility should allow the association of educational pairing and fertility transitions to vary over union duration rather than assuming proportional hazards. Second, our data do not allow us to directly observe individual preferences and attitudes that may contribute to selection into different educational pairings, such as family orientation, fertility intentions, or partner preferences. Future research combining longitudinal register data with information on these characteristics would be particularly valuable for identifying the mechanisms underlying fertility dynamics. Third, our findings are also relevant for discussions about the role of cross-country differences in the determinants and consequences of hypogamy. In societies where social norms place women under pressure to form families early—even when suitable partners are scarce—hypogamous unions may be linked to distinct fertility patterns. Due to a stronger selectivity in such societal contexts, hypogamous unions may be more likely to exhibit a pronounced increase in first birth risks during the initial years of partnership, followed by a sharper decline as the union progresses. This pattern may contrast with tendencies in less egalitarian contexts, where the socially determined timetables are more relaxed.

While this study investigates transitions to parenthood among hypogamous couples offering fresh theoretical perspectives and state-of-art empirical approaches, it has some limitations. Some of the restrictions are related to the data available for this study. Due to the relatively short observational window, we do not observe the partner-search process preceding union formation. Consequently, we cannot directly assess whether highly educated women entered hypogamous unions after prolonged partner search. Likewise, because of the short follow-up, our study is focused on transitions to first birth and does not consider further parities. Moreover, due to data restrictions, we had to focus on heterosexual couples. Given the growing diversity of European families, it would be of merit to investigate how hypogamy shapes fertility in same-sex unions.

Methodological limitations of our study pertain to the difficulty of identifying the exact reasons for selectivity among hypogamous unions. While our methods shed some light on the possible reasons why hypogamous unions exhibit different patterns of transition to parenthood compared to homogamous couples, the interpretation is partly speculative. Ideally, we would like to be able to measure longitudinally individual preferences regarding the timing of family formation and regarding partner characteristics as well as changes in couples' relationship quality across union duration. Unfortunately, all these factors cannot be observed in register data, which is why our study attempted to address the challenge of controlling them indirectly, with the use of simultaneous hazard models. We also note that

our choice regarding semi-parametric specification of the hazard model involves some trade-offs. On the one hand, including dummy variables per each year of union duration is less efficient compared to controlling for broader time intervals or a fully parametric specification. On the other hand, the nonlinear patterns observed in our data would be difficult to capture with any grouping or with parametric functions. Therefore, we prioritized more detailed estimates over efficiency of estimation. We also acknowledge that while our hazard models control for educational levels and their combinations, other methods such as diagonal reference models (Billingsley et al., 2018) or their recent extensions (Fosse & Pfeffer, 2025) could be used to better disentangle the effects of hypogamy from the effects of educational attainment.

Overall, this study contributes to the literature on educational pairings and fertility by showing that the relationship between educational hypogamy and the transition to parenthood is time-dependent rather than reflecting a general fertility disadvantage. Differences between hypogamous and homogamous couples are modest, vary across union duration, and remain largely unchanged after accounting for observed partner characteristics and selectivity related to union dissolution. Our results advance the understanding of the relationship between hypogamy and transition to parenthood. Previous research on this topic has shown mixed results, with some studies pointing to a disadvantage of hypogamy in terms of chances of becoming a parent (Nitsche, 2024; Nitsche et al., 2018; Osiewalska, 2017) and others finding no or minor differences (Bueno & García-Román, 2021; Leesch & Hiekel, 2026). Our study shows that addressing the question on hypogamy (dis)advantage benefits from taking the dynamics of childbearing processes into account. Our results show that while the probability of making transition to parenthood may be similar “on average” among hypogamous and homogamous couples, differences emerge if we consider differential fertility dynamics.

Declarations

Author Contribution

All authors jointly developed research questions for the study, ABR developed the methodology, ES and ABR performed the empirical analysis. All authors contributed to the interpretation the results and drafted the manuscript. NS supervised the project and secured funding. All authors read and approved the final manuscript.

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References

1. Agarwal, B. (1997). 'Bargaining"and gender relations: Within and beyond the household. *Feminist economics*, *3*(1), 1–51.
2. Bagavos, C. (2017). Do different educational pairings lead to different fertility outcomes? A cohort perspective for the Greek case. *Vienna Yearbook of Population Research*, *15*, 215–237.
3. Balbo, N., & Barban, N. (2014). Does fertility behavior spread among friends? *American sociological review*, *79*(3), 412–431.
4. Becker, G. S. (1973). A theory of marriage: Part I. *Journal of Political economy*, *81*(4), 813–846.
5. Berrington, A., Perelli-Harris, B., & Trevena, P. (2015). Commitment and the changing sequence of cohabitation, childbearing, and marriage: Insights from qualitative research in the UK. *Demographic Research*, *33*, 327–362.
6. Bertrand, M., Kamenica, E., & Pan, J. (2015). Gender identity and relative income within households. *The Quarterly Journal of Economics*, *130*(2), 571–614.
7. Billingsley, S., Drefahl, S., & Ghilagaber, G. (2018). An application of diagonal reference models and time-varying covariates in social mobility research on mortality and fertility. *Social Science Research*, *75*, 73–82.
8. Bittman, M., England, P., Sayer, L., Folbre, N., & Matheson, G. (2003). When does gender trump money? Bargaining and time in household work. *American Journal of sociology*, *109*(1), 186–214.
9. Bueno, X., & García-Román, J. (2021). Rethinking couples' fertility in Spain: Do partners' relative education, employment, and job stability matter? *European Sociological Review*, *37*(4), 571–587.
10. Corti, G. (2021). Educational assortative mating and the rise of hypogamy: causes and consequences.
11. Corti, G., & Scherer, S. (2021). Mating market and dynamics of union formation. *European Journal of Population*, *37*(4), 851–876.
12. De Hauw, Y., Grow, A., & Van Bavel, J. (2017). The reversed gender gap in education and assortative mating in Europe. *European Journal of Population*, *33*(4), 445–474.
13. Eeckhaut, M. C., Van de Putte, B., Gerris, J. R., & Vermulst, A. A. (2013). Analysing the effect of educational differences between partners: A methodological/theoretical comparison. *European Sociological Review*, *29*(1), 60–73.
14. Esteve, A., Schwartz, C. R., Van Bavel, J., Permanyer, I., Klesment, M., & Garcia, J. (2016). The end of hypergamy: Global trends and implications. *Population and development review*, *42*(4), 615.
15. Fosse, E., & Pfeffer, F. T. (2025). Beyond the diagonal reference model: Critiques and new directions in the analysis of mobility effects. *Sociological Methods & Research*, *54*(4), 1339–1395.
16. Fuchs, R., Göllner, T., Hartmann, S., & Thomas, T. (2024). Fostering excellent research by the Austrian micro data center (AMDC). *Jahrbücher für Nationalökonomie und Statistik*, *244*(4), 433–445.
17. Gonalons-Pons, P., & Gangl, M. (2021). Marriage and masculinity: Male-breadwinner culture, unemployment, and separation risk in 29 countries. *American Sociological Review*, *86*(3), 465–502.

18. Gupta, S. (2007). Autonomy, dependence, or display? The relationship between married women's earnings and housework. *Journal of Marriage and family*, *69*(2), 399–417.
19. Hatch, L. R., & Bulcroft, K. (2004). Does long-term marriage bring less frequent disagreements? Five explanatory frameworks. *Journal of Family Issues*, *25*(4), 465–495.
20. Hendershott, P. H., Ong, R., Wood, G. A., & Flatau, P. (2009). Marital history and home ownership: Evidence from Australia. *Journal of Housing Economics*, *18*(1), 13–24.
21. Hirschl, N., Schwartz, C. R., & Boschetti, E. (2023). Eight Decades of Educational Assortative Mating. *CDE working paper no. 2202–01*.
22. Impicciatore, R., & Billari, F. C. (2012). Secularization, union formation practices, and marital stability: Evidence from Italy. *European Journal of Population/Revue européenne de Démographie*, *28*(2), 119–138.
23. Karney, B. R., & Bradbury, T. N. (2020). Research on marital satisfaction and stability in the 2010s: Challenging conventional wisdom. *Journal of Marriage and family*, *82*(1), 100–116.
24. Kuang, B., Berrington, A., Vasireddy, S., & Kulu, H. (2025). The changing inter-relationship between partnership dynamics and fertility trends in Europe and the United States. *Demographic Research*, *52*, 179–228.
25. Leesch, J., & Hiekel, N. (2026). No Partner, No Children? Union Formation, Assortative Mating, and Educational Inequalities in Fertility in Germany. *European Journal of Population*, *42*(1), 8.
26. Lillard, L. A., & Waite, L. J. (1993). A joint model of marital childbearing and marital disruption. *Demography*, *30*(4), 653–681.
27. Nitsche, N. (2024). Relative resources in couples and their childbearing behavior in the united States. *Comparative Population Studies*, *49*.
28. Nitsche, N., Matysiak, A., Van Bavel, J., & Vignoli, D. (2018). Partners' educational pairings and fertility across Europe. *Demography*, *55*(4), 1195–1232.
29. Nitsche, N., Trimarchi, A., & Jalovaara, M. (2020). *Couples' educational pairings, selection into parenthood, and second birth progressions*. M. P. I. f. D. Research.
30. Osiewalska, B. (2017). Childlessness and fertility by couples' educational (in) equality in Austria, Bulgaria, and France. *Demographic Research*, *37*, 325–362.
31. Potarca, G., & Rossier, C. (2022). Are women in hypogamous unions more depressed? A cross-national comparison among the highly educated. *European Sociological Review*, *38*(1), 103–123.
32. Rahnu, L., & Jalovaara, M. (2023). Partnership dynamics and entry into parenthood: Comparison of Finnish birth cohorts 1969–2000. *Advances in Life Course Research*, *56*, 100548.
33. Schwartz, C. R., & Han, H. (2014). The reversal of the gender gap in education and trends in marital dissolution. *American sociological review*, *79*(4), 605–629.
34. Steiber, N., & Siegert, C. (2026). Educational hypogamy and gender equality within couples: a review of competing hypotheses and evidence from the Generations and Gender Survey. *European Sociological Review*, jcaf059.

35. Sullivan, O., & Gershuny, J. (2016). Change in spousal human capital and housework: A longitudinal analysis. *European Sociological Review*, *32*(6), 864–880.
36. Tichenor, V. J. (2005). *Earning more and getting less: Why successful wives can't buy equality*. Rutgers University Press.
37. Trimarchi, A., Steiber, N., Winter-Ebmer, R., & Berghammer, C. (forthcoming) (Eds.). Educational pairings, partners' economic resources, and second births in Austria. *Demographic Research*.
38. Trimarchi, A., & Van Bavel, J. (2020). Partners' Educational Characteristics and Fertility: Disentangling the Effects of Earning Potential and Unemployment Risk on Second Births: A. Trimarchi, J. Bavel. *European Journal of Population*, *36*(3), 439–464.
39. Trinh, N. A., Lersch, P. M., & Schunck, R. (2023). *Dynamics of Wealth Homogamy in Couples*.
40. Van Bavel, J. (2012). The reversal of gender inequality in education, union formation and fertility in Europe. *Vienna Yearbook of Population Research*, 127–154.
41. West, C., & Zimmerman, D. H. (1987). Doing gender. *Gender & society*, *1*(2), 125–151.

Figures

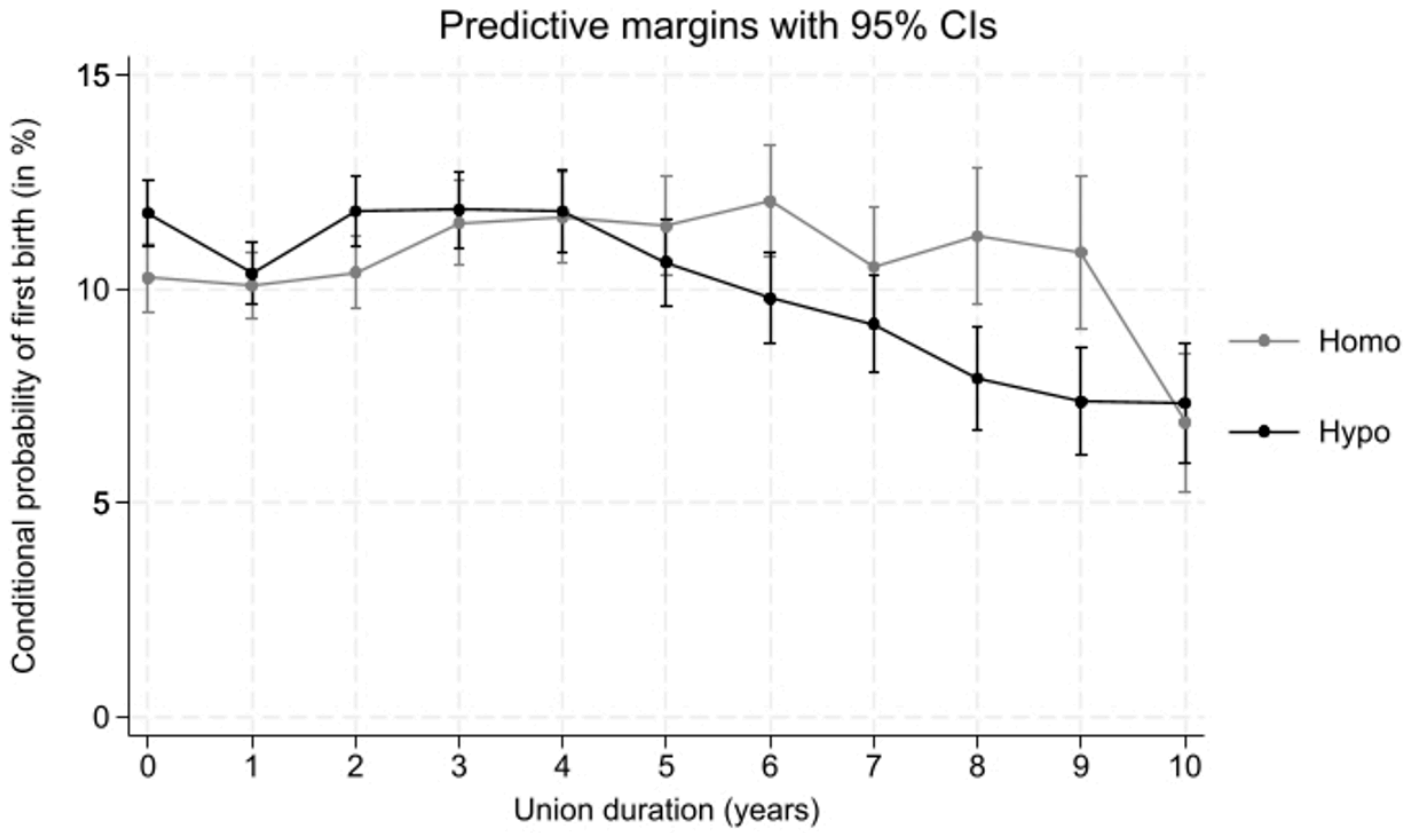


Figure 1

Predicted probability of first birth: Hypogamous vs. Homogamous couples, by union duration (Model 1).

Source: Austrian register data.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Annex.docx