Do Daughters gain from Hypogamy and Sons from Hypergamy? Parental Heterogamy and Children's Educational Outcomes

Abstract: Prior studies have abundantly documented the positive effect of parents' absolute educational attainment on their children's educational outcomes, but research on the impact of the relative dimension of parents' education remains limited. In this study, we investigate whether women have an educational advantage when raised in hypogamous rather than hypergamous families, whether men experience a similar advantage when raised in hypergamous rather than hypogamous families, and whether these advantages vary with the prevalence of hypogamous families relative to hypergamous ones. To examine these questions, we use data from four waves of the European Union Statistics and Living Conditions (EU-SILC) survey, yielding a sample of 50,746 individuals residing in 30 European countries and born between 1956 and 1995. Our results show that women benefit substantially from being raised in hypogamous families, a positive effect that has not decreased as hypogamy became more prevalent relative to hypergamy. Men experience a similar advantage when raised in hypergamous families, but this effect has waned with the decline of hypergamy relative to hypogamy. Beyond contributing to research on the influence of parental educational mating pattern on children's academic outcomes, our findings have relevant implications for the evolution of the gender gap in educational attainment.

Keywords: Educational assortative mating, parental relative education, educational attainment, gender gap.

1 Introduction

Trends in educational assortative mating in Europe over past decades reflect profound changes in the prevalence and composition of heterogamous partnerships (Esteve et al., 2016), particularly among highly educated individuals. The gendered expansion of tertiary education in most countries has imposed structural barriers to homogamous partnering for the highly educated (Leesch & Skopek, 2025; Permanyer et al., 2019; Uunk, 2024), often leading tertiary-educated women into hypogamous unions or singlehood. As a result, heterogamous families have not only become more common but have also undergone a marked transformation, with hypogamy increasingly prevailing at the cost of hypergamy (Esteve et al., 2016; Leesch et al., 2024).

These changes invite a closer look at their consequences for the next generation. Specifically, we wonder how daughters and sons fare when raised in heterogamous families, whether outcomes such as their educational attainment depend on the type of parental heterogamy (hypogamy or hypergamy), and how those differences in attainment evolved alongside the shift toward greater hypogamy and declining hypergamy. Drawing on the gender socialization hypothesis (Downey & Powell, 1993; Powell & Downey, 1997), research on the gendered allocation of family resources (Bonesrønning, 2010; Kaul, 2018; Wong, 2013), and evidence on the distinct gender attitudes of individuals entering hypogamous and hypergamous unions (Torche et al., 2025; Trimarchi, 2022), we anticipate that women will perform better in hypogamous families than in hypergamous ones, while men raised in hypergamous families will outperform their counterparts from hypogamous ones. However, as these advantages may be shaped by the specific characteristics of hypogamous and hypergamous families, we further hypothesize that the country-level prevalence of hypogamy and hypergamy moderate those effects, because the characteristics of a group are likely to change when it notably grows or shrinks (Valdés et al., 2025).

By addressing these questions, we contribute to a relatively small body of research examining the consequences of the parental educational mating pattern for children's educational outcomes. Most existing studies have compared children raised in homogamous and heterogamous families, consistently documenting better performance among the former (Blossfeld et al., 2024; Byun & Bai, 2020; Jacob, 2023). Yet such findings likely capture an absolute resource advantage rather than the specific impact of parental pairing, because within a given level of maximum education across partners, homogamous families pool resources from two better educated individuals, while heterogamous families include only one.

Unlike these previous studies, we focus specifically on heterogamous arrangements and compare the probability of tertiary attainment of children born to families with at least one tertiary-educated parent, thereby minimizing differences in absolute resources and focusing solely on which parent is more educated. A similar strategy was followed by Ortiz-Gervasi (2021), who observed that the advantage of girls over boys in terms of educational expectations and attainment was greater in tertiary-educated hypogamous

families than in tertiary-educated hypergamous and homogamous ones. In this work, rather than examining the gender gap across different family arrangements, we focus on the other side of the interaction: the effect of the type of heterogamous union on men's and women's tertiary attainment. Crucially, we extend previous research by considering a three-way interaction that incorporates the country-by-cohort prevalence of hypogamy and hypergamy, allowing us to test whether any advantage of girls in hypogamous families or boys in hypergamous ones depend on the share of hypogamous and hypergamous families at the population level.

To do so, we use data from four waves of the EU-SILC study that included the rotating module on the intergenerational transmission of poverty (2005, 2011, 2019, and 2023). These waves provide information on both parents' and respondents' educational attainment. Our analytical sample covers 28 European countries over a 40-year period (1956-1995) and includes 50,746 individuals aged 28-49 who grew up in heterogamous families with at least one tertiary-educated parent. Although homogamous families constitute the majority across Europe according to our data (71.2% of the total merged sample), nearly 60% of families with at least one highly educated parent are heterogamous (24.7% hypogamous and 34.4% hypergamous). Moreover, the percentage of individuals with at least one tertiary-educated parent has risen from 35.4% in the 1956-1965 cohort to 53.5% among the 1986-1996 cohort. Therefore, our analysis concerns a substantial and growing share of all families in contemporary Europe and addresses a sociologically relevant phenomenon.

The analysis proceeds in two steps. First, we estimate a linear probability model for tertiary education attainment, incorporating interactions between parental heterogamy type and the child's gender to assess whether parental hypogamy benefits girls, whether parental hypergamy benefits boys, and which effect is larger. Our main analysis is conducted on the merged sample but reproduced at the country level. Second, we exploit the long period covered by our data to examine whether the within-country variation in the proportion of hypogamous families relative to hypergamous families moderates those effects. For this purpose, we fit a cross-classification multilevel model with individuals nested in countries and birth cohorts.

The remainder of this paper is organized as follows. The next section describes trends in educational assortative mating, summarizes prior research on how the parental educational mating pattern shapes children's academic outcomes, and sets out the hypotheses of the study. We then present the data and methodological strategy, followed by the empirical results. The final section discusses the main findings and concludes.

2 Theoretical framework

2.1 Trends in educational assortative mating

In traditional societies, men attained higher levels of education than women in anticipation of the role that the former would play in the labor market. However, the

change in gender roles brought about a reversal in the gender gap in education. Although it did not occur simultaneously everywhere, women now outperform men in the educational system in nearly all developed countries (De Hauw et al., 2017; DiPrete & Buchmann, 2013).

One crucial consequence of that secular trend was the alteration of marital sorting patterns (De Hauw et al., 2017; Esteve et al., 2016; Schwartz, 2013). In the past, both men and women tended to attain low levels of education, which made low-educated homogamy the most likely partnering outcome. In the case of heterogamy, hypergamy was far more common than hypogamy because it was usually men who pursue higher levels of education.

However, educational expansion radically changed the educational landscape of societies and the structural constraints for mating (Leesch & Skopek, 2025; Permanyer et al., 2019; Uunk, 2024). Increasing levels of higher educational attainment brought a strong rise of highly educated homogamy at the cost of low-educated homogamy (Bratsberg et al., 2023; Uunk, 2024). Furthermore, as the process of expansion tended to be longer and more accentuated among women, hypogamous partnering notably grew at the expense of hypergamous arrangements (Esteve et al., 2016; Leesch et al., 2024).

2.2 Educational assortative mating and children's educational attainment

These (in some cases dramatic) shifts in mating patterns have drawn significant attention to the impact of educational assortative mating on the intergenerational transmission of educational advantage. By pooling resources relevant to academic achievement, educational homogamy enhances children's educational attainment compared to heterogamous arrangements (Schwartz, 2013). Several studies provide strong evidence that assortative mating increases the probability that highly educated individuals produce highly educated children (Corti & Scherer, 2022; Wittemann & Yastrebov, 2024), while comparative works show that countries where homogamous partnering is more frequent exhibit stronger educational reproduction (Katrňák et al., 2012).

At the individual level, Blossfeld et al. (2024) in a comparative study across Europe, Jacob (2023) for the US, and Byun and Bai (2020) for South Korea, all show that parental homogamy exerts a positive effect on academic achievement and educational attainment, with a larger impact among highly educated parents. Nonetheless, it is difficult to disentangle how much of the advantage of homogamous families over heterogamous ones merely results from their higher socioeconomic standing of the latter, instead of the matting pattern itself.

Research on the heterogeneity of the effect of parental mating pattern on children's educational outcomes based on their gender is even more uncommon and their conclusions are mixed. The most comprehensive study on the matter was conducted by

Ortiz-Gervasi (2021), who documented that the academic advantage of girls over boys peaked in hypogamous families, both in terms of educational expectations at age 15 and final attainment. Consistently with these findings, different studies show that girls benefit more than boys from a having a highly educated mother in terms of educational attainment, while boys benefit more than girls from having a highly educated father (Brenøe & Lundberg, 2018; Salomone Marino & Berrittella, 2024). For the US, Jacob (2023) reported a positive effect of homogamy and hypogamy on the probability of enrolling in college, but homogamy significantly increased enrolment among females, while hypogamy promoted enrolment among males.

To our knowledge, however, no work has investigated whether women enjoy an educational advantage if raised in a hypogamous rather a hypergamous family, whether boys enjoy a parallel advantage in hypergamous families, nor whether these advantages vary with the prevalence of hypogamy relative to hypergamy at society level.

2.3 Hypotheses

In this study, we expect that the type of parental heterogamy influences differently the educational attainment of boys and girls. This expectation is grounded in several complementary arguments.

The first one draws on the *gender socialization hypothesis*, which posits that children tend to be more strongly shaped by the same-sex parent (Downey & Powell, 1993; Powell & Downey, 1997): mothers are presumed to exert greater influence on daughters, while fathers more strongly shape the outcomes of sons. This asymmetry is thought to result from children's stronger identification with the same-sex parent, which increases the likelihood of emulating that parent's behaviors, values, and aspirations (Farré & Vella, 2013; Magnusson & Nermo, 2018; Polavieja & Platt, 2014). As an example from the educational domain, parents' fields of study impact their children's choice of field, but daughters are more influenced by their mother's field and sons by their father's (Altmejd, 2024). Accordingly, girls in hypogamous families should outperform girls from hypergamous families, as the same-sex (and, thus, more influential) parent (i.e., the mother) is, on average, better educated in the former; and the same logic applies to boys in hypergamous families compared to those in hypogamous families. In short, while both boys and girls benefit from having a highly educated parent, the advantage would be amplified when it is the same-sex parent, which occurs in hypogamous families for daughters and hypergamous families for sons.

The second argument concerns the allocation of family resources, including economic, cultural, or emotional forms, as well as time. Prior research indicates that parents may allocate resources differently depending on their children's gender (Bonesrønning, 2010; Kaul, 2018; Wong, 2013), with evidence suggesting that fathers may tend to favor sons, while mothers would be more likely to favor daughters (Raley & Blanchi, 2006). This pattern may be particularly pronounced in heterogamous families, where the more educated partner wields greater bargaining power over household decisions,

including resource distribution (Lundberg & Pollak, 1996). In hypergamous families, where the father is more educated, resources may be preferentially directed toward sons. Conversely, in hypogamous families, where the mother holds more education, daughters may receive a greater share of investment. As a result, girls in hypogamous families and boys in hypergamous ones may benefit academically from gendered patterns of intra-household resource allocation.

Finally, parental educational expectations for their children may differ across hypogamous and hypergamous unions. Parents adhering to more traditional gender beliefs may expect their daughters to prioritize family responsibilities over careers, and thereby hold lower expectations of tertiary education attainment compared to parents adhering to more egalitarian beliefs. As men holding gender-egalitarian beliefs are more likely to enter hypogamous unions (Torche et al., 2025; Trimarchi, 2022), hypogamous parents may hold higher educational expectations for their daughters compared to hypergamous parents. Given the strong influence of parental expectations on children's own expectations and future attainment (Roth, 2017; Wu & Bai, 2015), this dynamic may lead women from hypogamous families to be more likely to attain tertiary education than their peers from hypergamous families.

Based on these considerations, we propose the following hypotheses:

> ***Hypothesis 1a.*** *Women raised in hypogamous families are more likely to attain higher education than women raised in hypergamous ones, net of differences in family resources*.
>
> ***Hypothesis 1b.*** *Men raised in hypergamous families are more likely to attain higher education than men raised in hypogamous ones, net of differences in family resources.*

It is difficult to predict theoretically which advantage will be greater, either that of girls in hypogamous families or boys in hypergamous families, so it remains an empirical question. One may reason, however, that differences in the educational attainment of children from hypogamous and hypergamous families mostly reflect the distinctive characteristics of these unions. For instance, fathers in hypogamous families are more likely to take parental leave after childbirth (Wood et al., 2023) and devote more time to childcare (Miller, 2020), while hypogamy is associated with a smaller child penalty on women's earnings (Steiber et al., 2024) and greater wealth accumulation (Cheng & Zhou, 2022). As these factors are positively associated with children's academic performance, they may enhance the educational attainment of those raised in hypogamous families, thereby reinforcing the hypogamy advantage hypothesized among daughters and diminishing the hypergamy advantage hypothesized among sons.

Then, shifts in educational assortative mating patterns at the population level may affect the hypothesized effects. When women's educational expansion was still limited and hypogamy was therefore relatively rare, such unions may have been negatively selected on traits relevant for children's educational attainment (e.g., health or genetic predisposition to education), as hypogamy represented a "second-best" option attracting

men with less desirable characteristics. However, as women increasingly attained higher levels of education (eventually surpassing men), negative selection into hypogamy likely weakened, and the educational advantage of daughters in these unions may have progressively increased.

Such compositional changes have already been identified as key to explaining the reduction in divorce rates among hypogamous couples, who increasingly resembled homogamous unions in their likelihood of dissolution as hypogamy became more common (Schwartz & Han, 2014). Given the negative consequences of divorce on children's attainment (Bernardi & Boertien, 2017; Härkönen et al., 2017), such process would, in itself, raise the performance of daughters and sons raised in hypogamous families, which strengthens the hypogamy advantage among the former and mitigates the hypergamy advantage among the latter.

At the same time, the reversal in the gender gap in education and the consequent decline of hypergamy may have also altered the characteristics of these unions, turning them into a "second-best" option that attracts women with again less desirable characteristics. As a result, hypergamous unions may have become more negatively selected, weakening the forces that previously fueled the educational advantage of their sons compared to hypogamous families.

Therefore, the educational outcomes of boys and girls raised in heterogamous families may have evolved as the ratio of hypogamous to hypergamous unions increased (i.e. hypogamy became more common and/or hypergamy less so). Specifically, the weakening negative selection of hypogamous unions and the increasing negative selection of hypergamous unions lead us to expect that:

> ***Hypothesis 2a.*** *The positive effect of parental hypogamy (vs hypergamy) on daughters strengthens as the prevalence of hypogamous families increases relative to hypergamous families.*
>
> ***Hypothesis 2b.*** *The positive effect of parental hypergamy (vs hypogamy) on sons weakens as the prevalence of hypogamous families increases relative to hypergamous families.*

3 Data & method

3.1 Data source

The data for this study come from four waves of the European Union Statistics and Living Conditions (EU-SILC) survey that included the rotating module on the intergenerational transmission of poverty (2005, 2011, 2019, and 2023). In these waves, respondents aged 25 or above reported the educational attainment of both parents, which allows us to identify heterogamous families and examine the effect of the they of heterogamy (hypogamy or hypergamy) on the respondent's likelihood of completing tertiary education.

We restrict the sample to individuals aged 28 to 49. As our hypothesis specifically refer to individuals from hypogamous or hypergamous families, we further limit the analysis to individuals with heterogamous parents. Finally, we focus on individuals with at least one tertiary-educated parent (Ortiz-Gervasi, 2021), as the likelihood of completing tertiary education is significantly lower when neither parent has done so (Bernardi et al., 2025), and prior research suggests that relative education effects are most pronounced at higher absolute levels of education (Blossfeld et al., 2024). By doing so, the socioeconomic standing of the analyzed families is homogenized. After applying these restrictions, the analytical sample comprises 50,746 individuals born between 1956 and 1995 and residing across 28 European countries (Table 1).

Table 1. Distribution of the sample by country and cohort

	1956-1965	1966-1975	1976-1985	1986-1995	Total
Austria	167	533	653	384	1,737
Belgium	265	657	776	427	2,125
Bulgaria	47	263	430	180	920
Switzerland	128	584	628	187	1,527
Cyprus	88	312	470	272	1,142
Czechia	138	440	530	238	1,346
Germany	1,514	1,962	1,020	188	4,684
Denmark	175	431	381	208	1,195
Estonia	276	641	815	398	2,130
Greece	40	315	621	376	1,352
Spain	510	1,304	1,822	964	4,600
Finland	249	601	789	474	2,113
France	249	841	1,176	668	2,934
Croatia	31	219	431	233	914
Hungary	195	574	564	215	1,548
Ireland	122	402	583	176	1,283
Italy	328	851	962	582	2,723
Lithuania	160	337	424	234	1,155
Luxembourg	151	521	550	252	1,474
Latvia	153	449	520	295	1,417
Malta	44	185	272	151	652
Netherlands	300	811	808	411	2,330
Norway	298	611	596	370	1,875
Poland	306	726	926	469	2,427
Portugal	55	234	368	276	933
Sweden	123	488	660	476	1,747
Slovenia	62	324	521	250	1,157
Slovakia	219	407	475	205	1,306
Total	6,393	16,023	18,771	9,559	50,746

Note: Own elaboration from EU-SILC. Only individuals aged 28 to 49 with a highly educated parent in a heterogamous relationship are considered.

3.2 Variables

The dependent variable of the study is a binary indicator capturing the attainment of tertiary education, while the main independent variables are the type of parental heterogamy, either hypogamy (the mother is more educated than the father) or hypergamy (the father is more educated than the mother), and the individual's sex (1-Men; 0-Women).

Importantly, educational differences within hypogamous and hypergamous families may not be symmetric. Tertiary-educated women who marry down may be more likely to partner with low-educated men, while tertiary-educated men who marry down may more often partner with women of intermediate education (or the other way around). If so, the combined absolute education may systematically differ across hypogamous and hypergamous families, potentially influencing children's educational outcomes. To account for this, all models include a control for the educational level of the less educated parent.

Nevertheless, due to the gender pay gap, hypogamous families may still have systematically fewer economic resources than hypergamous families, even after controlling for the education of the less educated parent. To further purge our estimate of any differences in resources between hypogamous and hypergamous families, we consider two additional controls: (1) a subjective assessment of the household's financial situation when the respondent was 14 years old (1-Very bad; 2-Bad; 3-Moderately bad; 4-Moderately good; 5-Good; 6-Very good); and (2) an indicator of the tenancy status of the dwelling where the respondent's family lived at that age (1-Owned; 2-Rented; 3-Accomodation was provided for free). These controls are, however, excluded from the main analysis because tenancy status was not collected in 2005, and both questions were not systematically asked in all countries, which reduces the analytical sample from 50,746 to 40,303 cases. To preserve sample size, we first present results without these controls and then assess whether the findings are robust to their inclusion.

Furthermore, the profound changes in marital sorting experienced in Europe over the four decades covered by our data (De Hauw et al., 2017; Esteve et al., 2016; Uunk, 2024) allow us to assess whether within-country changes in the prevalence of hypogamy relative to hypergamy moderate the academic advantage of being raised in a heterogamous couple where the same-sex parent attained tertiary education. To this end, we divide the sample into four ten-year birth cohorts and calculate, for each cohort-country combination, the ratio between the share of hypogamous and hypergamous parents.

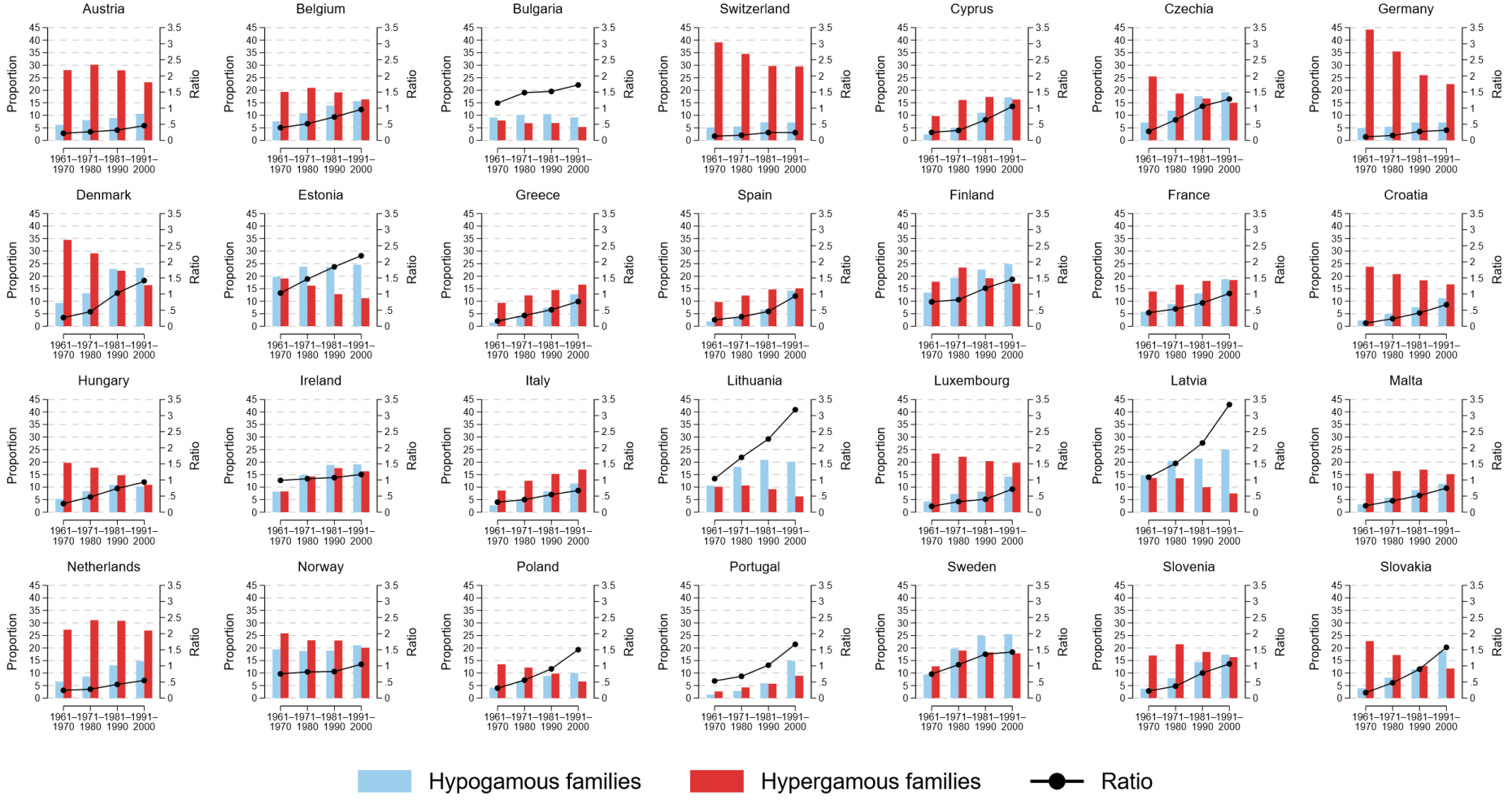
As shown in Figure 1, the prevalence of parental hypogamy relative to parental hypergamy has increased across all countries, although both the pace and eventual level of this shift vary substantially. In the Baltic countries (Lithuania, Latvia, or Estonia), hypogamy has risen markedly while hypergamy has declined sharply, causing the ratio to rise above 3 in the most recent cohort. In contrast, in German-speaking countries

(Germany, Austria, or Switzerland), even though hypogamy has increased and hypergamy has declined, hypergamous arrangements remain dominant in the last cohort, keeping the ratio below 0.5.

We intend to exploit the variation across countries in the pace of change of the hypogamy/hypergamy ratio to examine whether within-country increases in the prevalence of hypogamy relative to hypergamy modify the advantages experienced by women raised in hypogamous families and men raised in hypergamous ones. Because the ratio varies across both space and time, we isolate its longitudinal component by demeaning it, that is, by subtracting each country's average ratio over the observed period.[1] This yields a measure that is centered at zero for each country's average ratio, reflecting how much the hypogamy/hypergamy ratio deviates in each cohort from that country-specific baseline (see Fairbrother (2014) for more details). As a robustness check, we also examine the percentage of hypogamous families as a moderator instead of the ratio, as well as the percentage of hypergamous families.

[1] Valdés et al. (2025) use this same strategy to examine whether the level of expansion of university education among parents moderated the impact of parental education on children's academic achievement.

Figure 1. Evolution of the share of hypogamous and hypergamous families and the hypogamy/hypergamy ratio, by country



Note: Own elaboration from EU-SILC.

3.3 Method

To test Hypotheses 1a and 1b, we estimate a linear probability model predicting the likelihood of attaining tertiary education. The key independent variables are the type of parental heterogamy (Hypo, 1-hypogamy; 0-hypergamy), the individual's gender (G), and their interaction:

$$Y_{ijk} = \beta_0 + \beta_1 Hypo_i + \beta_2 G_i + \beta_3 Hypo_i \times G_i + \theta X_i + \gamma_j + \mu_k + \varepsilon_{ijk} \quad (1)$$

Where *i*, *j*, and *k* index individuals, cohorts, and regions, respectively. The terms γ_j and μ_k capture cohort and country-fixed effects. X_i is a vector of control variables that, in the main analysis, includes age and the educational level of the less educated parent, but additionally incorporates tenancy status and financial situation at age 14 in robustness checks. Finally, ε_{ijk} is the idiosyncratic error term.

From this model, we derive predicted probabilities of tertiary attainment for men and women raised in hypergamous and hypogamous families. Our primary focus is the marginal effect of being raised in a hypogamous rather than a hypergamous family, which is expected to be positive for women (Hypothesis 1a) and negative for men (Hypothesis 1b). Comparing the absolute value of these marginal effects allows us to determine which advantage is larger, whether that of women in hypogamous families or that of men in hypergamous families.

To test Hypotheses 2a and 2b, we adopt a multilevel modeling strategy and fit a cross-classified linear probability model, nesting individuals within both birth cohorts and countries. Cross-classification models are suitable when individuals belong simultaneously to multiple groupings that do not follow a strict hierarchical structure (Hox et al., 2018), such as cohorts and geographic units.

This model includes a three-way interaction between the individual's gender, type of parental heterogamy, and the longitudinal component of the ratio between the share of hypogamous and hypergamous families (R^L). Since this is a cross-level interaction, we allow random slopes on the lower-level predictors (Heisig & Schaeffer, 2019): gender and parental mating pattern. Additionally, because the pace and timing of changes in the hypogamy/hypergamy ratio varies substantially across countries, we can include cohort-fixed effects,[2] which absorb broader time trends in educational attainment. This approach ensures that our results capture the specific effect of an increased prevalence of hypogamy relative to hypergamy, rather than merely reflecting general modernization over time. The equation of our cross-classification model is:

$$Y_{ijk} = \beta_0 + \beta_1 Hypo_i + \beta_2 G_i + \beta_3 R^L_{jk} + \beta_4 (Hypo¿¿i \times G_i) + \beta_5 (Hypo¿¿i \times R^L_{jk}) + \beta_6 (G¿¿ \quad (2)$$

[2] The same value of the ratio is observed at different times in different countries, and the pace of change across cohorts also varies across countries. If the process were identical in timing and pace across all countries, cohort-fixed effects and the ratio would be perfectly collinear, making it impossible to include cohort-fixed effects in the model.

Where υ_{1k} and υ_{2k} represent the random slopes of parental relative education and gender at the region level, respectively, υ_{3j} and υ_{4j} stand for those random slopes at the cohort level, X is the same vector of controls as in eq. (1), and ε is the idiosyncratic error term. Overall, this model allows us to test whether the hypothesized advantage of individuals raised in heterogamous families where the same-sex parent is more educated is moderated by changes over time in the prevalence of hypogamy relative to hypergamy within countries.

4 Results

4.1 The effect of parental hypogamy and hypergamy by sex

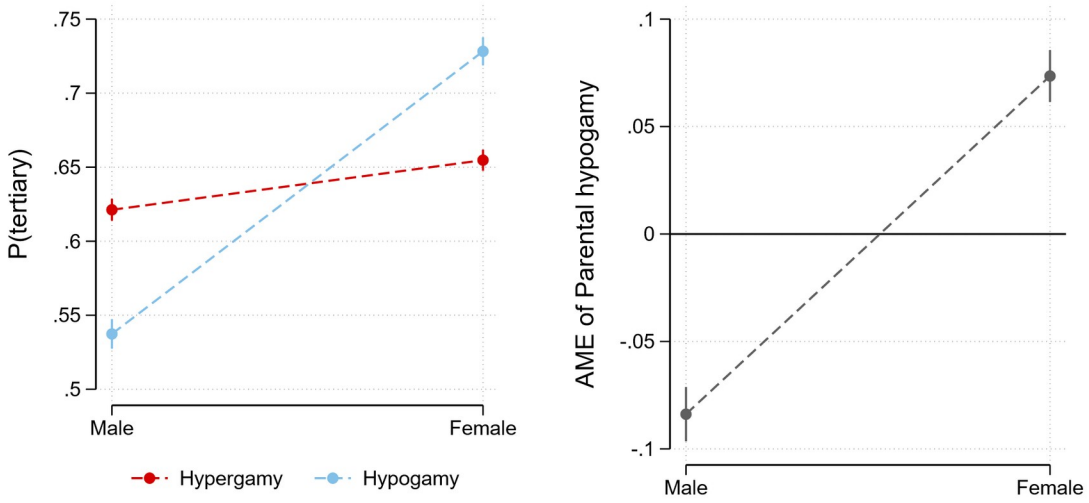
Results on the impact of parents' relative education on the educational attainment of men and women are reported in Figure 2. Panel A displays predicted probabilities (PP) of tertiary attainment for women and men from heterogamous tertiary-educated families based on which parent held the educational advantage, while panel B presents the average marginal effect (AME) of coming from hypogamous instead of hypergamous families for women and men. Note that just inverting the sign provides the AME of being raised in hypergamous instead of hypogamous families.

Women raised in hypogamous families (PP = 0.73) clearly outperform their counterparts from hypergamous families (PP = 0.65). Among men, in turn, it is those from hypergamous families (PP = 0.62) who exhibit a higher probability of tertiary attainment compared to their peers from hypogamous families (PP = 0.54). So, consistently with Hypothesis 1a and 1b, women and men from heterogamous families perform academically better if it is the same-sex parent the one holding the educational advantage. Even so, women from hypergamous families—disadvantaged because their same-sex parent did not hold the educational advantage—still outperform men from hypergamous families—who benefitted from their same-sex parent holding the educational advantage.

In numbers, women are 7.4 percentage points (pp) more likely to attain tertiary education if they come from a hypogamous family instead of a hypergamous one, a highly statistically significant effect (p-value ≤ 0.001). At the same time, men are 8.4 pp more likely to attain tertiary education if their parents partnered hypergamously rather than hypogamously, again a highly statistically significant difference (p-value ≤ 0.001). The positive effect of hypogamy among women is slightly smaller than the positive effect of hypergamy among men (-1.0), but the difference is not statistically significant (p-value = 0.262).

Figure 2. Effect of parental hypogamy on the probability of tertiary attainment, by gender

(A) Predicted probabilities **(B) Average Marginal Effect**



Note: Own elaboration from EU-SILC. Sample: individuals aged 28 to 49 with a tertiary educated parent in a heterogamous relationship. Models include country and cohort-fixed effects, and control for age and the educational attainment of the less educated parent.

Importantly, when we include controls for tenancy status and financial situation, which excludes from the analytical sample the entire 2005 wave as well as a few countries from other waves, the results remain virtually unchanged (see Figure A1 in the Appendix). After including these controls, the positive effect of hypogamy among women is 7.3 pp (p-value ≤ 0.001), while the positive effect of hypergamy among men slightly declines to 7.4 pp (p-value ≤ 0.001). Overall, even after accounting for differences in household economic resources, hypogamy continues to positively impact the educational attainment of women, while hypergamy does so for men.

4.2 Evidence at the country level

Figure 3 presents the average marginal effect of parental hypogamy for men and women on tertiary attainment in each country (see Table A1 in the Appendix for detailed results). As samples at the country level are relatively small, these estimates are subject to a high degree of statistical uncertainty. Consequently, we do not pursue a thorough analysis of the cross-country variation in the effect of interest. Nonetheless, we can see that the main findings from pooled EU-SILC data are reflected at the country level. In 25 of the 28 countries, we observe a positive effect of parental hypogamy on women's tertiary attainment, exceeding 3 pp in 20 of them. Although this effect is statistically significant at the 95% level in only 10 countries, it is never significant in the few countries where the estimated effect is negative.

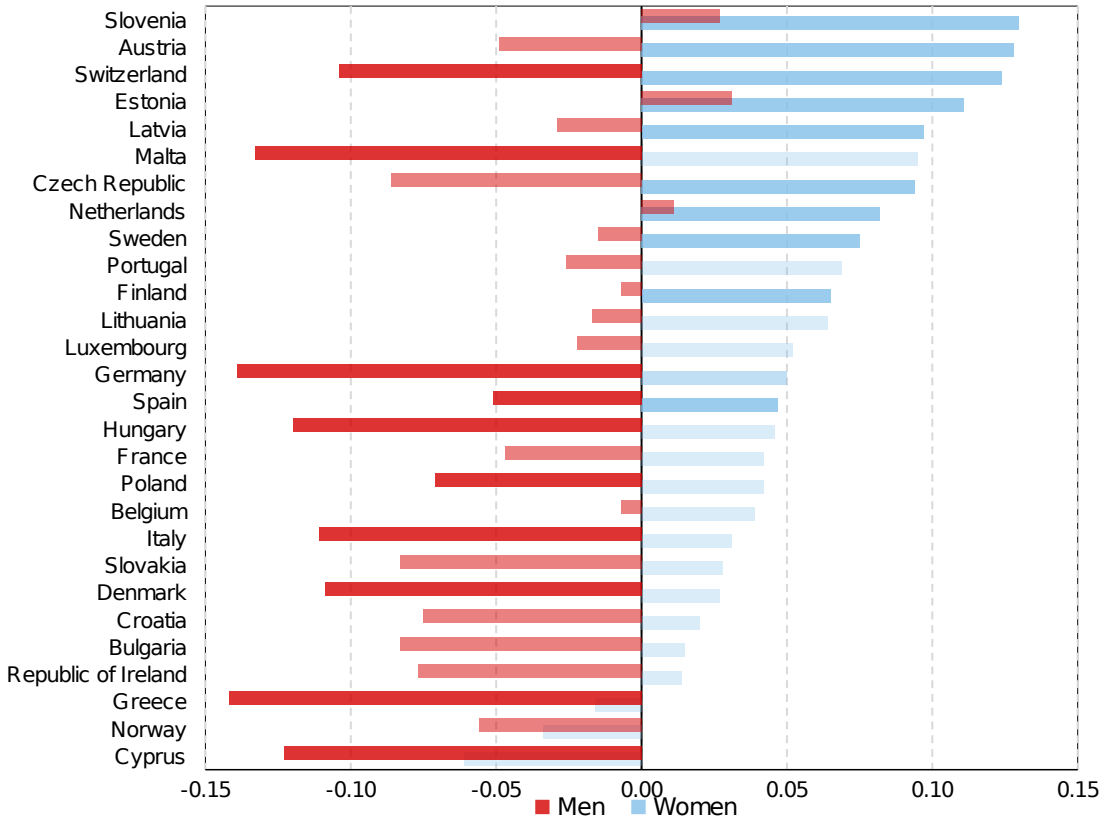
Among men, the effect of parental hypogamy is negative (or, equivalently, the effect of parental hypergamy is positive) in 25 of 28 countries, and greater than 3 pp in 18 of them. It reaches statistical significance in 10 countries and never in the three countries where men from hypogamous families outperform men from hypergamous ones.

When comparing the relative magnitude of both advantages, the results vary considerably across countries. In 13 countries, the hypergamous advantage among men exceeds the hypogamous advantage among women by at least 2 pp. Conversely, women's hypogamous advantage is at least 2 pp higher than the hypergamous advantage in 10 countries. In the remaining five countries, the absolute difference between the two advantages is below 2 points. Overall, these patterns provide no conclusive evidence on which advantage is larger, suggesting that the relative size of the advantages is highly country specific.

Furthermore, our results suggest that in countries where women's advantage in hypogamous families is stronger, men's advantage in hypergamous families is weaker, and *vice versa* (cross-country correlation of -0.45). Ancillary analyses indicate that this pattern arises from positive associations between the educational outcomes of men and women raised in hypergamous families, on the one hand, and of men and women raised in hypogamous families, on the other. In countries where men do well in hypergamous families—thereby increasing the hypergamy advantage among men—women raised in hypergamous families also tend to perform well—thereby reducing women's hypogamy advantage. Similarly, in countries where women do well in hypogamous families—thereby increasing the hypogamy advantage among women—men originating in hypogamous families also tend to perform well—thereby reducing men's hypergamy advantage.

This supplementary analysis also showed that individuals raised in hypergamous families largely drive the size of both advantages. The hypogamy advantage among women is larger in countries where women raised in hypergamous families exhibit a lower probability of tertiary attainment, while the hypergamy advantage among men is larger in countries where men raised in hypergamous families exhibit a higher likelihood of completing tertiary education.

Figure 3. Average marginal effect of parental hypogamy (vs hypergamy) on tertiary attainment, by gender and country



Note: Own elaboration from EU-SILC. Only individuals aged 28 to 49 with a highly educated parent in a heterogamous relationship are considered. Models include cohort-fixed effects, and control for age and the educational attainment of the less educated parent. Darker shades indicate statistical significance at the 95% level. Country sample sizes are reported between brackets.

4.3 The moderating role of the hypogamy/hypergamy ratio

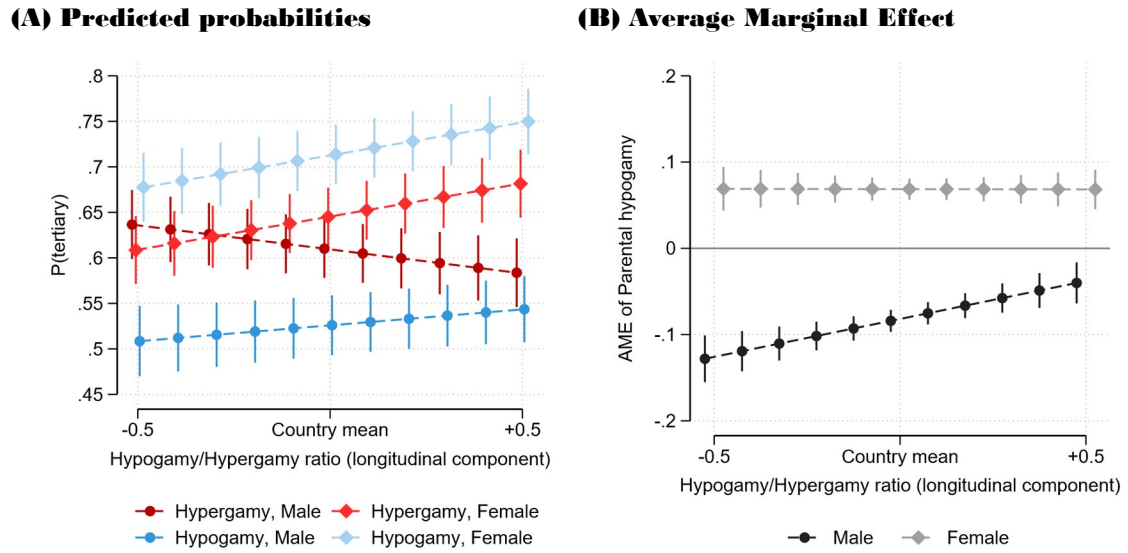
Now, we exploit within-country variation in the prevalence of hypogamy relative to hypergamy across Europe to examine whether the previously reported hypogamous and hypergamous advantages depend on the degree of selection into those unions. As a robustness check, we also test models that use the rate of hypogamy and the rate of hypergamy separately as moderators, rather than their ratio, and consider alternative functional forms, including a quadratic specification instead of a linear one.

Results from the main specification of the cross-classified multilevel linear probability model are displayed in Figure 3. The left-hand panel displays predicted probabilities, while the right-hand panel shows the average marginal effect of having hypogamous (as opposed to hypergamous) parents. In both panels, the x-axis represents the longitudinal component of the hypogamy/hypergamy ratio, centered at zero for the average ratio within each country over the period of analysis.[3] Thus, moving from left to right along the x-axis captures changes in marital sorting whereby hypogamy becomes more

[3] For instance, value 0 represents a ratio of 0.31 in Germany (hypogamous families represented one third of hypergamous families), while 1.05 in Finland (hypogamous and hypergamous families account for a similar share of all families).

prevalent, hypergamy declines, or both. It is important to emphasize that a value of 0.5 on this axis does not represent a hypogamy/hypergamy ratio of 0.5 (i.e., hypogamy being half as common as hypergamy), but rather that the ratio is 0.5 points higher than the country-specific average over the period analyzed. Therefore, our interest lies not in the estimated values at specific points on the x-axis, but in how these estimates change as we move rightward along the axis, that is, as hypogamy becomes more prevalent relative to hypergamy within a country.

Figure 4. Effect of parental matting pattern on educational attainment of men and women, by the hypogamy/hypergamy ratio within countries.



Note: Own elaboration from EU-SILC. Sample: individuals aged 28 to 49 with a tertiary educated parent in a heterogamous relationship. Models include cohort-fixed effects, and control for age and the educational attainment of the less educated parent. The x-axis represents the longitudinal component of the hypogamy/hypergamy ratio, centered at zero for the average ratio within each country over the period of analysis

Two main findings emerge from Figure 4. First, consistent with our previous analysis, women raised in hypogamous families notably outperform those from hypergamous ones, regardless of the hypogamy/hypergamy ratio. Because the effect of the ratio is virtually identical for women coming from both types of families, their curves run parallel, and the AME remains constant at 6.8 pp. In short, the hypogamy advantage among women does not decline as hypogamy becomes more prevalent at the society level relative to hypergamy.

Second, men raised in hypergamous families consistently outperform men from hypogamous ones, but this advantage diminishes as hypogamy expands and hypergamy recedes. Men from hypergamous families perform increasingly worse as the relative prevalence of hypogamy over hypergamy rises. Consequently, the positive effect of hypergamy among men declines sharply, from nearly 13 percentage points to less than 5 across the full range of the x-axis.

We tested the robustness of our findings from the cross-classified model using several variations of the main specification. First, Figure A2 in the Appendix presents the

results from an alternative specification that includes tenancy status and financial situation of the household at age 14 as controls, as well as their interactions with the longitudinal component of the hypogamy/hypergamy ratio. The conclusions remain entirely unchanged, indicating that our findings are not driven by changes in the different economic resources of hypogamous and hypergamous families as their relative prevalence shifts.

We also estimated a model including a quadratic term for the hypogamy/hypergamy ratio, which yields virtually identical results to the linear specification (Figure A3 in the Appendix).

Finally, Figures A4 and A5 in the Appendix present results using the hypogamy and hypergamy rates, respectively, instead of their ratio as the moderating factor. Both analyses lead to the same conclusions as our main model. Importantly, in Figure A5, the x-axis is to be read leftward—reflecting a decline in the prevalence of hypergamy—for the interpretation to remain consistent with the rest of analyses.

5 Conclusions

In this study, we set out to examine whether women and men from tertiary-educated heterogamous families benefit from being raised in households where the same-sex parent holds the educational advantage, and whether these advantages evolved as hypogamy became more common and hypergamy declined. Using EU-SILC data from 28 European countries over a forty-year period, we provide robust evidence that women are more likely to attain tertiary education when raised in hypogamous families (Hypothesis 1a), while men benefit from hypergamy (Hypothesis 1b), a pattern broadly reflected across countries. The probability of tertiary attainment increases by 7-8 percentage points if raised in a family where the same-sex parent has the educational advantage, and remains virtually unaltered after accounting for differences in economic resources between hypogamous and hypergamous families. Interestingly, the hypergamy advantage among men and the hypogamy advantage among women are negatively correlated across countries, and the cross-country variation in both effects is largely driven by differences in outcomes within hypergamous families. Nonetheless, we do not find any evidence that one of the two advantages is consistently larger than the other.

We also anticipated that these effects may be partly explained by selection into hypogamous and hypergamous unions, and therefore expected them to evolve as the prevalence of these types of families shifted over time. Our results show that the positive effect of hypogamy among women remained remarkably stable as hypogamy increased relative to hypergamy, suggesting that selection is not the driving force behind this advantage. In contrast, the positive effect of hypergamy among men declined sharply as hypogamy expanded and hypergamy contracted, entirely because men raised in hypergamous families became increasingly less likely to attain tertiary education. It seems that men entering hypergamous unions have become progressively more

negatively selected, a process particularly consequential for their sons' educational attainment that has eroded their advantage when raised in hypergamous rather than hypogamous families. Importantly, these results remain unchanged after accounting for shifts in the economic resources of hypogamous and hypergamous families as their prevalence evolved.

Since our model includes cohort-fixed effects, these results capture the specific effect of trends in assortative mating rather than broader modernization trends over time. It is important to clarify, however, that temporal fixed effects control for events occurring concurrently in all countries (such as the development of the welfare state in the post-war years or the successive economic crisis), but not for events that may accompany the expansion of hypogamy and the recession of hypergamy in all countries. For instance, if the extension of gender-egalitarian beliefs did not occur simultaneously across Europe, but the timing mimics the country-specific educational expansion among women and the consequential raise of hypogamy at the expense of hypergamy, then we do not control for that factor. Conversely, if the spread of egalitarian beliefs accompanied the broader economic development and modernization that most European countries shared over the second half of the twentieth century, that effect would be absorbed by the cohort-fixed effects and, therefore, cannot explain the observed pattern.

Overall, the contribution of our work is twofold. First, we add to a scarce line of research investigating the impact of the educational mating pattern of parents on their children's educational outcomes. Focusing exclusively on the type of heterogamous union and purging the results from underlying differences in economic and educational resources between hypogamous and hypergamous unions, we provide solid evidence of the advantage of women raised in hypogamous families and of men raised in hypergamous families. As reasoned above, these results are consistent with the greater influence of the same-sex parent on children's development (Downey & Powell, 1993; Powell & Downey, 1997), the gendered allocation of family resources among children (Bonesrønning, 2010; Kaul, 2018; Wong, 2013), and the higher prevalence of traditional gender attitudes among hypergamous couples (Torche et al., 2025; Trimarchi, 2022), leading to lower education expectations for their daughters.

Second, our findings offer relevant insights for research on the gender gap in educational attainment. In recent decades, the gender gap has reversed, with women now outperforming men academically in many countries (De Hauw et al., 2017; DiPrete & Buchmann, 2013). Our results suggest that this reversal may have been, at least partly, mechanically driven by two factors: (1) women benefit from being raised in hypogamous rather than hypergamous families, and men benefit from being raised hypergamous instead of hypogamous families; and (2) the prevalence of hypogamous families has increased while that of hypergamous families has declined. As family arrangements more conducive to women's educational success became more common, while those that favor men became less so, the gender gap in education widened in favor of women.

A third factor could, in principle, have counterbalanced this trend if the educational advantage of hypogamous families diminished as hypogamy became more prevalent. Yet, we do not observe such a pattern. Conversely, men's hypergamy advantage declined as hypergamy waned. Thus, if anything, compositional changes in family types have reinforced, rather than mitigated, the contribution of these dynamics to the widening of the gender gap in tertiary attainment in the last decades.

In sum, our study demonstrates that the educational outcomes of children are shaped not only by the absolute attainment of their parents but also by their educational mating pattern. As explained, however, our design is not fully insulated from factors that evolved concurrently with within-country trends in assortative mating, so we cannot make a strong causal claim. Future research exploiting exogeneous variation in the relative share of hypogamy and hypergamy, such as that generated by local marriage market squeezes, could strengthen our conclusions. Nonetheless, our findings provide robust evidence that gendered advantages in tertiary attainment are closely linked to parental educational heterogamy and its shifting prevalence, helping to explain the widening gender gap in education across Europe.

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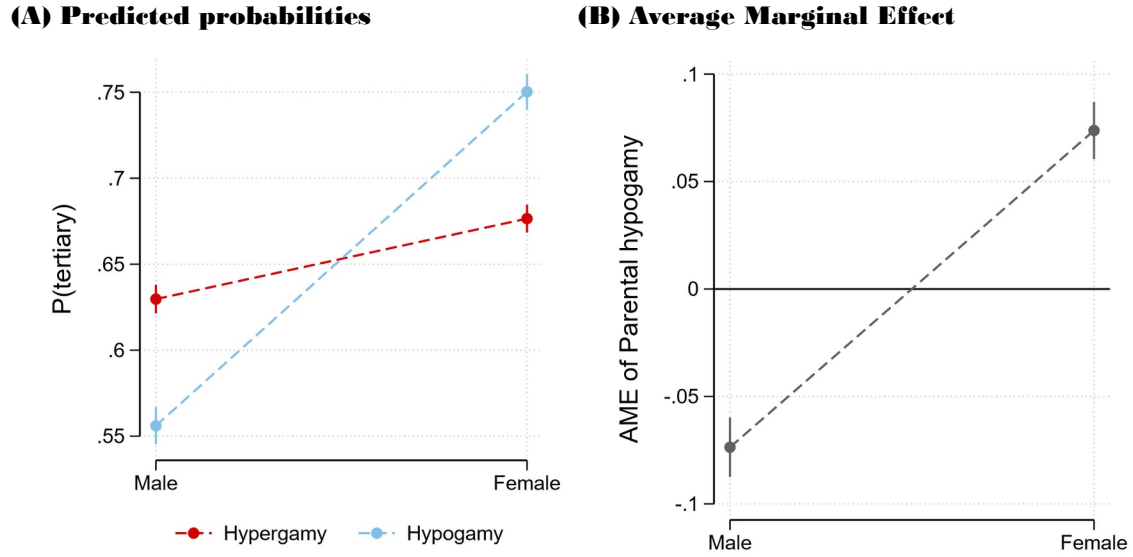
7 Appendix

Figure A1. Effect of parental hypogamy on the probability of tertiary attainment, by gender (additional controls)



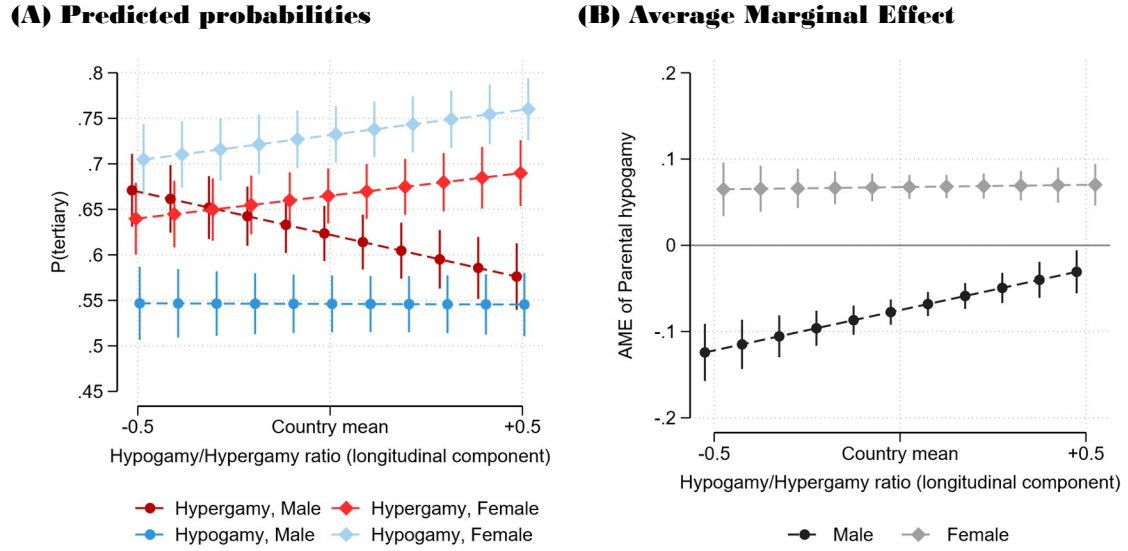
Note: Own elaboration from EU-SILC. Sample: individuals aged 28 to 49 with a tertiary educated parent in a heterogamous relationship. Models include country and cohort-fixed effects, and control for age and the educational attainment of the less educated parent, and the tenancy status and financial situation of the household when the respondent was 14.

Table A1. Average marginal effect of parental hypogamy, by gender and country

	Men			Women		
	Coef.	SE	p-value	Coef.	SE	p-value
Cyprus	-0.123	0.040	0.002	-0.061	0.036	0.094
Norway	-0.056	0.032	0.076	-0.034	0.032	0.285
Greece	-0.142	0.042	0.001	-0.016	0.040	0.686
Republic of Ireland	-0.077	0.035	0.029	0.014	0.030	0.640
Bulgaria	-0.083	0.048	0.086	0.015	0.047	0.753
Croatia	-0.075	0.047	0.106	0.020	0.048	0.674
Denmark	-0.109	0.040	0.007	0.027	0.039	0.494
Slovakia	-0.083	0.043	0.056	0.028	0.043	0.520
Italy	-0.111	0.029	0.000	0.031	0.030	0.293
Belgium	-0.007	0.028	0.803	0.039	0.028	0.160
Poland	-0.071	0.028	0.011	0.042	0.026	0.100
France	-0.047	0.025	0.058	0.042	0.023	0.073
Hungary	-0.120	0.037	0.001	0.046	0.037	0.209
Spain	-0.051	0.021	0.016	0.047	0.020	0.021
Germany	-0.139	0.033	0.000	0.050	0.029	0.080
Luxembourg	-0.022	0.034	0.516	0.052	0.033	0.118
Lithuania	-0.017	0.044	0.695	0.064	0.037	0.087
Finland	-0.007	0.029	0.800	0.065	0.030	0.029
Portugal	-0.026	0.043	0.549	0.069	0.044	0.117
Sweden	-0.015	0.033	0.655	0.075	0.033	0.022
Netherlands	0.011	0.036	0.764	0.082	0.032	0.010
Czech Republic	-0.086	0.044	0.052	0.094	0.043	0.028
Malta	-0.133	0.061	0.029	0.095	0.063	0.134
Latvia	-0.029	0.040	0.461	0.097	0.035	0.005
Estonia	0.031	0.031	0.317	0.111	0.030	0.000
Switzerland	-0.104	0.052	0.046	0.124	0.047	0.008
Austria	-0.049	0.038	0.202	0.128	0.038	0.001
Slovenia	0.027	0.041	0.507	0.130	0.039	0.001

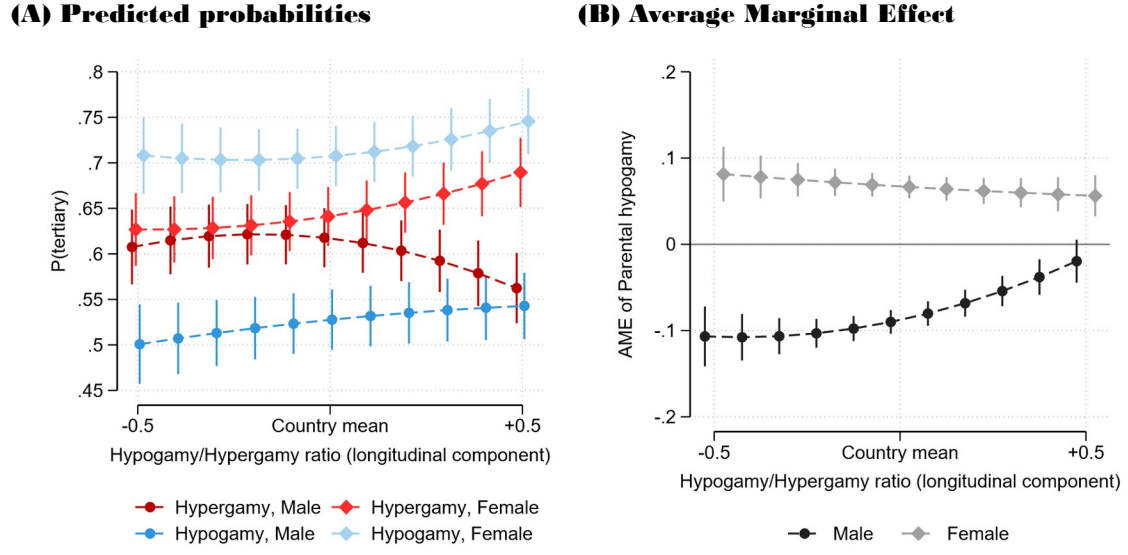
Note: Own elaboration from EU-SILC. Only individuals aged 28 to 49 with a highly educated parent in a heterogamous relationship are considered. Models include cohort-fixed effects, and control for age and the educational attainment of the less educated parent.

Figure A2. Effect of parental matting pattern on educational attainment of men and women, by the hypogamy/hypergamy ratio within countries (linear term and additional controls).



Note: Own elaboration from EU-SILC. Only individuals aged 28 to 49 with a highly educated parent in a heterogamous relationship are considered. Models include cohort-fixed effects, and control for age and the educational attainment of the less educated parent, as well as the tenancy status and financial situation of the household at age 14, and their interaction effect with the longitudinal component of the hypogamy/hypergamy ratio.

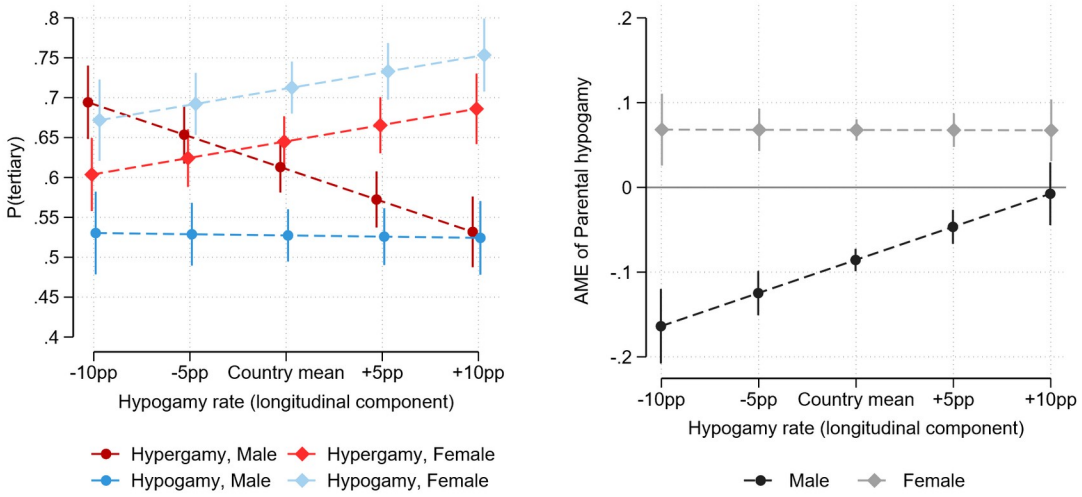
Figure A3. Effect of parental matting pattern on educational attainment of men and women, by the hypogamy/hypergamy ratio within countries (quadratic term).



Note: Own elaboration from EU-SILC. Only individuals aged 28 to 49 with a highly educated parent in a heterogamous relationship are considered. Models include cohort-fixed effects, and control for age and the educational attainment of the less educated parent.

Figure A4. Effect of parental matting pattern on educational attainment of men and women, by the prevalence of hypogamy within countries.

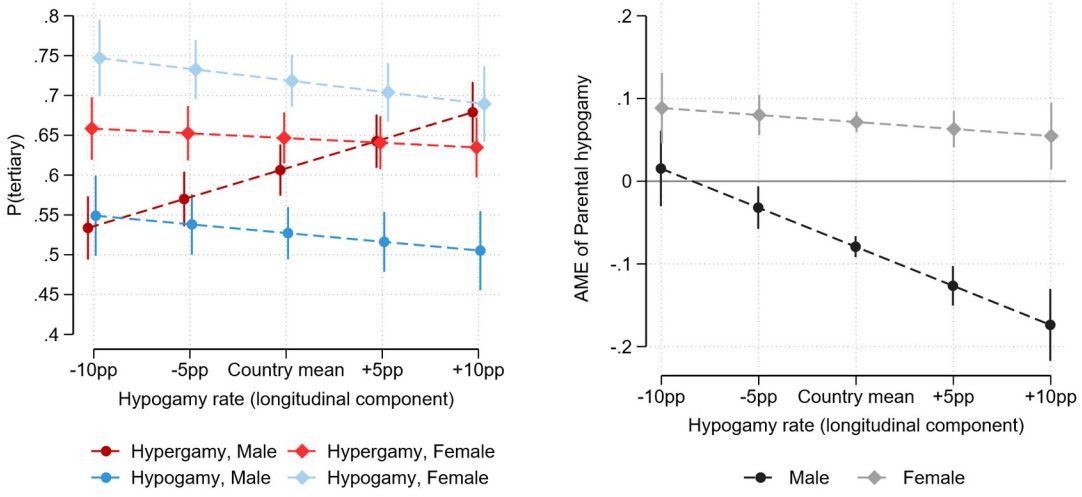
(A) Predicted probabilities **(B) Average Marginal Effect**



Note: Own elaboration from EU-SILC. Only individuals aged 28 to 49 with a highly educated parent in a heterogamous relationship are considered. Models include cohort-fixed effects, and control for age and the educational attainment of the less educated parent.

Figure A5. Effect of parental matting pattern on educational attainment of men and women, by the prevalence of hypogamy within countries.

(A) Predicted probabilities **(B) Average Marginal Effect**



Note: Own elaboration from EU-SILC. Only individuals aged 28 to 49 with a highly educated parent in a heterogamous relationship are considered. Models include cohort-fixed effects, and control for age and the educational attainment of the less educated parent.