Does the Bigger-Fish-in-the-Pond Hatch More Fry?

A register-Based Analysis Towards Assessing Causal Effects of Students Grade Rank Position in Schools on Completed Fertility, Marriage, and Divorce by Age 40

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Abstract

Educational attainment is strongly associated with fertility and family formation, yet less is known about whether students' relative standing within schools is linked to later demographic outcomes. This study examines whether 9th-grade rank within the school GPA distribution predicts completed fertility, marriage, and divorce by age 40. Using Swedish population-wide register data (N ≈ 726,000), we compare students with similar national GPA but different relative school rank, applying school-by-cohort fixed effects to reduce selection bias. Results show that relative academic position is associated with demographic behavior net of absolute performance. Lower relative rank is linked to higher childlessness and fewer children for both women and men, and to lower marriage and higher divorce risks among men. Higher rank is primarily associated with delayed motherhood. The findings suggest that institutionalized social comparisons in compulsory schooling are linked to long-term family outcomes, consistent with reference group mechanisms.

Introduction

The macro-level relationship between education and fertility has been a longstanding focus of fertility research. Childbearing and family life show considerable educational gradients (Myrskylä, Kohler & Billari, 2019). A host of research support the notion that educational institutions postpone family formation, change the opportunity costs of parenthood, and structure assortative mating (Balbo, Billari & Mills, 2013; Vasireddy et al., 2023) and that formative education may influence attitudes related to childbearing (e.g., Andersson 2019).

However, a different class of mechanisms may also be at play in the relationship between education and fertility. Specifically, the structure of educational institutions may shape variation in psychosocial processes, which in turn influence demographic behavior. How such mechanism interact with institutional structures have been identified as an under-explored area in the study of education and fertility (Bachrach & Morgan 2013). In this paper, we take a step in this direction by using Swedish register data to examine whether so called reference group mechanisms in schools (e.g., Davis 1966) shape fertility and family dynamics across the life course. Reference group mechanism occur when students compare their academic performance *relative* to their peers in their school rather than to the objective academic performance of the average population (Marsh, 1987; Marsh et al., 2003; 2008; Jonsson & Mood 2008). Reference group mechnisms are here to be understood as a class of many plausible mechanisms that have in common that they are affected by relative ranks, including perceptions of academic identity, self-efficacy and who one might befriend.

One common way to think about reference group mechanisms in school context is that exposure to schools with low-performing students increases the self-efficacy of the average-performing student (relative gratification), while exposure to schools with many high-performing students decreases the self-efficacy of the average-performing student (relative deprivation) (Stouffer et al., 1949; Merton, 1968). This is linked to the Big-Fish-Little-Pond phenomenon (BFLP), and been argued to be socially determined by assessing one's own ability to that of their peers (e.g., Marsh 1987) and, in turn, influence educational success and a range of behaviors in adulthood (Jonsson and Mood 2008; Rosenqvist 2018; Delaney and Devereux 2022). The potential impact of schooling BFLP effects believed to be important because almost every individual in society is exposed to them through compulsory participation in the educational system. However, there are two major concerns in BFLP and educational literature. First, it has proven difficult to account for unobserved selectivity to attain unbiased or plausibly less biased estimates of BFLP effects (Keller et al. 2023). Second, effects are believed unfold across the life-course but longitudinal studies on BFLP is lacking. Thus, this study is the first to measure the relationship between BFLP effects and demographic outcomes.

For the purpose of attending to these two bottlenecks, we take a different approach by using a novel empirical design from the economic literature (c.f. Denning et al. 2023; Delaney and Devereux 2022). We use Swedish population-wide register data on full student cohorts to measure students' relative school grade rank from the within-school distribution of grades. School-by-cohort fixed effects accounts for unobserved, time-invariant characteristics of schools, such as peer composition, grading culture, teacher quality, and institutional ethos. We thus compare outcomes of students with similar academic performance but different relative standing withing their local school context. The upshot is a plausible identification of reference group mechanisms on a population scale, addressing key sources of confounding and brings us one step closer to a causal estimate of the impact of an omnibus BFLP effect. We wage this design to study long term outcomes in fertility and partnering across the life course up to age 40.

Below, we briefly outline key theory and empirical work on big-fish-little-pond phenomena and position our study in the state-of-the-art of the relationship between individual differences, educational institutions, and demographic behavior.

Previous Research

Reference Group Mechanisms in School Contexts

The tendency to compare oneself to others appears to be human nature. This intuition led to early influential concepts of reference groups (1942) and similar renderings in the form of in-groups and out-groups (Sumner 1906), primary groups (Cooley 1909), and the marginal man (Stonequist 1937). The application of these notions to schooling contexts was particularly inspired by Kelley's (1952) distinction between the *normative* and *comparative* functions of reference groups (Jonsson and Mood, 2008; Rosenqvist, 2018). The normative function highlights how peers shape norms and influence each other, positively or negatively. The comparative function explores how individuals assess their own attitudes, behaviors, and achievements by comparing themselves to others within their reference groups. Whereas the normative functions of reference groups are drawn upon to understand the effect of peer effects on educational achievement (Sacerdote 2011; Wennberg & Norgren 2021), the comparative functions are used to understand experiences and consequences of ordinal position in schools (e.g., Davis 1966).

Reference group mechanisms are at play in all domains of life and appear from workplaces to public areas, shopping malls, and gyms. However, educational institutions, such as K9 schools, are arguably one of the most important channels for reference group mechanisms because close to every person is exposed to this mechanism. K9 institutions are not only often compulsory but also particularly efficient in generating experiences of relative deprivation and relative gratification (Jonsson and Mood 2008; Elsner & Isphording 2017; Kim 2021). Schools produce geographical, social, and information closure of the student population. Furthermore, schools facilitate reference group mechanisms through standardization, sorting students with their age peers and endowing them with the same teachers, curriculum, and formal and informal rules. Moreover, in the form of grades, schools provide an inter-subjectively transparent tractable ranking system against which students, willingly or not, can compare themselves. Finally, the incumbents of K9 institutions, youth and adolescents, are highly susceptible to social comparison and vulnerable to relative deprivation (Urberg, 1992); socially and neurobiologically, adolescents start prioritizing peer connections and friendships outside their family of origin (Antonio, 2004), and are particularly susceptible to group influences (Dahl et al., 2018).

The specific cases of reference group mechanisms based on educational performance often draw on hypotheses from the wide literature on the big-fish-little-pond phenomenon (Marsh, 1987; Marsh et al., 2008; Elsner & Isphording, 2017; Loyalka, Zakharov & Kuzmina, 2018). Extensively studied in social and educational psychology, the BFLP hypothesis explores how student's academic achievement relates positively (or negatively) to their school's overall achievement level. Essentially, being a high-achieving student (a Big Fish) in comparison to less-achieving students in the school (Little Pond) is hypothesized to increase students' academic self-concept from which other positive externalities flow, such as confidence or a positive outlook on the future, follow. Conversely, being a lower-achieving student in a high-achieving school setting can have the opposite effects (Marsh, 1987; Marsh et al., 2008).

Evidence of Reference Group Mechanisms in School Contexts

Grades are used as objective measures of academic performance, academic aptitude, and cognitive skills to predict important outcomes in adulthood. However, it follows from the BFLP hypothesis that, while achieving the same exact grade, two individuals have very different experiences based on variation in their ordinal school rank, experiences that also may predict important outcomes. Therefore, it is important to differentiate the known effects of absolute rank grades versus any potential relative effects of school grade rank on long-term outcomes in adulthood.

Several empirical findings align with general predictions of the BFLP hypothesis, showing that students' relative position influence their academic self-concept (Chiu 2012; Pinxten et al. 2015; Kavanagh 2020) and is associated with student effort in homework and test preparation (Trautwein et al. 2009), academic aspiration, motivation and achievement (Eccles 2009; Marsh & Martin 2011; Nagengast & Marsh 2012), and choices of further education (Guay et al. 2003; Nagy et al. 2006), However, as recent research by Keller et al. (2023) concluded, the current knowledge builds on non-representative or contexts where selection bias cannot be ruled out. Non-representativeness is concerning when attempting to capture universal experiences (school exposure) of universal mechanisms (reference group mechanisms).

Perhaps most importantly importantly, our understanding of BFLP effects is mainly correlational (e.g., Davis 1966; Meyer 1970; Drew and Astin 1972; Alwin and Otto 1977). analyses of causal mechanisms are considered key to move the literature forward analyses (Keller et al., 2023). There are strong reasons to believe that many extant observational studies on BFLP are spurious, especially those arising from reference group mechanisms in school settings (Elsner and Isphording 2017; Delaney and Devereux 2022; Denning et al. 2023). Parents often choose schools (or residential areas that grant access to specific schools) based on factors that are not directly observable but influence student outcomes, such as the school's reputation, socioeconomic composition, or suitability for their child's specific needs and abilities. As a result, students attending schools with markedly higher or lower average grades are likely to be selected on these unobservable factors and are more likely to have either a very high or very low school-specific rank in terms of grades. Therefore, the association between school rank and various outcomes measured in the literature (cf., Delaney & Devereux 2022) reflects both the potential BFLP effect from relative deprivation or gratification and the unobserved influences originating from parental school choice. This can bias estimates of BFLP effects in both directions.

These concerns are addressed by a small but growing number of recent studies that use novel designs to estimate a causal effect of school grade BFLP on various life chances. Findings suggest a positive effect of high high-school rank on income in the United States and Sweden (Denning et al., 2023; Dadgar, 2026), on choosing STEM degrees (Delaney & Devereux 2021; Shahbazian & Dadgar, 2024), on test scores (Murphy & Weinhardt 2020). Conversely, the negative effects of low high-school rank are linked to poorer health outcomes (Kim & Liu, 2023; Kiessling & Norris, 2023) and behavioral issues in school (Comi et al., 2021, Pagani et al., 2021).

Reference Group Mechanisms in School Contexts and Demographic Behavior

Previous research on BFLP effects from the educational system has focused on educational outcomes or work-life, rather than demographic outcomes. Demographic research, has considered various aspects of the relationship between psychology and fertility in depth, including genetics (Mills & Tropf, 2020), the link between attitudes and behavior (Ajzen & Klobas, 2013), and social contagion mechanisms such as the influence of friend's childbearing on birth risks (Balbo & Barban, 2011). However, the role of educational institution in facilitating psychological mechanisms has not been given much attention, despite the seminal role ascribed to education for demographic behavior (Vasireddy et al., 2023). In this paper, we extend this to family life by documenting BFLP effects on childbearing, marriage, and divorce.

There are at least two reasons why it is plausible to expect that BFLP phenomena influence childbearing and partnering. First, as previously discussed, a large body of research suggests that relative deprivation is aversive to mental health and lowers-self-efficacy (Comi et al., 2021; Chiu, 2012; Pinxten et al., 2015; Kavanagh, 2020; Kim & Liu, 2023; Kiessling & Norris, 2023). Mental health disorders, in turn, strongly predict individual differences in demographic outcomes. Mental health disorders almost exclusively find adverse effects on the likelihood of having a child (Golovina et al., 2024; Liu et al., 2023), a lower age at first birth (Vigod, 2014), and a lower likelihood of marriage (Haukka et al., 2003). Examining 414 diseases using Swedish register data, mental health issues were the most predictive of childlessness (Liu et al., 2023). Such effects have been found to be exacerbated by the dyadic nature of demographic behavior; childbearing decisions and union stability are influenced by the mental health of both partners (Kailaheimo-Lönnqvist, 2024). Couple dynamic effects are further multiplied by a fairly strong assortative partnering on mental health disorders (e.g., Mathews & Reus, 2001; Nordsletten et al., 2016). A recent nationally representative survey indicates that a fifth of respondents who wish to have a first child delay parenthood because of their own or partners' health issues (Artamonova et al., 2024). Furthermore, interdependencies between physical and mental health effects are most likely in place. For example, behaviors stemming from mental illness, such as eating disorders, affect fecundity (O'Brien et al., 2017). Many of these findings are corroborated by genetic data (Mills & Tropf, 2020). The question remains whether the variation in psychological factors caused by BFLP phenomena in schools may have ripples on demographic behavior in adulthood.

The second pathway by BFLP phenomena may affect childbearing and partnering indirectly by influencing core outcomes that, in turn, influence fertility and partnering. Recent research suggests a BFLP from school settings has substantial later-life consequences on income and tertiary education (Denning et al., 2023; Dadgar, 2026; Delaney & Devereux 2021; Shahbazian & Dadgar, 2024). In addition, an established finding is that self-efficacy and self-esteem negatively impact educational attainment and a range of labor market outcomes (e.g., March & Martin, 2011). Education attainment predicts the resources needed to form a family, and so has a positive income effect on fertility, but at the same time increases the fiscal opportunity costs of childbearing, which can have a negative impact on fertility (Jones, 2010; Oppenheimer, 2001). Women perform a larger share of childcare and household work, should be more strongly influenced by opportunity cost effects than men, and overall see a negative (or less positive) between educational attainment and fertility (Esping-Andersen & Billari, 2015; Goldscheider et al., 2015).

Study Contribution

Because school systems are ubiquitous in contemporary societies and BFLP phenomena are inherent to such institutions, it is important to know if this mechanism induces variation in key

outcomes in adulthood. Identifying BFLP effects on later life outcomes from spurious associations has remained a challenge in the literature. In this study, our primary objective is to come closer to causal evidence for any form of influence on BFLP effects on demographic behavior.

By showing the association between demographic outcomes and relative school grade rank (holding constant absolute national grade rank), we capture an 'omnibus' BFLP effect. In other words, we identify the sum of (a) the direct BFLP psychological effect on childbearing and partnering and (b) the indirect BFLP effect, where psychological effects influence education and labor market outcomes, which in turn influence childbearing and partnering (through opportunity cost and income effects). For example, if a higher school rank positively influences the number of children, we interpret this as reflecting a impact of amicable BFLP effects (relative gratification) following from either direct psychological factors, indirect opportunity cost and income effects, or both. If this effect remains after adjusting for educational attainment, we see tentative evidence for a impact of direct BFLP effects on psychological factors, independent of intermediate factors.

Based on the reasoning of research on mental health and demographic behavior, we expect adverse direct psychological BFLP effects (relative deprivation) to show patterns associated with other adverse correlates of demographic behavior: lower age at first birth, higher likelihood of childlessness and divorce, and lower likelihood of marriage (Lyngstad & Jalovaara, 2011). The effects of income and opportunity cost on childbearing and partnering operate through human capital formation, educational attainment, and labor market participation. BFLP, therefore, also might have indirect effects on fertility going through human capital formation. Income and opportunity cost effects are sometimes shown to negatively influence women's childbearing while positively influencing men's childbearing, potentially because women need to forfeit childbearing in order to pursue a career, while the same trade-off is not present for men (Billari & Espin-Andersson, 2015; Goldscheider, Bernhardt & Lappegård, 2015). We, therefore, study outcomes for men and women separately.

The Swedish Case

Sweden has a late-tracking system where all students attend the same comprehensive school until the 9th grade, after which they choose between academic and vocational tracks starting in the 10th grade (Halldén, 2008). This late selection point is important for our study because it allows us to examine student's academic rank before they self-select into these tracks. Additionally, the 9th grade is a critical period for students, as the early teenage years see orientation towards self-perceptions amidst the preparation for future academic competition competitions. Before 1997, the grading system in Sweden was norm-referenced for those in the 9th grade, with teachers assigning grades on a standardized scale from scale from 1 to 5, where 5 was the highest score. National guidelines advised that grade distribution should be balanced, with most students receiving a grade of 3 (34%), and fewer students receiving 1 (7%), 2 (24%), 4 (24%) and 5 (7%). Although the system aimed for national uniformity, especially in core subjects like Swedish, English, and math (which had standardized exams), teachers often aligned their grading more closely to the distribution of the class or school level.

The educational system is fully state-funded, offering free education at all levels, including tertiary education (Halldén, 2008; Amft, 2012). Students have access to state-backed study grants and low-interest student loans (Amft, 2012). The influence of family financial resources on educational choices is thus limited to school selection through neighborhoods.

During the study period, Sweden has a high incidence of divorce and childbearing and a relatively low rate of marriage, in comparison to many other OECD countries (Therborn, 2004). Childbearing is particularly characterized by a strong prevalence of two-child households. In Sweden, family and social security policies cover costs of childbearing more extensively than in most other OECD countries, which some argue diminishes the socioeconomic gradients from household earnings or education on demographic outcomes. However, the evidence for this is mixed (Jalovaara & Andersson, 2023; Jalovaara, Andersson & Miettinen, 2021). However, it does appear that the socioeconomic gradient is more similar for men and women in Sweden (Jalovaara et al., 2018, Kolk., 2021), which is congruent with the idea that state support mitigates the opportunity costs of childbearing for women.

Data and Methods

Data

We use Swedish administrative registers including all individuals who have resided in Sweden and attended 9th grade between 1990 and 1997. Each person is assigned a unique identification number, enabling linkage across records on education, income, and marital status. This linkage extends to parents, provided they have also ever resided in Sweden, as well as to their children, enabling us to access information about their family of origin, which school they enrolled in, and future demographic outcomes, including marriage, divorce, and childbearing.

We use data on all enrolment cohorts that entered ninth grade between 1990 and 1997 because of the grading system described above (N = 726,584). This corresponds to the birth cohorts born between 1974 and 1982, except for about 0.44 %, who either enrolled above or below their age group or re-enrolled. This data extends until 2021, by which the latest enrolment cohort of 9th grade students would have reached age 40. Since our outcomes are the adult age events of childbearing and partnering, we focus on outcomes from age 25 to age 40: the number of children (NCB) as a proxy of completed fertility, completed parity progression (PPR), mean age of first birth (AFB), ever married and ever divorced.

School and National Grade Rank

The main estimate of interest is the omnibus BFLP effect of relative (school) grade rank when objective (national) grade level is held constant, on demographic outcomes. Thus, the independent variable of interest in our study is students' ordinal position (or rank) within their school's grade distribution. For this, we use students' Grade Point Average (GPA) in 9th grade, divided into 20 percentiles (e.g., Denning et al., 2023; Dadgar, 2026). Each rank represents 5 percent of the school's population at the 9th grade level: rank 1 includes the 5 percent of the school's students with the lowest GPAs, while rank 20 consists of those with the highest GPAs. Students are strongly gender-segregated and tend to compare themselves to their peers of the same gender (e.g., Rosenqvist, 2018), a phenomenon that is recognized in the BFLP literature but rarely accounted for empirically. Additionally, demographic outcomes, such as fertility rates, are gender-specific – especially considering that women face a more pressing biological timeline and that the age at first birth varies significantly between men and women – students are, therefore, more inclined to compare themselves to peers of the same gender. Thus, to align

measurement and theory, the ranks are categorized separately by gender. This means we compare girls with other girls and boys with other boys. In alternative models, we also estimate school-wide effects, where each student compares their grades to those of boys and girls without distinction of peers' gender.

While relative school grade rank captures perceived ability within the local peer context in line with theories of reference group mechanisms, we also account for their 'objective' ability by ranking students nationally based on GPA. This national rank serves as a proxy for academic ability, as GPA determines access to upper-secondary programs in Sweden and shapes educational tracking. The objective grade measure ranges from 1 to 50, where 1 is the lowest 2 percent of all ninth graders in Sweden that year, and rank 50 is the highest 2 percent. In Sweden, during these cohorts, GPA was assigned on a scale from 1.0 to 5.0, with one decimal place, resulting in a maximum of 50 possible levels. There are about 120 students in ninth grade in each school. Complete summary statistics for prevalence and spread of students per school and school rank are shown in Table S1 and Figure S1 in the supplementary appendix.

Analytical Strategy

Our baseline model regress demographic outcomes on students' school grade rank in the school's grade distribution (β_1) while controlling for individual's own GPA (β_2), and controlling for observable confounders of potential birth cohort differences, developmental maturity (birth month effects), and family environment using the following variables (β_3): year and month of birth, immigration background, and years of education and income for both parents. The distribution of these variables across the study population can be found in Supplementary Table S2.

$$\gamma(NCB, AFB, PPR1234, Marriage, Divorce)_{i,s,c} = \alpha + \qquad \text{Eq. 1}$$
$$\beta_1(School\ grade\ rank_{i,s,c}) +$$
$$\beta_2(GPA_{i,s,c})$$
$$\beta_3(Control\ variables: parents\ background_{i,s,c}) + + \varepsilon_{i,s,c}$$

However, to reliably isolate the effect of students' school grade rank in the school's grade distribution, one must, in addition to adjusting for student's national grade rank, also isolate this effect from both observable and unobservable factors affecting school grade rank and later adult outcomes. This is achieved by creating a national grade rank, where each student is objectively ranked relative to all other students in Sweden within their cohort, based on their GPA. The national rank provides a standardized benchmark, enabling comparisons across schools with varying grading standards and levels of competition.

The first set of biases are school quality biases (a), which arise if attending a high-achieving school (which directly influences relative school rank) and influence adult outcomes through means other than school grade rank or objective grade rank. For example, schools of different average grades may be differently formative via academic culture, social codes, or social networks through alumni that influence adult outcomes, including childbearing and partnering. A second and very similar set of biases are parental school selection bias (b). Parents and the parental environment can affect the outcomes of their children above their children's absolute and relative grades. Such parental effects could be subsumed into BFLP effects if parents who influence their child's adult outcomes in a specific direction also systematically make specific

choices of which school their child attends based on the schools' students' academic performance.

Our second model (Eq. 2) deals with these biases (a and b) by categorizing all schools into 10 groups based on rank deciles on mean GPA within each school and enrolment cohort. We, therefore, interact students' objective 50 national grade rank (β_2) with dummies for school grade decile, resulting in school group * national rank fixed effects (β_4).

This model also considers two other forms of biases that arise due to heterogeneity between schools that are not necessarily related to the average performance of their schools, but that may influence grading distribution in school. Our estimate requires that schools capture the objective ability of students in grades in more or less the same way. This assumption can be violated (c) if strictness and leniency in grading practices may differ between schools and enrolment cohorts due to differences and changes in school and teacher culture or protocol. Finally, (d) unobserved school characteristics unrelated to its average GPA may influence both relative grade distributions and adult outcomes, such as teaching philosophies and school amenities, such as access to nearby activities. We, therefore, introduce an interaction between all schools in Sweden and all eight enrolment cohorts (β_5). These school-and-enrolment-cohort fixed effects effectively control for differences in grading practices between schools and over time, and unobserved school characteristics. Moreover, geospatial and regional characteristics such as access to nearby universities, facilities, and population density become accounted for by design.

$$\boldsymbol{\gamma}(NCB, AFB, PPR1234, Marriage, Divorce)_{i,s,c} = \boldsymbol{\alpha} + \qquad\qquad \textbf{Eq. 2}$$
$$\boldsymbol{\beta_1}\big(School\ grade\ rank_{i,s,c}\big) +$$
$$\boldsymbol{\beta_2}\big(GPA_{i,s,c}\big) +$$
$$\boldsymbol{\beta_3}\big(Control\ variables: parents\ background_{i,s,c}\big) +$$
$$\boldsymbol{\beta_4}\big(School\ group\ \&\ national\ rank\ fixed\ effects_{s,c}\big) +$$
$$\boldsymbol{\beta_5}\big(School\ \&\ enrolment\ cohort\ fixed\ effects_{s,c}\big) + \boldsymbol{\varepsilon}_{i,s,c}$$

As our second model (Eq. 2) are more robust to the potential biases a-d than the first (equation 1), we analyze them stepwise. We consider model 2 to be the closest approximation of causal omnibus BFLP effects. These effects include both the direct effect of psychological effects, as well as all indirect effects of these on educational and labor market outcomes. In our third model (Eg. 3), we tentatively address whether the 'direct' psychological factors from BFLP phenomena in ninth-grade influence demographic behavior independently of the indirect pathway. We therefore include controls for adult outcome in terms of average income between ages 35-39 (β_6). A contrast between school rank effect estimates across models 2 and 3 provides cues of the sources behind BFLP effects (if any) on childbearing and partnering.

$$\boldsymbol{\gamma}(NCB, AFB, PPR1234, Marriage, Divorce)_{i,s,c} = \boldsymbol{\alpha} + \qquad\qquad \textbf{Eq. 3}$$
$$\boldsymbol{\beta_1}\big(School\ grade\ rank_{i,s,c}\big) +$$
$$\boldsymbol{\beta_2}\big(GPA_{i,s,c}\big)$$
$$\boldsymbol{\beta_3}\big(Control\ variables: parents\ background_{i,s,c}\big) +$$
$$\boldsymbol{\beta_4}\big(School\ group\ \&\ national\ rank\ fixed\ effects_{s,c}\big) +$$
$$\boldsymbol{\beta_5}\big(School\ \&\ enrolment\ cohort\ fixed\ effects_{s,c}\big) +$$
$$\boldsymbol{\beta_6}\big(Control\ variable: student\ adult\ income_{i,s,c}\big) + \boldsymbol{\varepsilon}_{i,s,c}$$

In all models, we estimate NCB and AFB using ordinary least squares and parity progressions, marriage and divorce using linear probability models. All results are presented in figures where the BFLP effect (the effect of relative school grade rank holding objective national rank constant) is represented on the y-axis and separately for men and women. Model specifications are available in Appendix Tables A1-A4. The BFLP effect is estimated for each separate school rank level, holding the middle 10th rank level as the baseline, and plotted across the x-axis. Thus, a positive value on the y-axis, at the left side of the x-axis (school rank < 10) indicates that being lower performing relative to school peers (relative deprivation) indicates a positive effect on the outcome – compared to those with the same absolute grade but whose grades where average relative to their school peers. In contrast, a positive value on the y-axis, on the right side (school rank > 10), indicates that being higher-performing relative to school peers (relative gratification) leads to a higher age at first birth.

Results

Demographic outcomes in adulthood across absolute levels of national GPA
Before we analyze the impact of BFLP effects based on grades, we show the crude relationship between national GPAs and out outcome variables, here ranked into 20 deciles. Figure 1 shows that mean age at first birth increases substantially with GPAs, with more than four years, for both men and women; The mean number of children is decreases by a factor of 0.2 between the lowest and median grade rank for women, but shows a positive relationship for men. The share ever divorcing of the ever-married population by age 40, shows a rather linear negative relationship with GPA, while the share married shows a positive relationship, across the range of school grade ranking. Ever becoming a parent by age 40 (PPR) is rather invariable for women across school rank. For men, however, the share ever parents increase from the bottom to median grade rank. In sum, in line with previous research on educational gradients (Jalovaara et al 2018), that there is a clear variation on demographic outcomes across ninth grade absolute GPAs, particularly so in childlessness, age at first birth and the propensity of marriage and divorce. We now turn focus to the main issue of the study, if relative grade rank, above and beyond own absolute school grade rank, also influence demographic behavior.

Figure 1. Mean age at first birth, mean nr of children born, ever married or divorced, and first parity progression by age 40, across national GPAs. Men and women.
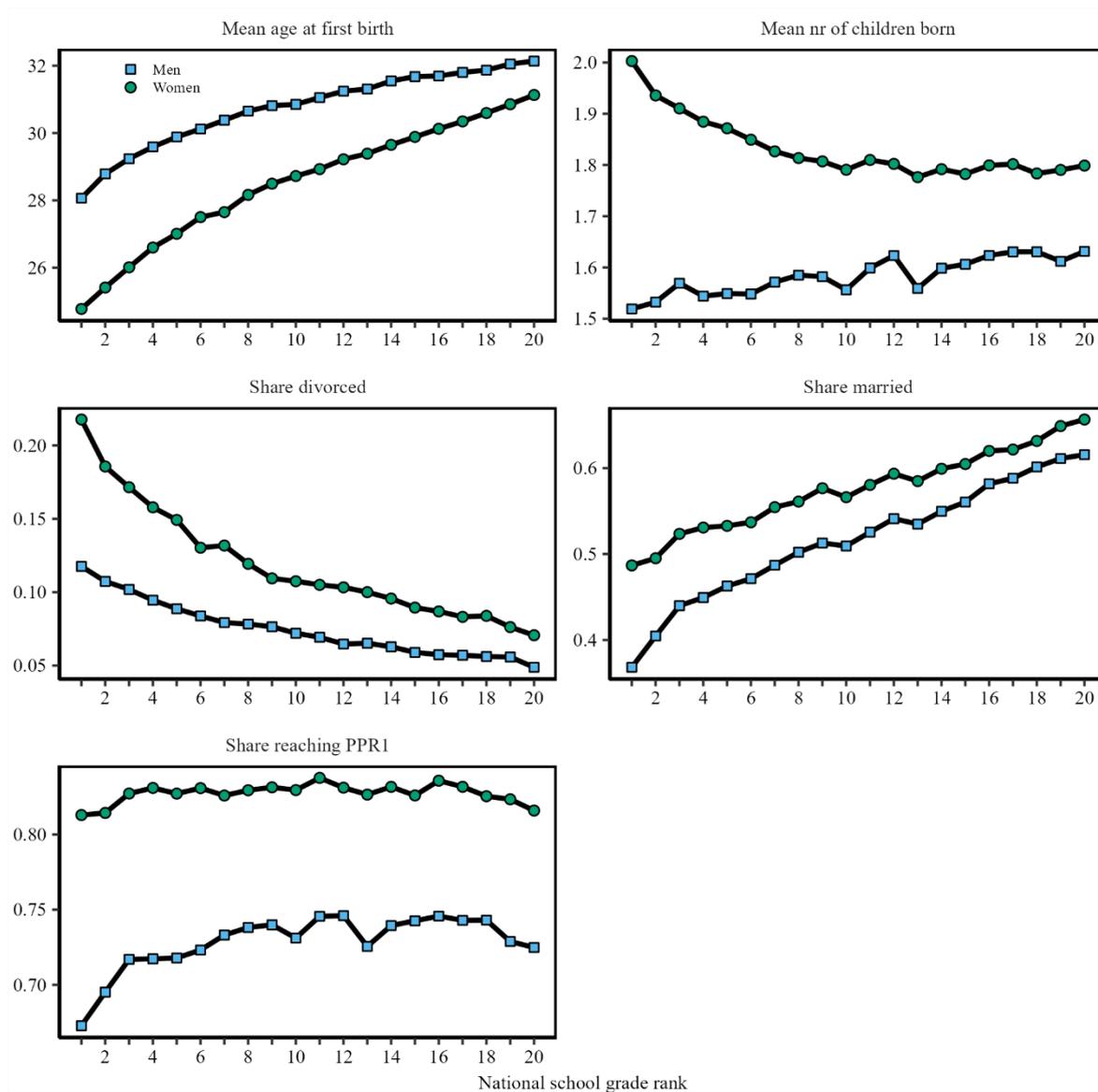

Number of Children Born

Figure 2 shows the coefficient of the school grade rank adjusted for GPA (the BFLP effect) on the number of children born by age 40. For men, the results from model 1 (gray line) show a pervasive positive linear BFLP effect: men with low school's rank (i.e., those who perform worse relative to their school peers, shown towards the left side of the x axis) have fewer children compared to men and women with the same absolute grade but who' perform average relative to their school peers. In contrast, men with higher school's rank (i.e., those who perform better relative to their school peers, shown towards the right side of the x axis) have more children compared to men and women with the same absolute grade but who' perform average relative to their school peers. For women, model 1 estimate shows that the number of children are high among those who perform worse than their peers, but those who perform better than

their school peers do not differ from women with the same absolute grade but who' perform average relative to their school peers: a relative deprivation effect, but no relative gratification effect.

It is important to note that estimates of model 1 do not adjusted for fixed effect combinations and likely includes the unobserved variables biases discussed in the methods section. Model 2 adjust for these using school and enrolment cohort fixed effects, as well as, school group and national rank fixed effects. Model 3, in addition, adjusts for human capital in adulthood (average income between ages 35-39). Estimates of both model 2 and model 3 differ in both size and direction from model 1 in the predicted number of children. This divergence is strongly suggestive of unobserved variable bias in our naïve model. Thus, accounting for selection effects, we see types of BFLP effects leading to fewer children, for men and women both. The results are contingent on the school rank distribution, however. For men, the bottom 20 percent (rank 1 to 4) and for women, the bottom 25 percent (rank 1 to 5) are statistically significant. For the rest of the population, ordinal rank has no effect on the number of children at age 40. In the remaining, we only show the estimates of model 2, as our main weight of interpretation is on the more robust model estimates (model 2 and 3) and as estimates models 2 and 3 are indistinguishable for all outcomes. Figures with estimates from all three models can be found in Appendix Figures A1-A3.

Figure 2. BFLP effects across school rank on Number of children by age 40. Men and women.
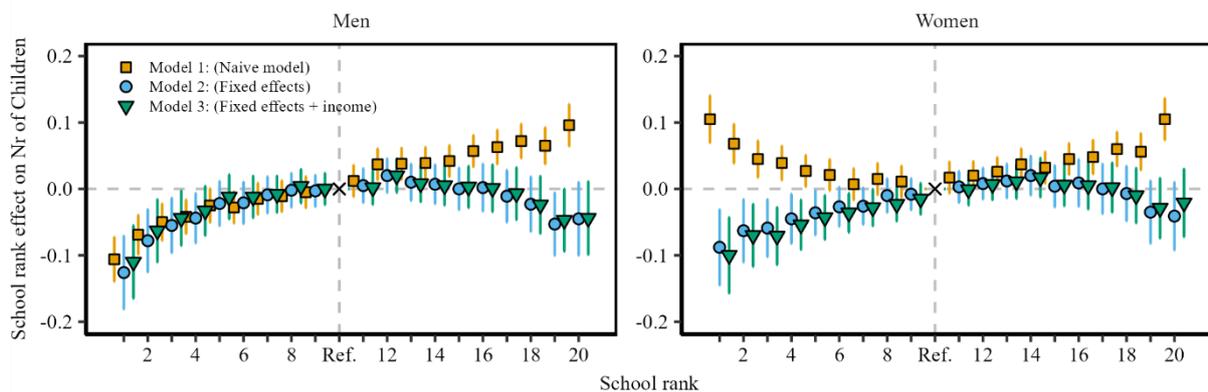
Age at First Birth

Figure 3 shows the BFLP effect on the age at which individuals become parents, among the population who ever become parents by age 40. For women, those at the top of the school's rank distribution (e.g., those who perform better relative to their school peers) tend to become a mother at a later age. In contrast, for men, being at the bottom of the school's rank distribution (e.g., performing worse relative to their school peers) result in a higher probability of becoming a father later in life. Again, while the overall pattern is rather clear, estimates are only statistically significant towards the lower or higher end of the rank distribution.

Figure 3. BFLP effects across school rank on the age at first birth. Men and women with at least one child by age 40.
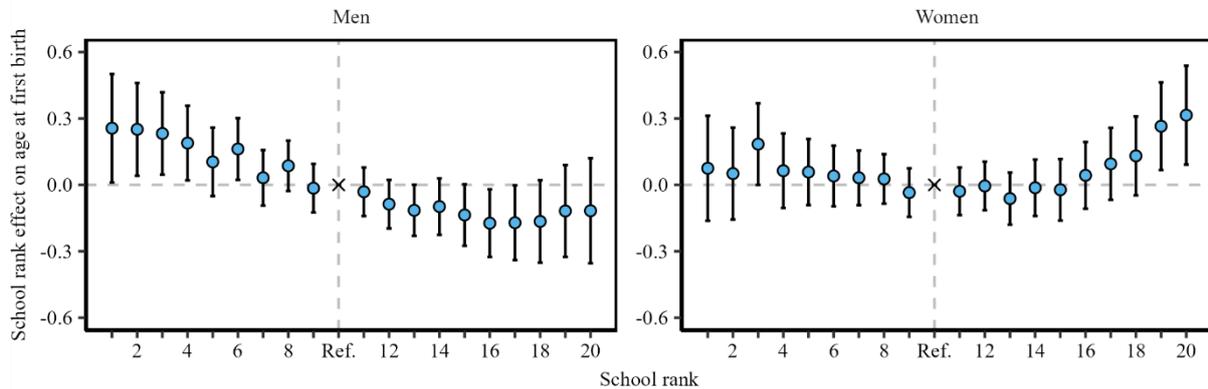

Childlessness and Parity Progression

Figure 4 shows the BFLP effects on first to fourth completed parity progression by age 40, for men and women. Men and woman with low school rank (those who perform worse relative to their school peers) are less likely to reach first parity, but the opposite effect is not found for those with high school rank. Thus, while BFLP may be present in the form of relative deprivation that increases the likelihood of childlessness, but relative gratification does not seem to decrees the risk of childbearing. The results show similar patterns for both genders, although they are more pronounce for men.

Among men who had at least one child, the likelihood of reaching second parity is decreased by low school rank, again suggesting that relative deprivation hinders childbearing. However, this effect is not found for women. We find no statistically significant effects or substantively prevalent patterns suggestive of BFLP effects on reaching higher parities (PPR3 and PPR4), and all ranks are of small magnitude.

Figure 4. BFLP effects across school rank on parity progressions. Men and women.
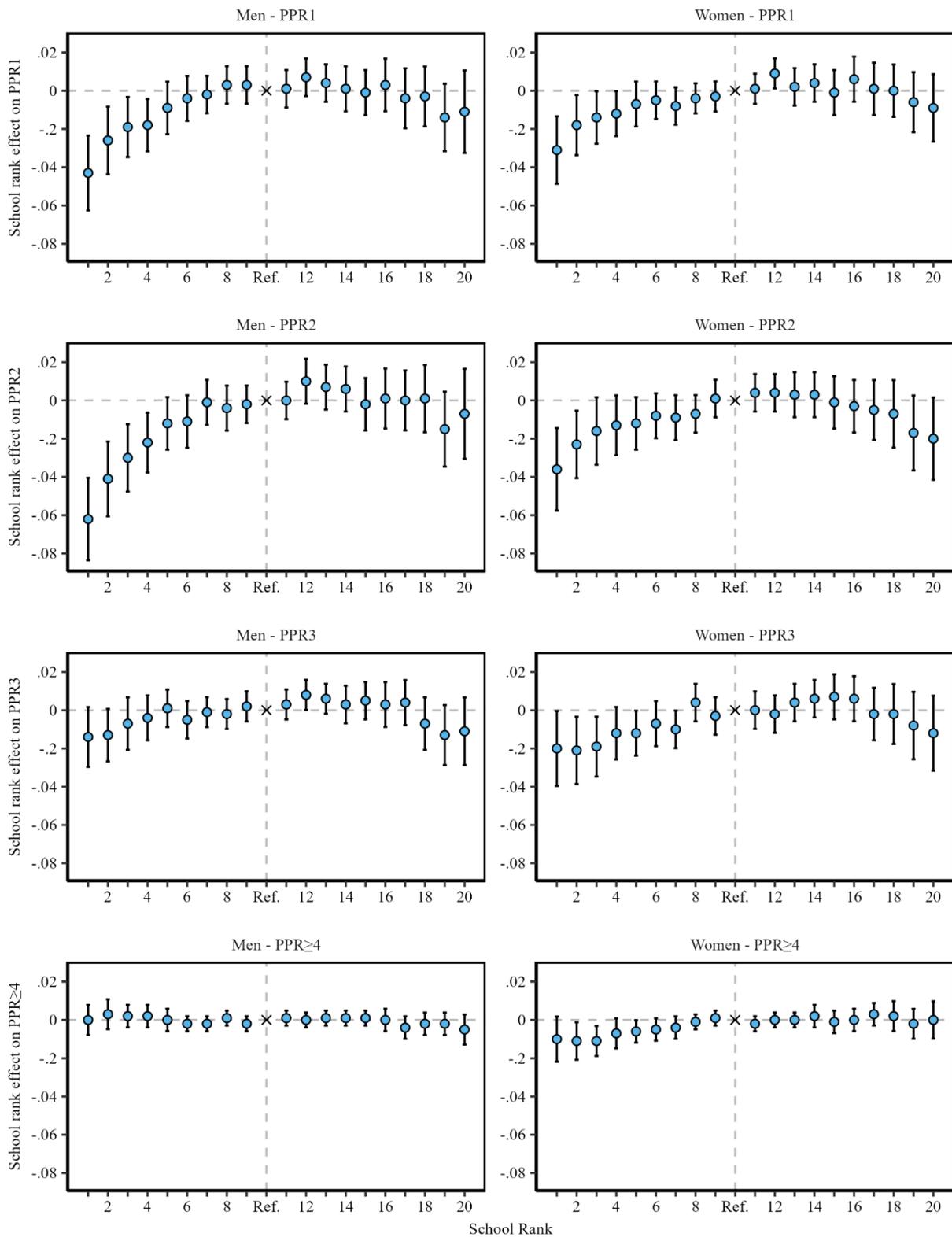
Marriage and Divorce

Figure 5 shows BFLP effects on ever experiencing marriage or divorce by age 40. For women, no clear patterns or statistically significant BFLP effect are found for marriage nor divorce. Men with low school rank have a lower probability of ever having married at age 40 and - among those men who do get married – a higher likelihood of divorce by age 40. While statistically significant estimates are found only at the bottom of the school's rank distribution, the overall trend is quite clear.

Figure 5. BFLP effects across school rank on marriage and divorce. Men and women.
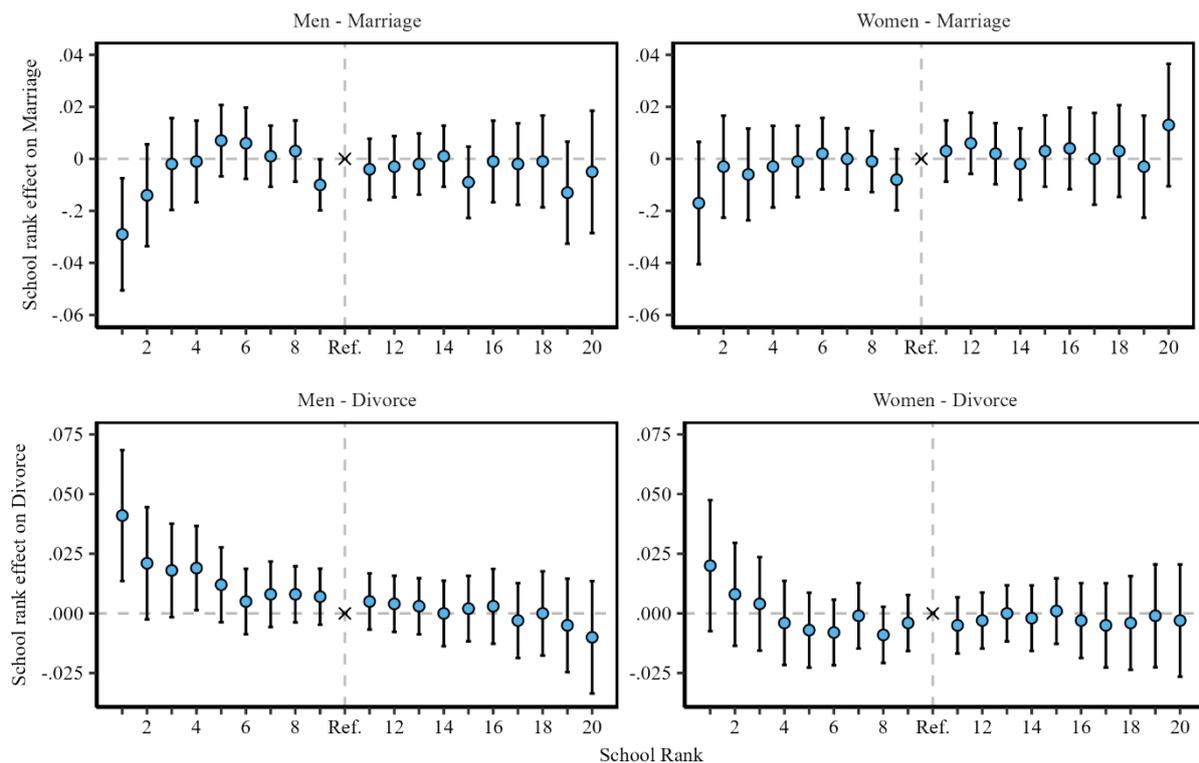
Robustness Checks and Alternative Specifications

Appendix Figures A1-A3 reproduces Figures 3-5 using models that include controls for income (equation 3). We find that even after considering the influence of BFLP on human capital, relative deprivation effects remain. This is suggestive pervasive psychological effects from reference group mechanisms at play during childhood school settings.

Appendix Figures A4-A7 reproduce Figures 2-5 using the total school rank rather than boy and girl specific rank among gender group, and total national GPA rather than boy and girl specific GPA. The effects again support an effect in the direction and magnitude of figures 2-5, with a U-shaped pattern in respect to number of children, and a predominance of relative deprivation in the direction of earlier childbearing, higher likelihood of divorce and lower likelihood of marriage. We also conduct gender specific analyses to total school rank. The results, shown in figures Appendix Figures A10 and A11, again aligning with the results of figure 2 and 3. This suggests that our findings are robust to different operationalizations of reference groups in the school context.

While it of course is preferable to measure demographic outcomes at age 45 rather than at age 40, this was not our preferred model because variance is substantially reduced as our school and enrolment fixed effects would be limited to 3 cohorts x 1400 schools rather than 8 cohorts x 1400 schools. Appendix Figures A8-A11 reproduce Figures 2-5 for the enrolment cohorts that we can observe up to age 45, and measure all demographic outcomes at age 45. The findings from figure 2-5 are very similar, suggesting that our estimates are robust age-cut-off enforced by the data.

Finally, we examine age-specific onset of parenthood, marriage and divorce in Appendix Figures A12 and A14. The findings corroborate the prevalent pattern of our analyses that relative deprivation seems to take precedence over relative gratification effects when concerning demographic outcomes. The exception to this is for the likelihood of first birth by age 25 for women, where we see that relative gratification effects decreases the likelihood of early parenthood – the likelihood of becoming a parent by age 25 is lower among women with high school rank (those who perform better relative to their school peers) compared to women with the same absolute grade but who perform average relative to their school peers.

Discussion

In modern societies, almost everyone attends comprehensive school and spends most of their days with peers in educational institutions where scholastic ability is tested, graded and compared. This study has examined whether big fish in a little pond dynamics carry over into salient adult behavior, specially in childbearing and partnering outcomes. We aim to contribute both to family sociology as well as to the broader literature on BFLP effects by providing, to our knowledge, the first comprehensive exploration of how relative school ranking might be associated with demographic behavior over the fertile life course.

Moreover, we tackle three recognized bottle-necks in the literature. First, we improve the contextual validity and reliability by using population-wide data rather than survey samples. Second, we distinguish potential relative deprivation and relative gratification channels, rather than estimating only a single average effect. Third, we mitigate selection bias more fully than many past studies by relying on a design on school-by-cohort fixed effect, school grade decile groups, and national grade rank (e.g., Denning et al., 2023; Dadgar, 2026). While this empirical strategy strengthens and takes us one step closer to causal inference, they cannot eliminate all sources of bias.

The results suggest that BFLP effects influences demographic behavior and family life in Sweden, with two key patterns in particular being outlined by our analysis. First, BFLP effects follow the gendered patterns. Among women, being at the top of the school's rank distribution, while controlling for national grade rank, leads to delayed childbearing. In contrast, for men, a lower school rank delayed fatherhood; Men at the bottom of the school's ability distribution are more likely to be childless age 40, while this pattern is less pronounced for women; school rank does not significantly influence women's likelihood of marriage or divorce, it does so for men. Men at the bottom of the school's rank distribution are less likely to have ever married by age 40 and show a decreasing probability of divorce as school rank increases.

The second pattern we observe is that relative deprivation effects (the experience of having relative lower school rank) appear more pronounced for fertility outcomes than relative gratification. This is consistent with the notion that unfavorable comparisons to school peers' scholastic achievements may undermine self-esteem, self-efficacy or perception of scholastic

ability, increasing the likelihood of negative responses, such as disruptive or problematic behavior (Comi et al., 2021) or mental health issues (Kiessling and Norris., 2023). Under this interpretation, boys exposed to relative deprivation might face challenges in the partner market and in having children. The reason for this divergence is beyond the scope of this study. We note, however, that it aligns with the possibility that psychological or behavioral elements may play a larger role in partnering and fertility outcomes for men than for women (cf. Liu et al., 2023).

These results may have implications for both policy and basic research in family sociology. First, if adverse consequences tied to relative deprivation are stronger in certain outcomes (cf. Comi et al. 2021; Kiessling and Norris 2023), while positive relative gratification effects are weaker or absent, then policies aimed at supporting mental health during school years might pay particular attention to students in lower ranks. For example, educators or policy makers might monitor the distribution of scholastic achievement, especially in high-performance schools, knowing that relatively disadvantaged students may be vulnerable. More generally, this study underscore pathways in which individual differences relevant for long term family sociological outcomes might be linked to the structure of educational systems.

Future work should aim to generate data that are not yet available but that are feasible within large and long-term interdisciplinary projects linking longitudinal administrative records with medical and other health datasets, as well as full-school panel studies. Such data would allow more rigorous mediation analysis of reference group mechanisms, child mental health and adult outcomes. Second, while school and enrolment cohort fixed effects (as well as school grade decile groups) help address selection into schools and adjust for parental and environmental unobservable factors, these approaches are not without limitation. One potential concern is that this empirical strategy may eliminate more variance that necessary, as suggested in recent advancements in sibling fixed effects research (e.g., Engzell and Hällsten 2024), which argue that too much variation can be lost. Given the identification strategy used in this study, would imply that the study's result may be conservative estimates (e.g., Delaney and Devereux 2022). At present, no single method can resolve every challenge in causal inference, except a pure randomization of students into school. Therefore, we encourage future research to find and apply a wide range of methods (e.g., sibling models, instrumental variables, panel designs) to explore the long term effects of schooling.

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Appendix

Figure A1. BFLP effects across school rank on the age at first birth, models 2-3. Men and women with at least on child by age 40.
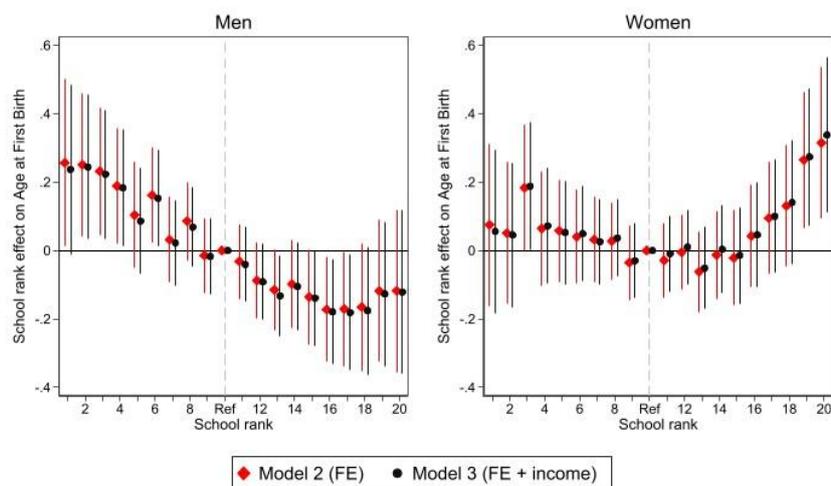

Figure A2. BFLP effects across school rank on parity progressions, models 2-3. Men and women.

BTA

Figure A3- BFLP effects across school rank on marriage and divorce, models 2-3. Men and women.

Figure A4. BFLP effects across school rank on the number of children by age 40, unisex grade rank. Men and women.

Figure A5. BFLP effects across school rank on the age at first birth, unisex grade rank. Men and women with at least on child by age 40.
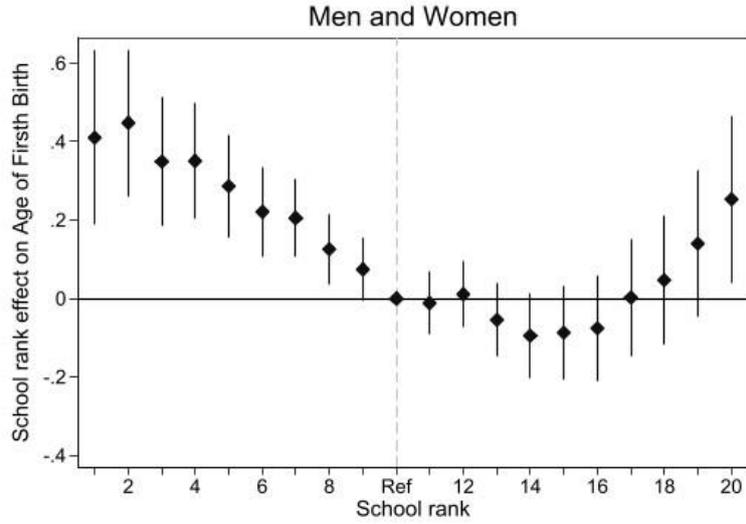
Figure A6. BFLP effects across school rank on parity progressions, unisex grade rank. Men and women.

Figure A7. BFLP effects across school rank on marriage and divorce, unisex grade rank. Men and women.
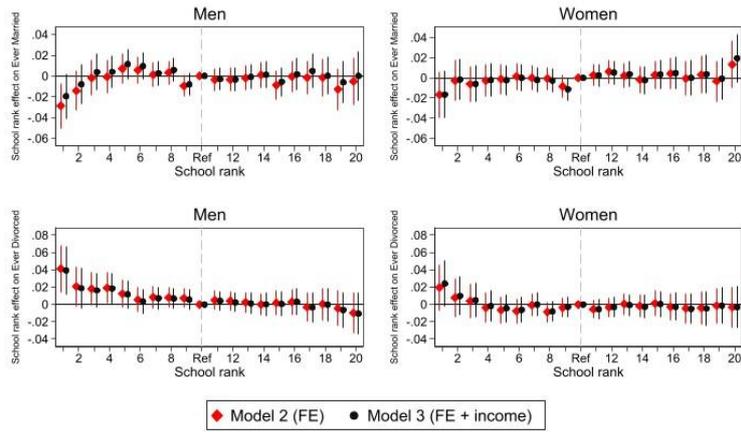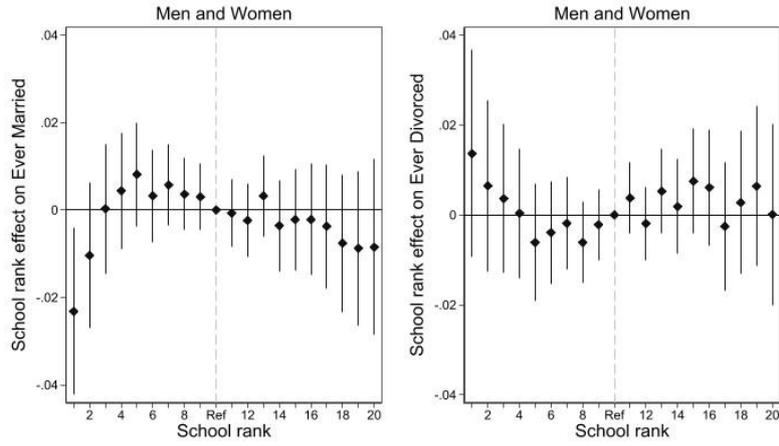
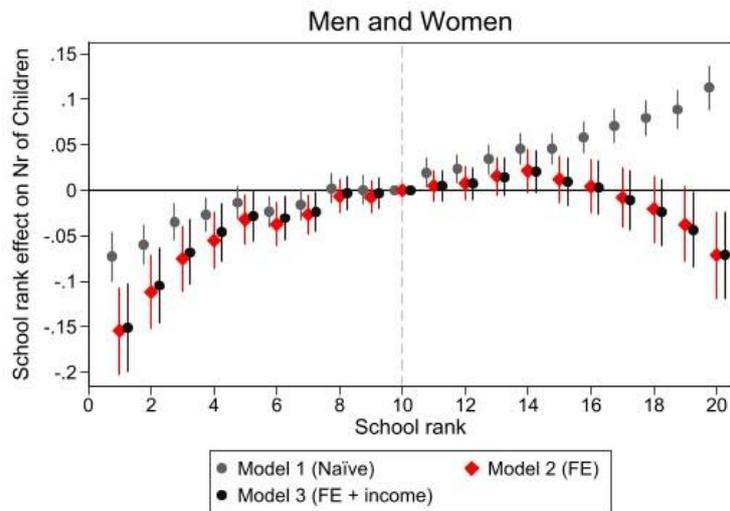Figure A8. BFLP effects across school rank on the number of children by age 45. Men and women.
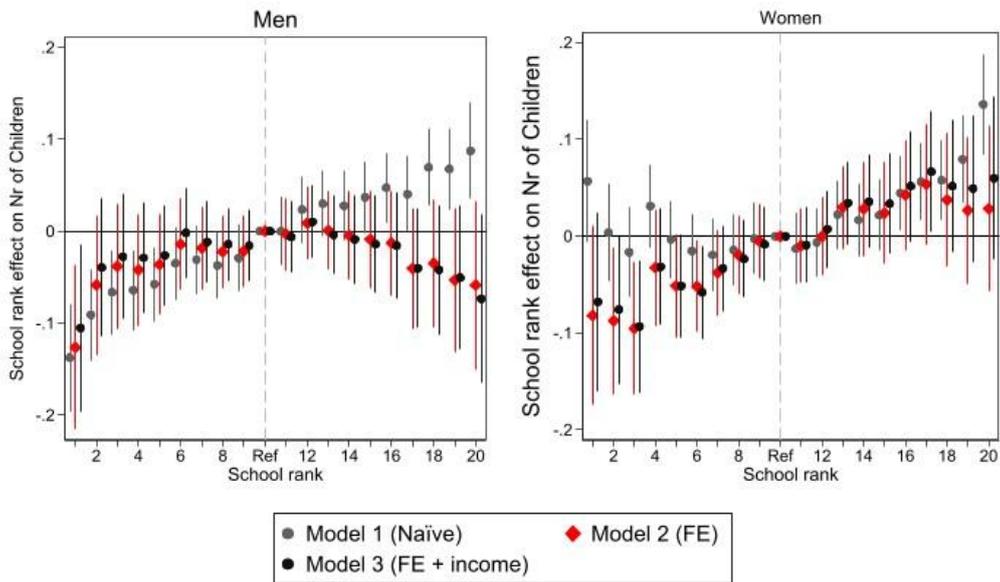
Figure A9. BFLP effects across school rank on the age at first birth by age 45. Men and women with at least on child by age 45

Figure A10. BFLP effects across school rank on parity progressions by age 45. Men and women.

TBA

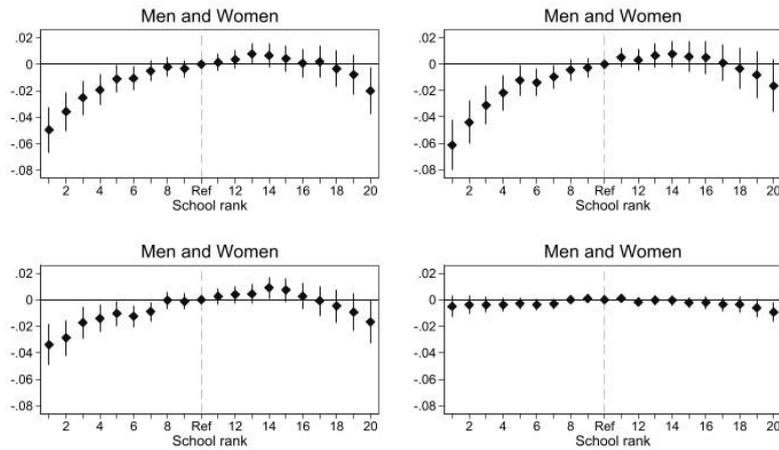Figure A11. BFLP effects across school rank on marriage and divorce by age 45. Men and women.

Figure A12. BFLP effects across school rank on first parity progression, by age 25,30,35,40. Men and women.
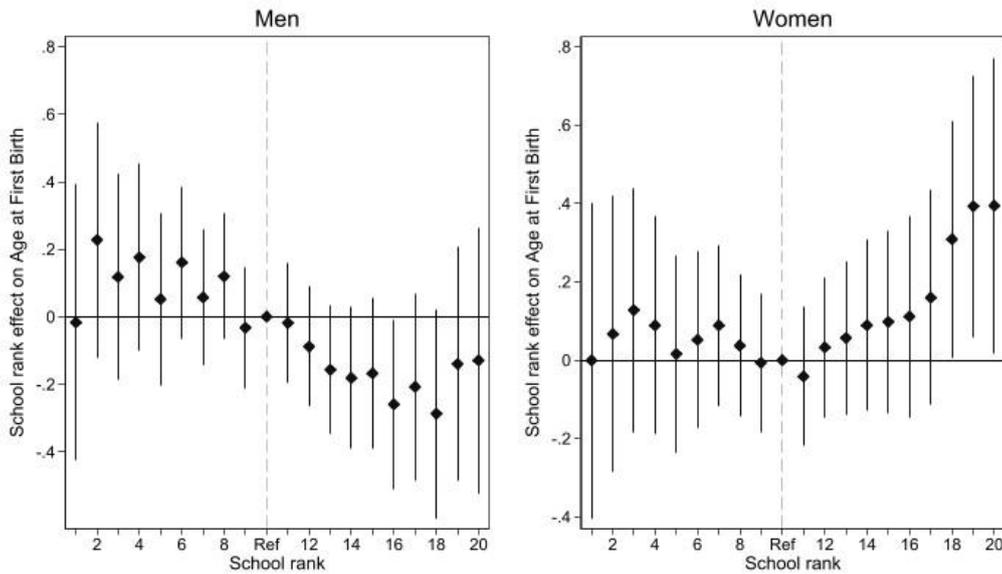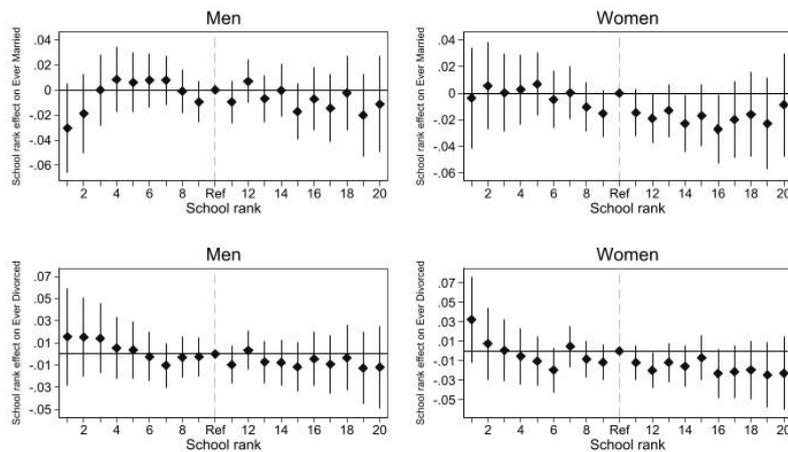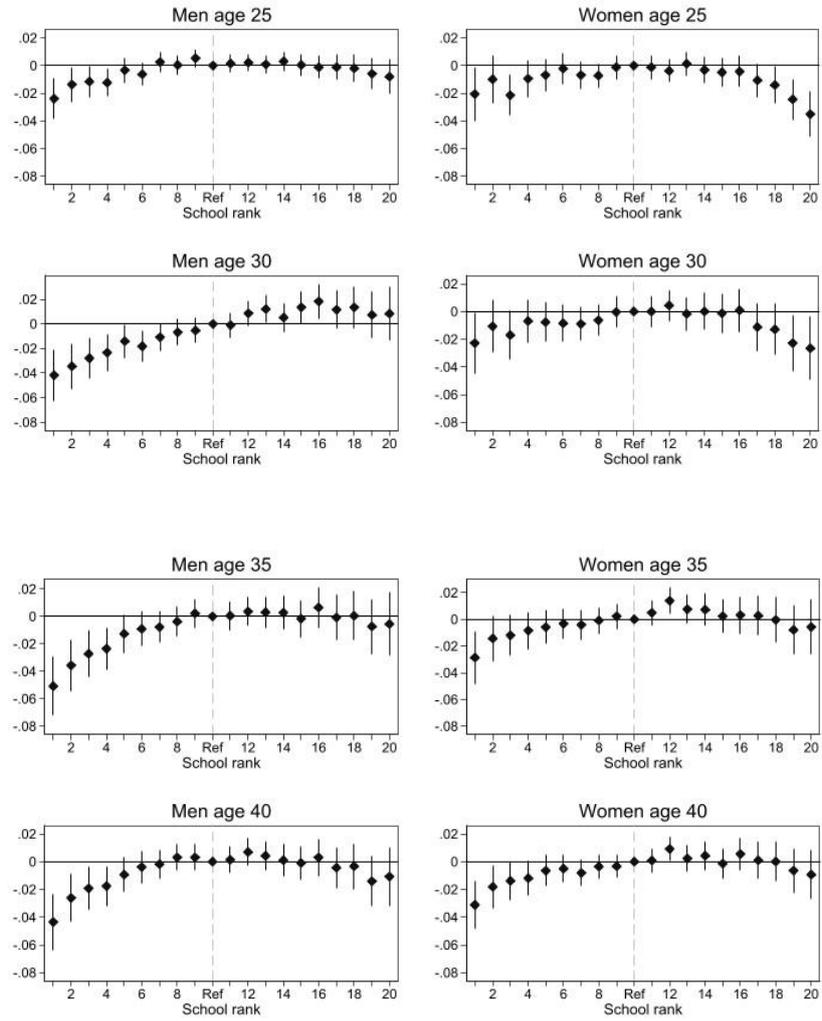
Figure A13. BFLP effects across school rank on marriage, by age 25,30,35,40. Men and women.
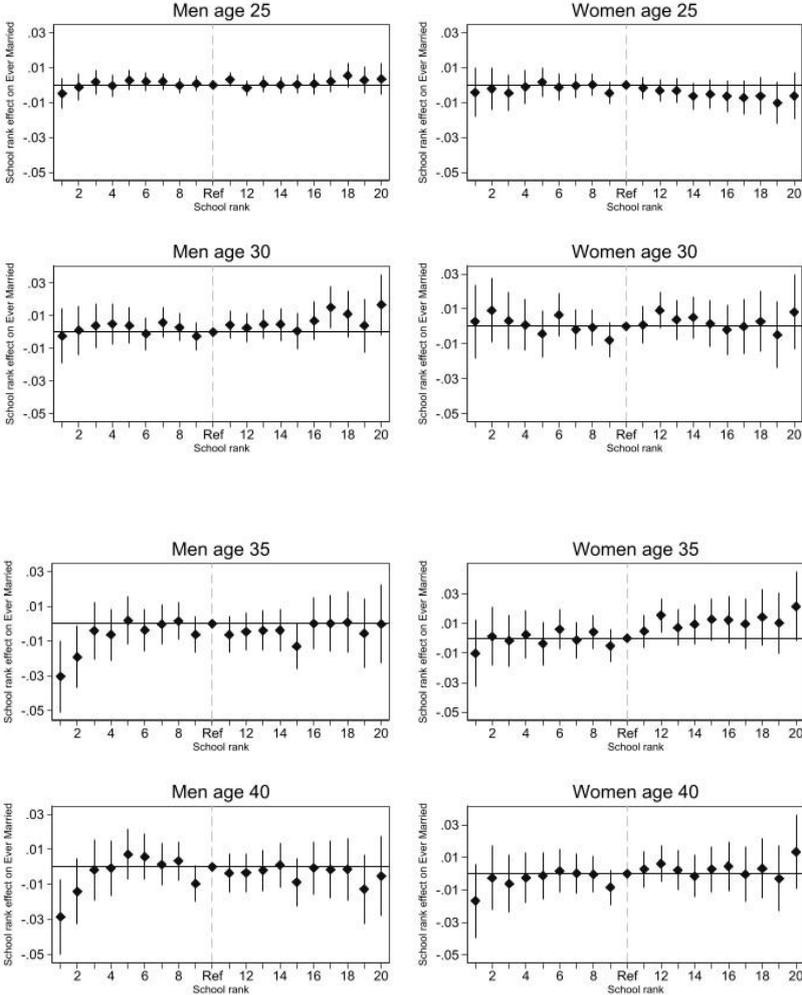
Figure A14. BFLP effects across school rank on Divorce, by age 25,30,35,40. Men and women.
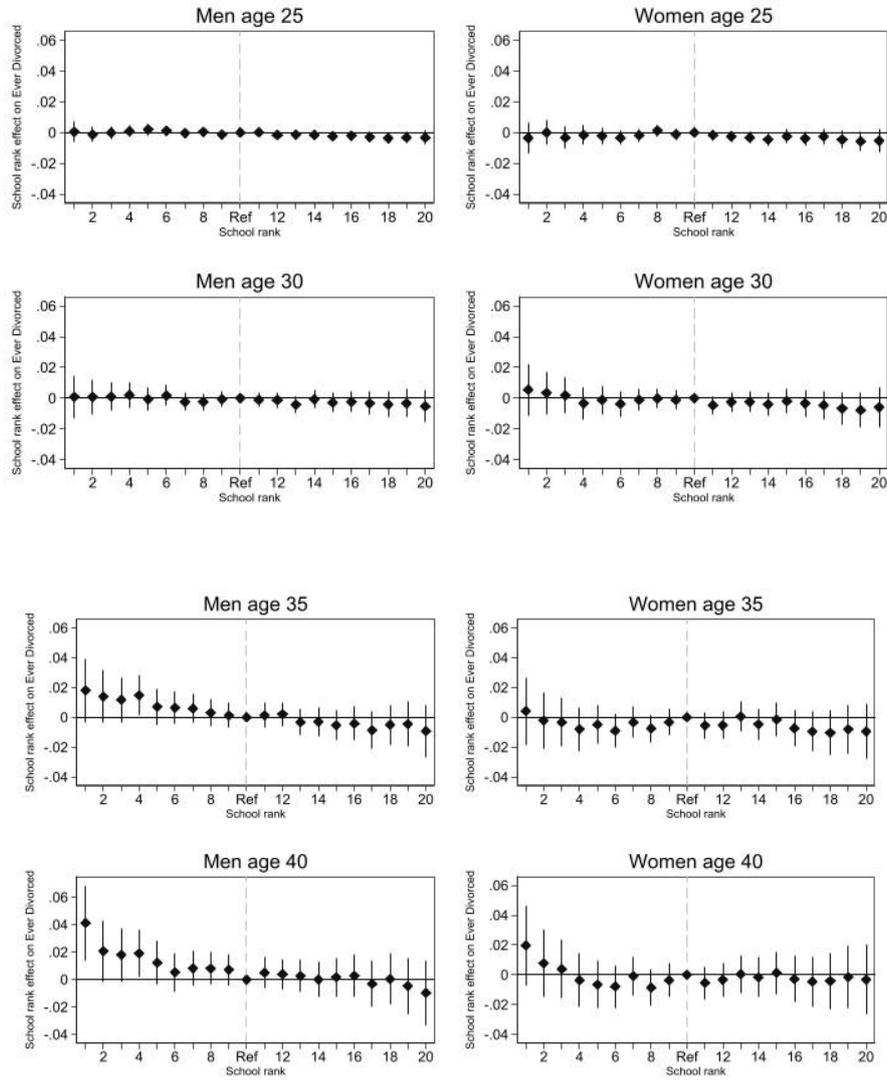
Table A1. Number of children born. Figure 2 model estimates.

	Women			Men		
	M1	M2	M3	M1	M2	M3
Rank 1	0.105***	-0.088***	-0.100***	-0.106***	-0.126***	-0.110***
	(0.018)	(0.029)	(0.029)	(0.017)	(0.028)	(0.028)
Rank 2	0.068***	-0.063***	-0.070***	-0.069***	-0.078***	-0.063***
	(0.015)	(0.024)	(0.024)	(0.015)	(0.024)	(0.024)
Rank 3	0.045***	-0.059***	-0.071***	-0.050***	-0.055***	-0.044**
	(0.014)	(0.022)	(0.022)	(0.014)	(0.021)	(0.021)
Rank 4	0.039***	-0.045**	-0.054***	-0.042***	-0.044**	-0.033*
	(0.013)	(0.019)	(0.019)	(0.013)	(0.019)	(0.019)
Rank 5	0.027**	-0.036**	-0.043**	-0.025**	-0.022	-0.012
	(0.012)	(0.017)	(0.017)	(0.013)	(0.017)	(0.017)
Rank 6	0.021*	-0.027*	-0.036**	-0.028**	-0.021	-0.012
	(0.012)	(0.015)	(0.015)	(0.012)	(0.016)	(0.016)
Rank 7	0.007	-0.026*	-0.028**	-0.015	-0.009	-0.008
	(0.012)	(0.014)	(0.014)	(0.012)	(0.014)	(0.014)
Rank 8	0.015	-0.010	-0.023*	-0.011	-0.002	0.004
	(0.012)	(0.013)	(0.013)	(0.012)	(0.013)	(0.013)
Rank 9	0.011	-0.008	-0.015	-0.005	-0.003	0.000
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Rank 11	0.017	0.003	-0.001	0.012	0.005	0.002
	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)	(0.013)
Rank 12	0.020*	0.008	0.007	0.037***	0.020	0.020
	(0.011)	(0.012)	(0.012)	(0.012)	(0.013)	(0.013)
Rank 13	0.026**	0.012	0.011	0.038***	0.010	0.008
	(0.011)	(0.013)	(0.013)	(0.012)	(0.014)	(0.014)
Rank 14	0.037***	0.020	0.017	0.039***	0.007	0.005
	(0.012)	(0.015)	(0.015)	(0.012)	(0.015)	(0.015)
Rank 15	0.032***	0.004	0.006	0.042***	0.000	0.003
	(0.012)	(0.016)	(0.016)	(0.012)	(0.016)	(0.016)
Rank 16	0.045***	0.009	0.005	0.057***	0.002	0.001
	(0.012)	(0.018)	(0.018)	(0.012)	(0.018)	(0.018)
Rank 17	0.048***	-0.000	0.002	0.063***	-0.011	-0.007
	(0.013)	(0.019)	(0.019)	(0.013)	(0.020)	(0.020)
Rank 18	0.060***	-0.007	-0.010	0.072***	-0.023	-0.024
	(0.013)	(0.021)	(0.021)	(0.013)	(0.021)	(0.022)
Rank 19	0.056***	-0.035	-0.029	0.065***	-0.053**	-0.047*
	(0.014)	(0.024)	(0.023)	(0.014)	(0.024)	(0.024)
Rank 20	0.105***	-0.041	-0.021	0.096***	-0.045	-0.044
	(0.016)	(0.026)	(0.026)	(0.016)	(0.028)	(0.028)
Observations	354,122	354,122	333,338	372,321	372,321	351,046
R-squared	0.005	0.034	0.040	0.006	0.033	0.052
All control	Y	Y	Y	Y	Y	Y
School-cohort-FE	N	Y	Y	N	Y	Y
School*ability	N	Y	Y	N	Y	Y
Income	N	N	Y	N	N	Y

Table A2. Age at first birth. Figure 3 model estimates.

	Female	Male
Rank 1	0.075	0.256**
	(0.121)	(0.125)
Rank 2	0.051	0.251**
	(0.106)	(0.107)
Rank 3	0.184*	0.232**
	(0.094)	(0.095)
Rank 4	0.064	0.189**
	(0.086)	(0.086)
Rank 5	0.058	0.104
	(0.076)	(0.079)
Rank 6	0.040	0.162**
	(0.070)	(0.071)
Rank 7	0.032	0.032
	(0.063)	(0.064)
Rank 8	0.027	0.086
	(0.057)	(0.058)
Rank 9	-0.035	-0.015
	(0.056)	(0.056)
Rank 11	-0.029	-0.031
	(0.055)	(0.056)
Rank 12	-0.005	-0.087
	(0.056)	(0.056)
Rank 13	-0.062	-0.115*
	(0.060)	(0.059)
Rank 14	-0.013	-0.098
	(0.065)	(0.065)
Rank 15	-0.022	-0.136*
	(0.071)	(0.071)
Rank 16	0.043	-0.173**
	(0.077)	(0.078)
Rank 17	0.095	-0.171**
	(0.083)	(0.086)
Rank 18	0.131	-0.165*
	(0.091)	(0.095)
Rank 19	0.265***	-0.118
	(0.101)	(0.106)
Rank 20	0.315***	-0.117
	(0.114)	(0.121)
Observations	293,135	270,396
R-squared	0.186	0.115

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A3. Parity progression. Figure 4 model estimates.

	PP1		PPP2		PPP3		PPP4	
	Female	Male	Female	Male	Female	Male	Female	Male
Rank 1	-0.031***	-0.043***	-0.036***	-0.062***	-0.020**	-0.014	-0.010*	0.000
	(0.009)	(0.010)	(0.011)	(0.011)	(0.010)	(0.008)	(0.006)	(0.004)
Rank 2	-0.018**	-0.026***	-0.023**	-0.041***	-0.021**	-0.013*	-0.011**	0.003
	(0.008)	(0.009)	(0.009)	(0.010)	(0.009)	(0.007)	(0.005)	(0.004)
Rank 3	-0.014**	-0.019**	-0.016*	-0.030***	-0.019**	-0.007	-0.011***	0.002
	(0.007)	(0.008)	(0.009)	(0.009)	(0.008)	(0.007)	(0.004)	(0.003)
Rank 4	-0.012*	-0.018**	-0.013*	-0.022***	-0.012*	-0.004	-0.007**	0.002
	(0.006)	(0.007)	(0.008)	(0.008)	(0.007)	(0.006)	(0.004)	(0.003)
Rank 5	-0.007	-0.009	-0.012*	-0.012*	-0.012**	0.001	-0.006*	0.000
	(0.006)	(0.007)	(0.007)	(0.007)	(0.006)	(0.005)	(0.003)	(0.003)
Rank 6	-0.005	-0.004	-0.008	-0.011	-0.007	-0.005	-0.005*	-0.002
	(0.005)	(0.006)	(0.006)	(0.007)	(0.006)	(0.005)	(0.003)	(0.002)
Rank 7	-0.008*	-0.002	-0.009	-0.001	-0.010*	-0.001	-0.004	-0.002
	(0.005)	(0.005)	(0.006)	(0.006)	(0.005)	(0.004)	(0.003)	(0.002)
Rank 8	-0.004	0.003	-0.007	-0.004	0.004	-0.002	-0.001	0.001
	(0.004)	(0.005)	(0.005)	(0.006)	(0.005)	(0.004)	(0.002)	(0.002)
Rank 9	-0.003	0.003	0.001	-0.002	-0.003	0.002	0.001	-0.002
	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.002)	(0.002)
Rank 11	0.001	0.001	0.004	0.000	0.000	0.003	-0.002	0.001
	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.002)	(0.002)
Rank 12	0.009**	0.007	0.004	0.010*	-0.002	0.008**	-0.000	-0.000
	(0.004)	(0.005)	(0.005)	(0.006)	(0.005)	(0.004)	(0.002)	(0.002)
Rank 13	0.002	0.004	0.003	0.007	0.004	0.006	0.000	0.001
	(0.005)	(0.005)	(0.006)	(0.006)	(0.005)	(0.004)	(0.002)	(0.002)
Rank 14	0.004	0.001	0.003	0.006	0.006	0.003	0.002	0.001
	(0.005)	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)	(0.003)	(0.002)
Rank 15	-0.001	-0.001	-0.001	-0.002	0.007	0.005	-0.001	0.001
	(0.006)	(0.006)	(0.007)	(0.007)	(0.006)	(0.005)	(0.003)	(0.002)
Rank 16	0.006	0.003	-0.003	0.001	0.006	0.003	0.000	-0.000
	(0.006)	(0.007)	(0.007)	(0.008)	(0.006)	(0.006)	(0.003)	(0.003)
Rank 17	0.001	-0.004	-0.005	0.000	-0.002	0.004	0.003	-0.004
	(0.007)	(0.008)	(0.008)	(0.008)	(0.007)	(0.006)	(0.003)	(0.003)
Rank 18	0.000	-0.003	-0.007	0.001	-0.002	-0.007	0.002	-0.002
	(0.007)	(0.008)	(0.009)	(0.009)	(0.008)	(0.007)	(0.004)	(0.003)
Rank 19	-0.006	-0.014	-0.017*	-0.015	-0.008	-0.013*	-0.002	-0.002
	(0.008)	(0.009)	(0.010)	(0.010)	(0.009)	(0.008)	(0.004)	(0.003)
Rank 20	-0.009	-0.011	-0.020*	-0.007	-0.012	-0.011	-0.000	-0.005
	(0.009)	(0.011)	(0.011)	(0.012)	(0.010)	(0.009)	(0.005)	(0.004)
Observations	354,122	372,321	354,122	372,321	354,122	372,321	354,122	372,321
R-squared	0.030	0.032	0.033	0.035	0.034	0.028	0.044	0.031
All control	Y	Y	Y	Y	Y	Y	Y	Y
School-cohort-FE	Y	Y	Y	Y	Y	Y	Y	Y
School*ability	Y	Y	Y	Y	Y	Y	Y	Y

Table A4. Divorce and marriage. Figure 5 model estimates.

Table 4A – Married at age 40			Divorced at age 40	
	Female	Male	Female	Male
1	-0.017	-0.029***	0.020	0.041***
	(0.012)	(0.011)	(0.014)	(0.014)
2	-0.003	-0.014	0.008	0.021*
	(0.010)	(0.010)	(0.011)	(0.012)
3	-0.006	-0.002	0.004	0.018*
	(0.009)	(0.009)	(0.010)	(0.010)
4	-0.003	-0.001	-0.004	0.019**
	(0.008)	(0.008)	(0.009)	(0.009)
5	-0.001	0.007	-0.007	0.012
	(0.007)	(0.007)	(0.008)	(0.008)
6	0.002	0.006	-0.008	0.005
	(0.007)	(0.007)	(0.007)	(0.007)
7	0.000	0.001	-0.001	0.008
	(0.006)	(0.006)	(0.007)	(0.007)
8	-0.001	0.003	-0.009	0.008
	(0.006)	(0.006)	(0.006)	(0.006)
9	-0.008	-0.010*	-0.004	0.007
	(0.006)	(0.005)	(0.006)	(0.006)
11	0.003	-0.004	-0.005	0.005
	(0.006)	(0.006)	(0.006)	(0.006)
12	0.006	-0.003	-0.003	0.004
	(0.006)	(0.006)	(0.006)	(0.006)
13	0.002	-0.002	0.000	0.003
	(0.006)	(0.006)	(0.006)	(0.006)
14	-0.002	0.001	-0.002	0.000
	(0.007)	(0.006)	(0.007)	(0.007)
15	0.003	-0.009	0.001	0.002
	(0.007)	(0.007)	(0.007)	(0.007)
16	0.004	-0.001	-0.003	0.003
	(0.008)	(0.008)	(0.008)	(0.008)
17	-0.000	-0.002	-0.005	-0.003
	(0.009)	(0.008)	(0.009)	(0.008)
18	0.003	-0.001	-0.004	0.000
	(0.009)	(0.009)	(0.010)	(0.009)
19	-0.003	-0.013	-0.001	-0.005
	(0.010)	(0.010)	(0.011)	(0.010)
20	0.013	-0.005	-0.003	-0.010
	(0.012)	(0.012)	(0.012)	(0.012)
Observations	353,451	371,577	353,451	371,577
R-squared	0.039	0.048	0.040	0.030
All control	Y	Y	Y	Y
School-cohort-FE	Y	Y	Y	Y
School*ability	Y	Y	Y	Y