Education, gender, and family formation

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Abstract

We study the effect of educational attainment on family formation using regression discontinuity designs generated by centralized admissions processes to both secondary and tertiary education in Finland. Admission to further education at either margin does not increase the likelihood that men form families. In contrast, women admitted to further education are more likely to both live with a partner and have children. We then pre-register and test two hypotheses which could explain each set of results using survey data. These suggest that the positive association between men's education and family formation observed in the data is driven by selection. For women, our estimates are consistent with the idea that, as increased returns to social skills shift the burden of child development from schools to parents and particularly mothers, education can make women more attractive as potential partners.

Keywords: family, education, gender
JEL Classification: J13, I26

In response to the wide-ranging consequences of falling fertility rates, governments across high income countries are considering how to increase rates of family formation (Harper, 2014; OECD, 2021). A focus of these efforts has often been either on men with low levels of education, who are the least likely to form families (Miettinen et al., 2015; Greenwood et al., 2016; Jalovaara et al., 2019), or on making career and family more compatible for highly educated women (Baudin et al., 2015; Bertrand et al., 2021; Goldin, 2021). Despite significant scientific interest in the relationship between education and family formation (Becker, 1981; Doepke et al., 2023), however, there remains limited empirical evidence on how education shapes family formation across the life-cycle.

If men and women face different opportunities in the labor market or if women hold comparative advantages in household production, the incentives for and returns to investing in education may differ by gender (Becker, 1965). A common view – and a pattern supported by both cross-national and within country historical comparisons – is that while increases in education may be associated with higher rates of family formation for men, the relationship between education and family formation may exhibit a hump-shape for women, whereby highly educated women are less likely to form families (Baudin et al., 2015; Bertrand et al., 2021).

But, the past century has seen a tremendous progress in the labor market opportunities for women and technological changes have weakened the economic incentives for one partner to specialize in household production (Kleven and Landais, 2017; Goldin, 2021; Doepke et al., 2023). Over this period, the hump-shaped relationship between women's education and family formation has begun to flatten or even reverse in countries with more egalitarian gender norms (Esping-Andersen and Billari, 2015; Bertrand et al., 2021). In addition to changes in gender norms, several governments have implemented family policies that have made it increasingly possible to combine career and family (Bar et al., 2018; Doepke et al., 2023; Hazan et al., 2023). In fact, today, highly educated women in several high income countries are more likely to form families than women with less education (Jalovaara et al., 2019; Doepke et al., 2023).

In Finland, our data show these same patterns. In the past, the relationship between women's educational attainment and family formation was negative. Today, however, increased educational attainment is associated with higher rates of family formation for both men and women. This is not to say that this relationship is causal. Men and women with different educational trajectories are likely to vary in numerous ways – including the types of families they come from as well as their preferences prior to making educational investments.

To isolate the effects of education on family outcomes we use a pair of regression discontinuity designs (RDD) generated by centralized admissions processes to secondary and tertiary education. The first discontinuity increases the probability that first-time applicants to secondary education obtain any secondary educational degree. Likewise, the second design, focuses on first-time applicants to universities of applied sciences, and – as in Hoekstra (2009) or Zimmerman (2014) – increases

the probability that applicants complete any tertiary education. Both designs focus on how access to additional education affects the marginal applicant. We then follow men and women through their late thirties (age 38), tracing the effects of the admissions decisions on whether they cohabit or have children.

Prior research attempting to isolate the causal effects of education on family formation has almost exclusively focused on women at low education levels and used increases in the length of compulsory education for identification (Breierova and Duflo, 2004; Black et al., 2008; Monstad et al., 2008; Silles, 2011; Cygan-Rehm and Maeder, 2013; Fort et al., 2016; Geruso and Royer, 2018; Chen and Guo, 2022; Cummins, 2022).[1] These studies typically find that increasing female education reduces teenage pregnancy.[2] Studies that track fertility over a longer period find either no effect or a negative effect on total fertility (Cummins, 2022; Fort et al., 2016; Cygan-Rehm and Maeder, 2013; Monstad et al., 2008). There remains little evidence on how education shapes life-cycle dynamics in family formation, particularly for men, women with post-secondary education, or for the most recent cohorts. We extend this empirical literature with new insights on how education affects family formation across the board, including for policy relevant groups such as highly educated women and men with low levels of education.

Our regression discontinuity results show that increases in educational attainment increase the probability that women form families by their late thirties. Women admitted to secondary education are over 5 percentage points more likely to have a child by age 38. While these estimates are a little noisy, we obtain similar but more precise estimates at the margin for tertiary education. Women admitted to universities of applied science are about 5 percentage points more likely to have a child by age 38. In contrast, the marginal man admitted to either secondary or tertiary education is no more likely to have children than their peers who are just barely denied admission to further education. While it is possible that these results could change as men enter their forties, our estimates do not show signs of a trend in the prior few years. Further, the descriptive data shows that by about the age of 35, the relationship between education and childbearing already begins to stabilize, while the relationship between education and partnership stabilizes by people's early thirties. Finally, our regression discontinuity estimates show that, if anything, men admitted to further education are less likely to cohabit or marry than their less educated peers while women experience an increase in the

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[1]A handful of papers use other sources of variation to study the effects of education on family formation. For example, McCrary and Royer (2011) use age-at-school-entry policies to identify the effect of female education on fertility. Amin and Behrman (2014) compare twin women in the United States with different levels of education, and find that more educated twins have fewer children, but are equally likely to be childless. Tropf and Mandemakers (2017) compare female twins and argue that a large portion of the raw association between education and fertility is likely to be explained by family background. Humlum et al. (2017) use a regression discontinuity design from college admissions to study how the timing of college affects family formation. See Koebe and Marcus (2022) who also study the timing of education and family formation.

[2]Within this literature, Fort et al. (2016) note an important caveat, observing that the negative effects of education on teenage fertility do not extend across national contexts in continental Europe.

rates of cohabitation and marriage.

These results challenge existing theories for how education may shape the probabilities by which men and women form families. A common view is that if education increases income, education should improve men's prospects to form families (Becker, 1981). And, if education increases the opportunity cost for women to form families, education may decrease women's rates of family formation (Baudin et al., 2015). In contrast, we find that education has no effect on men's family formation rates despite large and persistent effects of admission to tertiary education on men's income. Further, we find that increased educational attainment raises the probability that women cohabit and have children even though we find that admission to tertiary education improving women's early career incomes.

However, considering that Finland is a country with relatively weak gender norms and strong family policies, it may not be altogether surprising that there is no negative relationship between educational attainment and women's probabilities of forming families (Bertrand et al., 2021; Doepke et al., 2023). More surprising is that our regression discontinuity results suggest that the effect of education on women's family formation outcomes is positive – even at the tertiary education margin, and education does not increase the probability that men form families.

Since our main results are not easily explained by the channels highlighted in the existing literature, we acquire additional register data and collect new survey data to conduct additional analysis, aiming to shed more light on our main results. To tie our hands in this analysis, we published a working paper with our main results, and pre-registered the hypotheses we would further examine before collecting the new survey data.

One potential explanation for why access to education might increase the likelihood that women form families is if education shifts women into jobs which make it easier to combine career and family Doepke et al. (2023). As a first step to assess this hypothesis, we follow Goldin (2014) and Bang (2022), and link our sample to measures of job flexibility based on O*NET. In line with recent research showing that white collar jobs provide more job flexibility (Adams-Prassl et al., 2022), we show that higher levels of education are often associated with increased job flexibility. However, using our regression discontinuity designs, we show that admission to further education has only small and ambiguous effects on women's job flexibility. Moreover, the data from our survey indicates that, if anything, educated women are more likely to report that their jobs present obstacles for forming families.

We offer a skill-based explanation for why education might increase the rates of family formation for women in particular. Human capital – and particularly higher order skills – are increasingly important in determining people's economic outcomes (Goldin and Katz, 2009; Deming, 2017). While schools are still learning how to foster non-academic skills, parents have been shown to be crucial in developing these types of higher order skills (Doepke and Zilibotti, 2017; Black et al.,

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2018). Moreover, recent research from Sweden suggests that parents are aware of these shifts in skill-demand (Hermo et al., 2022). As the returns to human capital have increased and technological changes have reduced the costs of household chores, household production in couples has shifted from chores to investment in children (Lundberg and Pollak, 2014; Chiappori et al., 2017). This is documented in recent studies which show that highly educated mothers spend more time with their children in childcare intensive activities – even though they enjoy it less and face higher opportunity costs than their less educated peers (Dotti Sani and Treas, 2016; Kalil et al., 2023). Together, these changes in the labor market shift the burden of skill development from schools to parents and, more notably, to mothers. In turn, we suggest that given the outsize contributions of mothers to child development – particularly in the early years, education may make women more attractive as potential spouses. This could be either because maternal education signals parental ability or if education allows women to enter careers where they are better able to combine career and family. By and large, our survey data supports this hypothesis. This data shows us that more recent cohorts of adults in Finland perceive the growing importance of social rather than academic skills in the labor market, and believe that, compared to academic skills, social skills are best developed by parental inputs – and particularly those of mothers. Moreover, we find that younger cohorts of men are increasingly likely to indicate a preference for college educated partners.

Our pre-registered hypotheses regarding why education might not increase men's likelihoods of forming families are not, however, supported in our survey data. Within the framework of Becker (1981), one potential explanation for why education might not increase men's likelihoods of forming families is if education simultaneously raises not just the value of men on the marriage market, but also the value that men ascribe to leisure time (Lerman, 1989). Challenging this idea, our survey data show that men with tertiary degrees are no more likely to perceive lifestyle changes accompanying family formation as an factor preventing them from settling down. Another potential explanation for the lack of effects of education on men's likelihoods of forming a family is that if the earnings premium resulting from higher education makes men more attractive on the marriage market, men may perceive a lower risk to remaining single and delay cohabitation – potentially until it is too late to find a suitable spouse. Our survey data, however, suggest that men with tertiary education are no less likely to report difficulties in finding a suitable partner as an obstacle for having children, and they indicate being more ready to commit to a relationship. The lack of support for these hypotheses leaves open the possibility that the relationship between education and family formation amongst men is driven by selection. Although this may be surprising, Huttunen and Kellokumpu (2016) find a similar pattern of effects in their analysis of income shocks on fertility choices, whereby women who suffer an income shock decrease their fertility while men are unaffected.

Together, our results have important implications for policy. Two groups which have received the brunt of attention from policy-makers are men with low levels of educational attainment and women

with post-secondary education (Sobotka et al., 2019; OECD, 2021). Our results offer new insights regarding both groups. Our results suggest that, for men, education improves their position in the labor market but is not a panacea for increasing the rates of family formation. These results are sobering in that they do not offer easy solutions for policymakers interested in raising fertility rates among men with low levels of education. Our findings highlight the importance of developing more theory and empirical evidence focused on the family formation of men, a group that has been largely ignored in prior research. For women, we find that post-secondary education may not lower rates of family formation and can even increase them. This suggests that factors like education, which can help advance women's careers, can also promote family formation. However, our results show that while higher education leads to substantial increases in earnings for men, the earnings effects for women are very modest – a potential consequence of mothers remaining in a singular position in their role for child development. This highlights the complexity of designing family policies that simultaneously promote maternal employment and foster child development.

1   Institutional setting

Finland shares several key institutional features with other Western countries, making it an interesting context to study the relationship between education, gender, and family formation. First, the structure of education in Finland is typical, with the end of compulsory education (age 16) and application to tertiary education (age 19) representing the two main junctures in the education system. Second, the educational attainment of women has surpassed that of men. And third, fertility rates have declined over the last decades.

1.1   The structure of education in Finland

Compulsory education in Finland begins at age seven, and – for the cohorts we study – continues through age sixteen.[3] Compulsory education is followed by upper secondary school in either general or vocational programs. After secondary education – typically age nineteen – students have the opportunity to continue to higher education (see Figure A.2). Higher education in Finland is formally divided into two types of programs – those offered in universities of applied science and those offered in universities. While it is difficult to draw a precise analogy, in the United States universities of applied science might correspond to public universities outside of state flagships and in the United Kingdom these schools might correspond to polytechnics.

In our main analysis we focus on shifts in educational attainment that occur when students are either granted admission or denied entry to any upper-secondary program or universities of

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[3]In 2021 this changed, as the compulsory schooling age in Finland was raised to 18.

applied science. While we include all secondary programs at the secondary school margin, we focus exclusively on universities of applied science at the tertiary margin. This is because in the cohorts we study, admissions scores are only available for universities of applied science – and applications to universities does not take place through a centralized admissions system. Fortunately, as in Hoekstra (2009) or Zimmerman (2014), admission to these schools typically determines whether or not students are admitted to any tertiary program.

Admissions to both upper-secondary and universities of applied science takes place through a centralized application system maintained by the Finnish National Board of Education (FNBE) and follows a deferred acceptance algorithm based on admissions scores and applicants' ranked preferences over various programs. Admissions scores to upper-secondary school are based primarily on grades (GPA) in the last year of compulsory school, while admissions scores to tertiary education are typically based on a combination of secondary school grades, end of high school exams (formally called the matriculation exam), and program-specific entrance exams.

We focus on cohorts born between 1979 an 1985. In these cohorts nearly all apply to upper-secondary education, and a little less than 90 percent obtain a degree from secondary education.[4] Approximately 60 percent apply to higher education by age 23.[5] Of these applicants, 40 percent apply only to universities of applied science, 40 percent apply to both universities of applied science as well as traditional universities, and 20 percent apply only to traditional universities. In these cohorts, close to 45 percent complete higher education degree.

1.2 Education, gender, and fertility today

To situate cohorts born between 1979 and 1985 in time and place, we contextualize education and fertility in contemporary Finland compared to other countries, and picture key measures of education and family formation in Finland over time. Finland is broadly representative of Western countries in terms of average years of schooling and total fertility rates (Figure A.1). Moreover, in Finland today, as in most OECD countries, women aged 25-34 are more likely than men to obtain higher educational degrees (Figure A.3). In the cohorts we study, 39 percent of men have earned a tertiary degree by age 37, while 44 percent have a secondary degree but no tertiary degree, and 17 percent do not hold a degree from post-compulsory education. The corresponding numbers are 56, 45, and 9 percent for the women in our sample (Figure A.4).

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[4]For additional details on application behavior and admissions processes to secondary education in Finland, see Silliman and Virtanen (2022) and Huttunen et al. (2023).

[5]While the majority of first-time applications to higher education take place at age nineteen and defer admission, some wait a few years to apply. This is particularly true for men, who are required to serve in the Finnish Defence Forces for a minimum of six months.

Figure 1: Cohort trends in fertility by education and gender

(a) Has child (age 42), women

(b) Has child (age 42), men
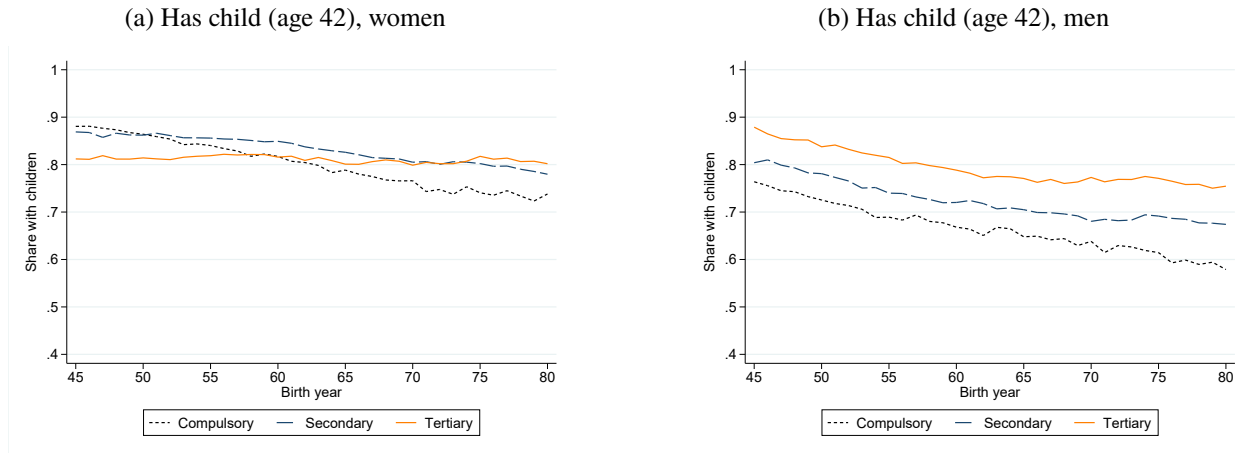
Notes: These figures plot the share of cohorts who have children by age 42 by educational levels, for women (a) and men (b) separately. The x-axis in both figures shows birth years from 1945 to 1980.

Traditionally, women with high levels of education were less likely to have children than their less educated counterparts (Goldin, 2021). This is also what we see in data from Finland (Figure 1). However, gender roles as they pertain to work and family have shifted dramatically over the past century (Goldin, 2021; Doepke et al., 2023). Our data shows that highly educated women in the more recent birth cohorts are the most likely to have children.

Strikingly, this change is driven by falling fertility rates amongst all the groups we observe except for highly educated women.[6] The likelihood of having a child has been remarkably stable over this period for women with tertiary education. While women born in 1945 who obtained tertiary degrees were almost 10 percentage points less likely to have kids than their less educated peers, since the cohort born in 1975 women with higher education have been most likely to have children.

For men, having children is strongly positively correlated with education across all cohorts examine. The number of children has also declined fairly steadily in all education groups, with the differences between education groups slightly widening over time. This is in line with the pattern of results reported by Bratsberg et al. (2021) in Norway, who show that the gap in childlessness between high and low earning men has grown over past decades.

Data from Sweden also shows increases in the share of high income women who have children over the past several decades (Chudnovskaya and Ueda, 2023). Parallel to these shifts in fertility patterns, Bertrand et al. (2021) observe that marriage rates amongst highly educated women have

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[6]See research documenting these trends by education and gender in recent work by demographers in Finland (Jalovaara et al., 2019; Jalovaara and Andersson, 2023; Savelieva et al., 2023) as well as in other western countries (Bongaarts, 1999; Sleebos, 2003; Impicciatore and Tomatis, 2020). Although this decline in fertility has coincided with development, research also points out that within countries people at higher economic levels have escaped the most recent declines (Myrskylä et al., 2009).

flipped in all Nordic countries, as well as in Canada, Ireland, the United Kingdom, and the United States. Likewise, Low (2024) shows that the relationship between a women's income and their spouse's income ceased to be non-monotonic at the top of the income distribution in the United States around the same time as we see the fertility pattern shift in Finland.

2   Data sources and descriptive statistics

2.1   Data sources and outcomes

We link together several administrative registries spanning data on demographic characteristics and family background, educational admissions decisions, education and labor market outcomes, as well as measures of family formation and fertility. So that we can both follow applicants as long as possible – to their late thirties – and access detailed data on educational admissions decisions, we focus on cohorts born between 1979 and 1985.

Our primary source of data are population-wide administrative registers at Statistics Finland. Demographic characteristics come from the FOLK Basic data module (Statistics Finland, 2023b). We merge this data to the EDUC Student and Degree Registers, which contain information on the year, level, and field of study of all post-compulsory enrollment and degree completion (Statistics Finland, 2023a,g). We identify both parents and children of our sample from the Child- Parent data (Statistics Finland, 2023c). The FOLK Income and Employment Modules (Statistics Finland, 2023f,e) provide us with detailed measures of labor market outcomes for both our sample and their parents. We have information on marriage and cohabitation from the FOLK Cohabitation module (Statistics Finland, 2023d).

Our primary outcomes are two key dimensions of family formation – having children and having a partner. In our preferred measures of these outcomes, we measure these both through binary indicators. Our measure for having children is simply zero if a person does not have any children by a certain age, and one if the person has had children by that age. Our measure for having a partner takes a value of one if a person is observed cohabiting with a partner or is married at each age, and zero otherwise. Cohabitation and marriage outcomes are measured annually to take into account both partnerships and separations.

We complement these primary measures with two other measures: the number of biological children each person has, such that having no children is coded as zero; and, a binary indicator for partnership based only on marriage. Compared to our two preferred measures of family formation, these alternative measures focus less exclusively on whether or not people form families, but capture what kinds of families people have.

The application and admissions information we use to construct the regression discontinuity

designs comes from the Finnish National Agency for Education. The Secondary Education Application Registry contains information of compulsory school performance, secondary school application preferences, and admissions results (Finnish National Board of Education, 2023a). We focus on first time applicants between the years 1996 and 2000 who are 15-17 years old at the time of applying. For the tertiary margin, we use the Application Registry of University of Applied Sciences that includes information on application scores, application preferences, and admissions results (Finnish National Board of Education, 2023b). Here we focus on 19-23 year old first time applicants in 2003 and 2004.

We complement the registry data with an original survey to test our hypotheses regarding the potential mechanisms driving our main results. This survey was designed and implemented in collaboration with EVA in Finland in the last two weeks of March, 2024. The survey instrument we used for data-collection is included in Appendix B, and a pre-registration for how we originally planned to use this data to test our hypotheses is registered at the Foundation for Open Science.[7] The survey panel intends is used by EVA research to represent a nationally representative sample, and includes survey weights to help achieve this aim. The survey was sent to 10,000 people, and we received responses from 2,087 individuals.

Additionally, we use publicly available data from several other sources to provide further insight into our context and mechanisms underlying our results. First, we provide an international comparison of gender differences in educational attainment in Finland using data from the OECD (2022). Second, we show how gender norms in Finland compare to other European countries using data from the European Institute for Gender Equality EIGE (2023). Finally, we follow Goldin (2014) and Bang (2022) and construct occupational level measures of job-flexibility using data from the O*NET (2023) database. These measures are linked to Finnish registry data on occupations based on four digit ISCO-2008 codes and then to six-digit educational degrees.

2.2 Family formation by education level

Merging these data sources together, we are able to follow full cohorts of Finnish men and women born between the years 1979 and 1985 through the year 2022, typically through age 37 (tertiary sample) or 38 (secondary sample). Restricting our sample to only the two oldest cohorts we lose statistical power necessary for our regression discontinuity design, but are able to follow individuals through age 42.

To provide a first sense of how education and gender relate to our four main measures of family formation, we plot the means of each of our outcomes over the life-cycle separately for men and women. Figures 2a-2b show how the share of people who have children vary by education levels and

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[7]Open Science Foundation: `https://doi.org/10.17605/OSF.IO/5UWR8`.

gender through people's early forties. These figures show that both men and women with the lowest levels of education – only a compulsory degree – have children earlier than people with secondary or tertiary degrees. And, that having children is delayed for both men and women with tertiary degrees. By age 28, however, women with secondary degrees are already more likely to have children than those with only compulsory degrees. The same pattern holds for men, with a two year delay. By age 37, women with tertiary degrees overtake those with either only secondary or compulsory degrees, and are the most likely to have a child. Similarly, higher educated men overtake their lower-educated counterparts by age 34, and are the most likely to have children. Overall, about seventy-five percent of women and seventy percent of men have children by the time they are 42. The descriptive pattern for the number of children people have by education looks qualitatively similar for men, but highly educated women still have fewer kids than their less educated peers at age 42 (Figure A.6).

Next, we turn to the relationship between educational attainment and having a partner (Figures 2c-2d). In contrast to having children, men and women with higher levels of education do not appear to significantly delay cohabitation or marriage. For women, rates of cohabitation increase rapidly after age 17 – or 18 for women who go on to obtain higher educational degrees. Already age 20, however, the rate of cohabitation for women with only compulsory school degrees begins to plateau, peaking at around 45 percent at age 30, and decreasing to 40 percent by age 38. The rate of cohabitation for women with secondary degrees plateaus by their mid-twenties, peaking just above age thirty, before declining to just over 60 percent at age 38. While women who obtain higher educational degrees are slightly slower to cohabit, by 26 they are already the group of women who are most likely to live with a partner – and this is the only group of women who experience no decline in cohabitation through their late thirties. By age 38, rates of cohabitation vary drastically by education level, with almost 75 percent of highly educated women are living with a partner – almost double the rate of cohabitation compared to women with the lowest levels of education. While slightly delayed, these patterns look very similar for men. Not surprisingly, both men and women are slower to marry than to cohabit, and fewer people marry than cohabit – even by age 42 (Figures A.6c-A.6d). That said, marriage patterns by education and gender are qualitatively similar to those for cohabitation. For both men and women, marriage rates begin to plateau by age 35, at which point 50 percent of highly educated men and women, almost 40 percent of those with secondary degrees, and just over twenty percent of those with only compulsory education, are married. Notably, marriage rates across all education groups and for both men and women are below 20 percent through age 25, by which point almost 40 percent of lower educated women already have children. For higher educated women and for men across educational groups, marriage rates diverge less from child-bearing.

Although this paper focuses on three distinct levels of education – compulsory, secondary, and tertiary – we also plot life-cycle patterns of family formation by more granular types of programs

(Figure A.7). These figures show that men and women who obtain tertiary degrees from universities of applied sciences, which define the cutoffs in our regression discontinuity designs, show almost identical descriptive patterns in family formation, when compared to their peers who obtain degrees from more selective universities. Not only are the more selective universities in this sample more selective, but their programs are also much common to lead to graduate degrees.

While men and women with different levels of education exhibit distinct patterns of family formation over the life-cycle (Figures 2), these differences may not stem from educational attainment – as these groups of people are different in a number of ways. In order to isolate the role of education in explaining these gaps, we will turn our focus to individuals at the margin of either compulsory and secondary education – or at the margin of secondary and tertiary education. These are people most likely to be affected by policies that change the relative sizes of each educational sector.

Figure 2: Family formation, by education level and gender

(a) Has children, women   (b) Has children, men

(c) Cohabitation, women   (d) Cohabitation, men
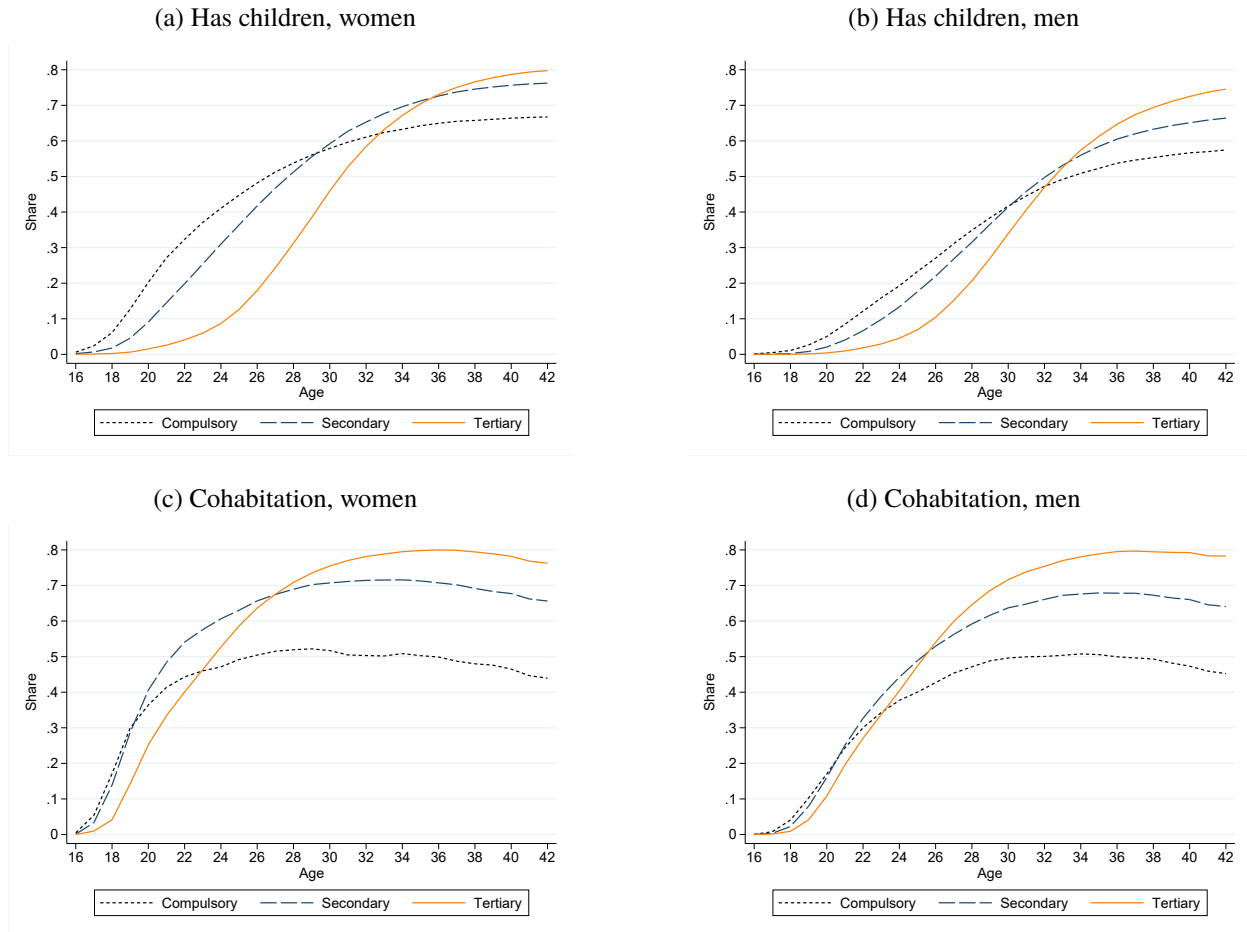
Notes: These figures plot our two main measures of family formation from ages 16 to 42 by each person's highest level of education and gender. Figures (a) and (b) plot the portion which has at least one child at each age. Figures (c) and (d) plot the share who are cohabiting at each age. So we can follow this sample through age 42, these figures are based on cohorts born between 1979 and 1980.

3 Empirical strategy

3.1 Admissions cutoffs and the running variable

We are interested in identifying the causal effect of educational attainment on family formation. In an ideal experiment, we would randomly assign individuals to different educational trajectories – varying the length of post-compulsory education individuals are exposed to. Of course, this is not feasible. To identify the causal effect of educational attainment on family formation, we use two sets of regression discontinuity designs generated by the centralized admissions processes to oversubscribed programs in secondary and tertiary education. In both designs, scoring above the

admissions cutoff increases applicants' participation in education as well as educational attainment. We construct admissions cutoffs from the data as follows.

The first of these regression discontinuity designs determines whether or not applicants receive a place in any secondary education program after finishing compulsory education. Admission to secondary programs is based primarily on the grade point average (GPA) in the final year of compulsory education. That said, some programs apply slightly different criteria, weighting particular grades more, or supplementing GPA with other admissions criteria. We have data on the admissions scores for each cutoff, and include them in our construction of the running variable. These are standardized following Silliman and Virtanen (2022) and Huttunen et al. (2023).

The second cutoff determines whether or not applicants to tertiary education receive admission to universities of applied science – the least selective set of tertiary degree programs in Finland. As in Hoekstra (2009) or Zimmerman (2014), admission to universities of applied sciences increases the probability that these students enroll in any tertiary degree program. Admission to universities of applied sciences is based on a combination of secondary school grades, end-of-high school exam scores, and entrance exams – with different programs weighting these differently. In our data we directly observe the admissions scores which combine these several criteria. We then standardize each application score to a rank amongst all applicants who apply to that program, and divide this by the total number of applicants to that program (Abdulkadiroğlu et al., 2014).

At both margins, the admissions cutoff to each program (k) is the standardized admissions score of the lowest-scoring application offered admission that year. The distance each applicant (i) is from the admissions cutoff is,

$$a_{ik} = (c_{ik} - \tau_{ik}), \tag{1}$$

where τ_{ik} is the score of the lowest scoring applicant offered admission, and c_{ik} is the applicants own standardized admissions scores. We exclude applicants that define admissions cutoffs from our estimation sample.

For each applicant, we focus on the admission cutoffs where they have the best chance of receiving an offer to any secondary school (at the secondary margin) or to any university of applied sciences (at the tertiary margin). Panel A of Figure 3 shows that scoring just above the minimum admissions requirements increases the probability of admission to secondary education by approximately 55 percentage points for both men and women. From Panel B of Figure 3 we see that scoring above the minimum requirements for admission to tertiary education increases the probability of admission by over 30 percentage points for men and by 50 percentage points for women. Differences in the jumps in admissions probabilities for men and women at the tertiary margin are driven by differences in the set of programs each applies to. So that our estimates of effects are comparable between men and women, we scale our estimates of family formation outcomes by admissions rates for men and

women.

At the secondary school margin, crossing the admissions cutoff increases the probability of enrolling in secondary education that year by about 30 percentage points, and the probability of graduating with a secondary degree within the following 15 years by 7 percentage points (Figure A.9). At the tertiary margin, admission increases enrollment in any higher education by about 15 percentage points for men and by 30 percentage points for women (Figure A.10). It also increases the probability of graduating with a tertiary degree within 15 years by close to 10 percentage points for men and by over 5 percentage points for women. However, since enrollment and graduation are both endogenous to being admitted, we prefer to scale our reduced form results by admission.

3.2   Estimation samples

In our regression discontinuity estimates, we focus on first-time applicants to oversubscribed secondary school programs between the years 1996 and 2000 and oversubscribed programs in universities of applied sciences between the years 2003 and 2004. Applicants in our secondary school sample are between 15 and 17 years old (most typically 16), and applicants in our tertiary sample are 19-23 years old (but mostly 19). Further, we limit the majority of our analysis to programs with at least two applicants on either side of each admissions cutoff. These restrictions leave us with 10 percent of applicants to secondary education and 20 percent of all secondary programs. At the tertiary margin, these restrictions leave us with 70 percent of applicants to universities of applied sciences and 60 percent of all programs.

Tables A.1 and A.2 report background characteristics, applications, and key outcomes in both estimation samples, further restricting these samples individuals in the fixed bandwidths used in our main estimates. By and large, individuals in the estimation samples resemble the broader set of applicants to further education. This is particularly true at the tertiary margin, where admission is much more competitive and our estimation sample includes the majority of tertiary applicants. In contrast, at secondary level, only approximately five percent of the applicants fail to gain admission to any secondary education each year. Hence, it comes as no surprise that applicants in our secondary margin estimation sample receive lower grades in compulsory school and are less likely to form families as adults when compared to the full sample. Furthermore, at the secondary margin, applicants from urban areas and applications to general upper-secondary programs are overly represented.[8]

Our RDD sample does not include traditional universities, and thus, we are missing data on more prestigious tertiary programs such as law or medicine. To study how the tertiary sample we focus on differs from those graduating from universities, we plot the life-cycle patterns of key

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[8]These educational programs have a larger number of applicants and, therefore, are more likely to meet the requirements of the RDD strategy.

outcomes by more granular groups of education (Figure A.7). These figures suggest that applicants to universities of applied sciences (polytechnics) are actually quite representative of all those in higher education. Surprisingly, the figures also suggest that those who do not complete any tertiary education after general upper-secondary education are less likely to have children than those with no post-compulsory education.

While interpreting our results, it is also important to recall that our estimates apply to the marginal applicant – i.e. they are estimates of local average treatment effects (LATE). These sets of applicants are an interesting group because they are people most likely to be affected by policy-changes which shift the number of places in secondary or tertiary education. Still, there may be reasons to think that our estimates might not extend to applicants farther away from admissions cutoffs – those who would have attended further education no matter what, or those who would not attend further education even if spots were made available to them. In both margins, the marginal admitted applicant would likely be the weakest student in the program they are admitted to – which could have consequences on family formation. For example, a man just about admitted to higher education may struggle in their coursework and thereby be perceived as an unattractive partner amongst their peers. In contrast, the top of the class in higher education may be a particularly attractive partner. In this case, our estimates for marginal men would be a lower bound of the effects for always takers outside of our RDD sample.

Figure 3: Admissions probabilities at the secondary and tertiary margins

(a) Admissions threshold to secondary education

(b) Admissions threshold to tertiary education
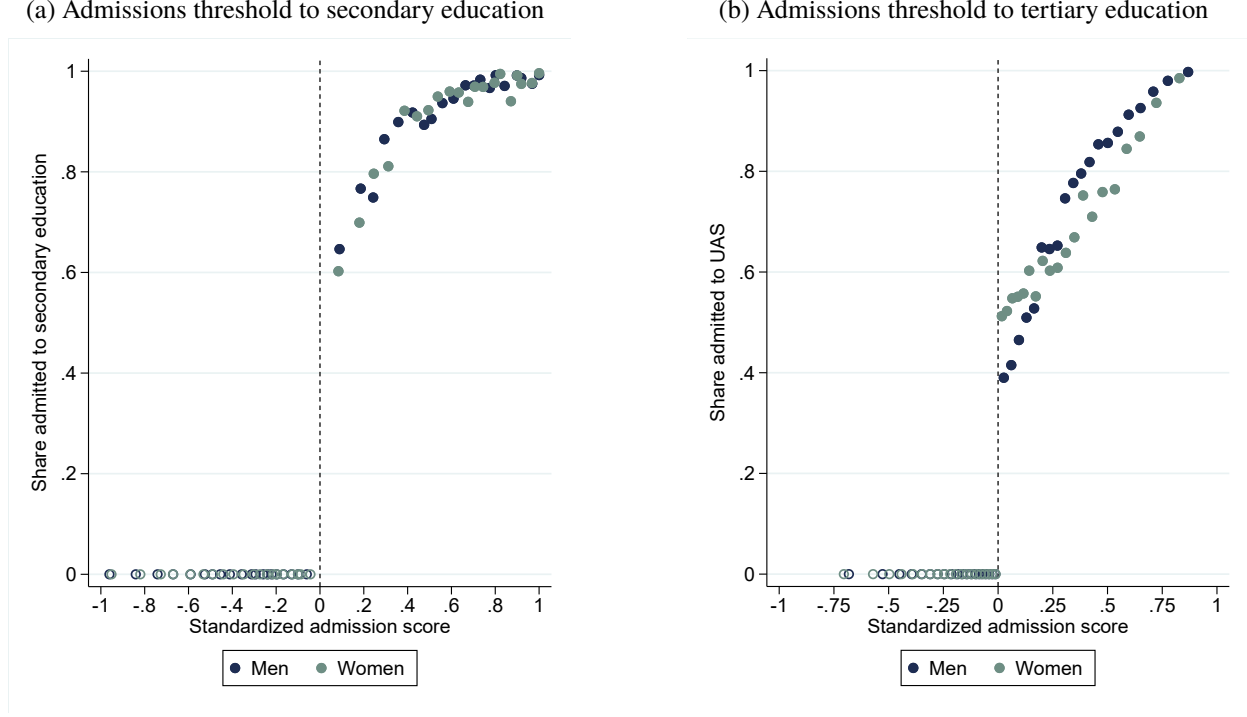
Notes: These figures plot the share of applicants admitted to secondary (a) and tertiary (b) education based on their admissions scores. At each margin, we set the number of bins based on admissions scores to 40 equally sized groups, and show these plots without fit lines (Korting et al., 2023).

3.3 Specification

To overcome selection bias, we focus on shifts in educational participation caused by the unpredictable admissions cutoffs described above. We estimate how admission to secondary and tertiary education shape family formation outcomes using the specification described below.

$$Y_{igk} = \beta_g Z_{igk} + \gamma_{0g} Score_{igk} + \gamma_{1g}(Score_{igk} \times Z_{igk}) \tag{2}$$

$$+\alpha_{kg} + \sum_{x=1}^{10} \delta_x P_{x,igk} + \epsilon_{igk}$$

The variable Y_{ik} is the outcome variable (e.g. has children, is married) for applicant i to cutoff k; Z_{ik} is a binary variable which measures whether the applicant's score ($Score_{ik}$) is positive and places them above the cutoff. We allow the slope of the running variable (γ_{ng}) to vary on either side of the cutoff as well as by gender (g). An indicator variable for each cutoff (α_{kg}) allows the baseline levels of each outcome to vary by and gender. In our most flexible specification, we also allow the slope to vary by cutoff (γ_{ngk}).

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We follow Abdulkadiroglu et al. (2022) to control for applicant type, defined by their preferences over different programs by including the local DA propensity scores (P_{ik}).[9] We cluster standard errors (ϵ_{ik}) at the applicant level (Abadie et al., 2023). So that our estimates are as local to the cutoff as possible, we use triangular kernel weights (Hahn et al., 2001). Since we estimate effects across several outcomes and years, we fix the bandwidth to 0.5 for all outcomes, which is close to optimal across different outcomes (Calonico et al., 2014).

To estimate the effects of admission on family outcomes simultaneously for men and women, we interact each of the variables in our specification with the sex of the applicant. This approach allows us to assess whether any effects we uncover are distinct for men and women. We use a fuzzy RDD strategy where we define the treatment as admission to either secondary education or a university of applied science ($D_i k$). This allows us to incorporate any differences in the effects on admissions probabilities as we assess the differential magnitudes for men and women.

3.4 Validity

Our identification assumption is that the potential outcomes of applicants develop smoothly across the admissions threshold for both samples (Lee and Lemieux, 2010). Two institutional features of the admissions processes support this assumption. First, the deferred acceptance algorithm used in both admissions procedures provide few incentives for strategic behavior. Second, since the application often takes place before people know even their own admissions scores, it is impossible for applicants to strategically manipulate their scores to gain an edge in admissions.

We also perform two types of tests to assess for whether the identifying assumption is satisfied. First, we test for whether we can observe any differences in observable characteristics of applicants across the cutoff by testing for balance in covariates across the admissions threshold. First, we replace the outcome variable (Y_{ik}) in our main specification (Equation 2) with each available background characteristic, and run separate regressions to test for covariate-level balance. These results are reported in Table 1 for each of our samples and for men and women separately. We observe balance across almost all covariates for both women at the secondary margin and men at the tertiary margin. These tests of individual covariates do, however, detect a handful of statistically significant differences in observables for men at the secondary margin and women at the tertiary margin. Nonetheless, we show that the covariates are not jointly significant. Moreover, the implied selection from these coefficients would, if anything, go against our main results, and our results are unchanged when we add covariates to our estimating equation.

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[9]Similarly to Huttunen et al. (2023), our sample restrictions and the focus on applicants within the bandwidth from the admission cutoff exclude students with zero risk of being admitted to a relevant school, as well as applicants who are accepted with certainty either to the school determining the cutoff or to a preferred option. Hence, the DA propensity score is used solely to control for applicant type.

While the institutional features make manipulation of the admissions scores difficult, we test for any potential evidence of manipulation of these scores across the cutoff by plotting our data in histograms and running a McCrary bunching test. Figure A.8 shows no evidence of bunching at the admissions thresholds – and the results from the McCrary test support these visual results (Table 1).

Table 1: Covariate balance

	Secondary margin		Tertiary margin	
	Women	Men	Women	Men
GPA	0.0 (0.0)	0.0 (0.0)	-0.0 (0.0)	0.0 (0.0)
Finnish speaking	0.01 (0.01)	0.01 (0.01)	0.01 (0.00)	0.00 (0.00)
Swedish speaking	-0.01* (0.01)	0.00 (0.01)	0.00 (0.00)	-0.00 (0.00)
Other language	-0.00 (0.01)	-0.01 (0.01)	-0.01* (0.00)	-0.00 (0.00)
Finnish	-0.00 (0.01)	-0.01 (0.01)	0.00 (0.00)	0.00 (0.00)
Urban	-0.01 (0.02)	0.04** (0.02)	0.03** (0.01)	-0.01 (0.02)
Suburban	-0.00 (0.02)	-0.01 (0.01)	-0.03*** (0.01)	0.02 (0.01)
Rural	0.00 (0.01)	-0.02 (0.01)	0.01 (0.01)	-0.00 (0.01)
Mother's income	-264 (1,054)	2,599** (1,125)	345 (391)	3,856 (3,620)
Mother in NEET	-0.01 (0.03)	-0.03 (0.02)	-0.01 (0.01)	0.00 (0.01)
Mother secondary	0.01 (0.04)	0.04 (0.04)	-0.01 (0.01)	0.02 (0.02)
Mother tertiary	-0.00 (0.02)	-0.01 (0.03)	-0.02* (0.01)	0.00 (0.01)
Father's income	-1,088 (1,831)	-369 (1,989)	-224 (845)	-1,794 (1,598)
Father in NEET	-0.04 (0.03)	-0.06* (0.03)	-0.01 (0.01)	0.01 (0.01)
Father secondary	0.03 (0.04)	0.08** (0.04)	0.01 (0.01)	0.01 (0.02)
Father tertiary	-0.03 (0.03)	0.05 (0.03)	-0.01 (0.01)	-0.00 (0.01)
Has children predicted	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)
Applicants/McCrary	-23 (56)	-30 (65)	21 (53)	-26 (55)

Notes: Columns 1, 2, 4, and 5 show the mean background characteristics above and below the cutoffs from both the secondary and tertiary regression discontinuity designs above. Columns 3 and 6 report results from a test for balance in these characteristics at the cutoff (p-values: * < 0.10, **< 0.05, and *** < 0.01).

4 Results

4.1 Main results

Using admissions cutoffs that increase the educational attainment of marginal applicants to both secondary and tertiary education, we study the causal effect of education on men's and women's family formation outcomes.

We start by examining the effects of education on the probability that men and women have a child through their late thirties (Figure 4 and Tables A.3-A.4). For women, admission to further

education increases the probability of having children by age 37 by over 5 percentage points at both the secondary and tertiary margins, with more precision at the tertiary margin. In contrast, for men the point estimates of the effects of increased educational attainment on the probability of having children are close to zero at both margins. Although we lack statistical power to rule out that the estimates are different from zero or different across genders each year – these estimates are consistent across both the secondary and tertiary margins and present regardless of the specific age we look at. This gender differential in childbearing is also present when we look at the effects of education on the number of children (Figure A.12).

Still, it is possible that education could have a positive effect on childbearing for men – if we could follow them long enough. Men admitted to higher education experience an initial delay in childbearing, and at age 30 are 8 percentage points less likely to have a child than their less educated peers, but catch up by age 38.[10] Nonetheless, these estimates are stable over the last observation years and the descriptive figures suggest that gaps in both men's and women's fertility rates by education levels have stabilized by age 35 (Figure A.6).

Next, we study the effects of educational attainment on cohabitation (Figure 5 and Tables A.3-A.4). As for fertility, education increases the probability of cohabitation by about 5 percentage points for women. Our results do not suggest a positive effect of education on having a partner for men. This gendered pattern even more pronounced when we look at marriage (Figure A.13).
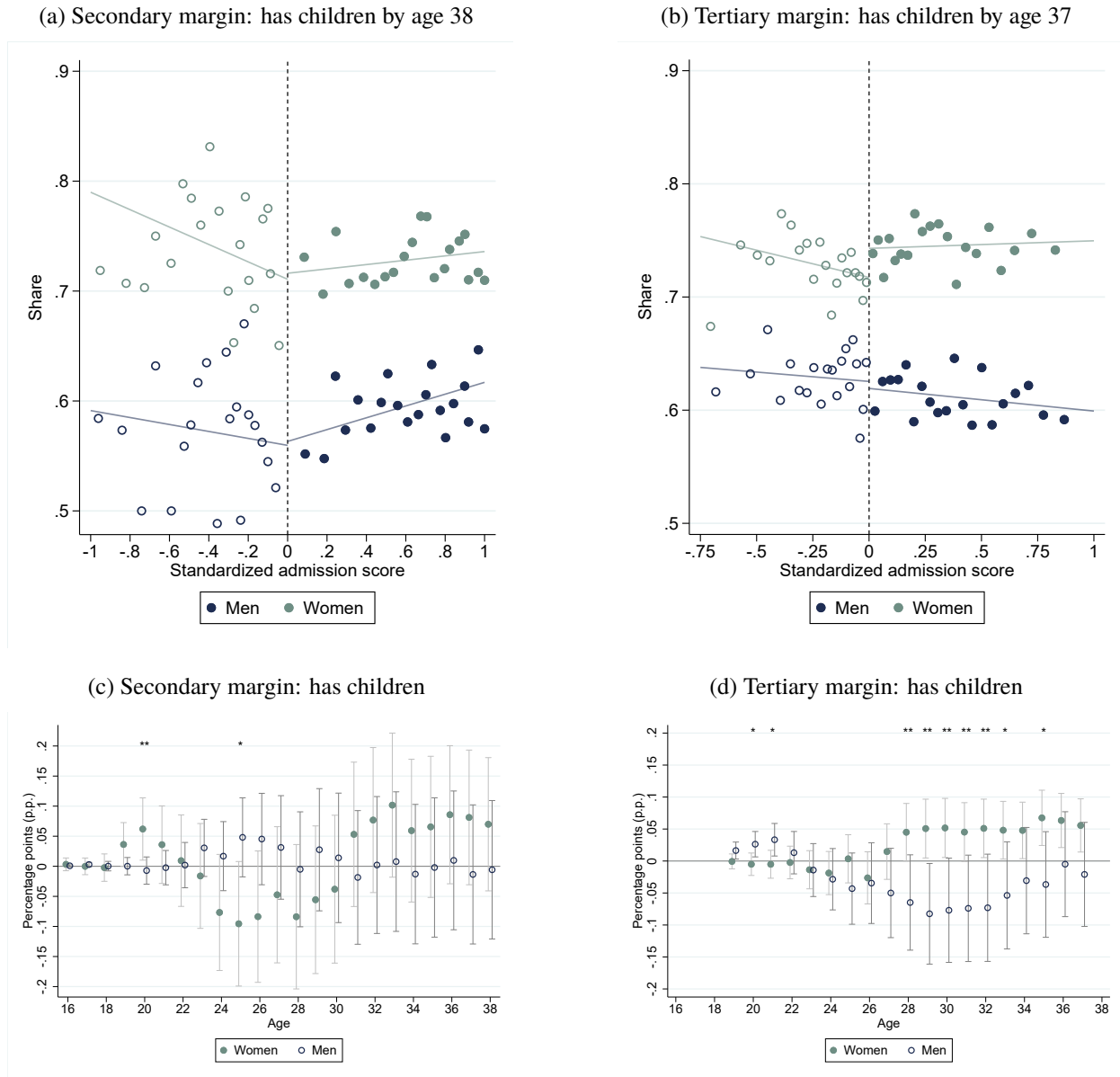
For women, these estimates of local average treatment effects (LATE) correspond quite closely to the mean gaps in family formation outcomes by education level, despite scaling by admission rather than completion (see Figure 2). In contrast, while mean differences in family formation by educational attainment appear about as large for men as for women – our estimates suggest that, at least for the marginal applicant, this relationship is not driven by educational attainment itself.

Together the results from the secondary and tertiary margins suggest that educational attainment can affect family formation outcomes – and do so in divergent ways based on gender. In Section 5, we explore how these findings relate to existing literature, and propose and test potential explanations for our results.
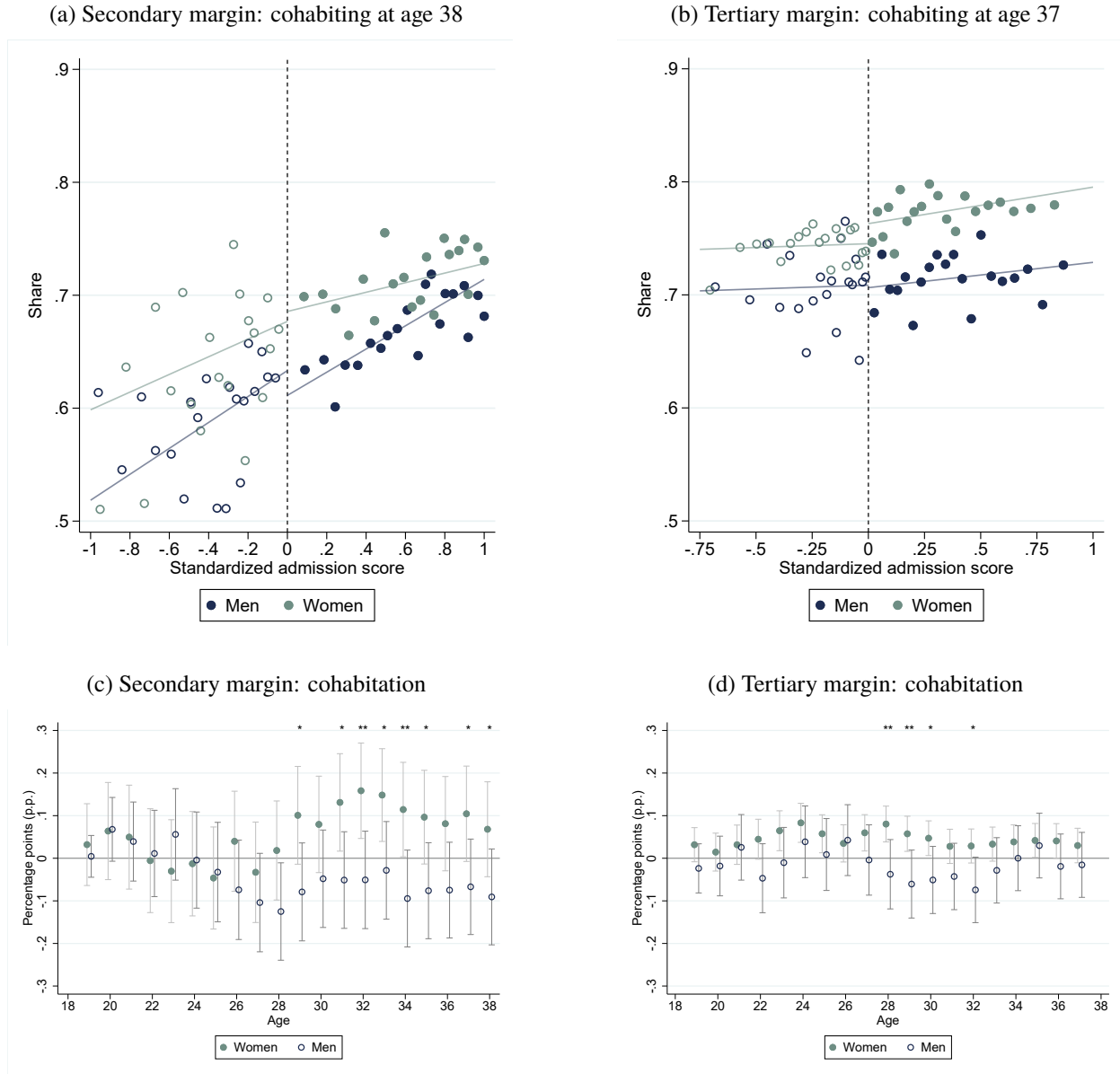
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[10]However, we do not detect statistically significant differences in the age at first birth for either gender or at either cutoff (Tables A.3-A.4).

Figure 4: Effects of admission to further education on having children

(a) Secondary margin: has children by age 38

(b) Tertiary margin: has children by age 37

(c) Secondary margin: has children

(d) Tertiary margin: has children

Notes: Figures (a) and (b) plot the share of men and women who have children by standardized admissions score. Figures (c) and (d) show the RDD estimates of the effects of admission to further education on having children over the life-cycle, as well as their 90-percent confidence intervals. Figures (a) and (c) focus on students at the margin of admission to secondary education, while Figures (b) and (d) focus on students on the margin of admission to tertiary education. Results are reported separately for men and women. Significance stars are used to denote whether we are able to detect statistically significant differences in the effects for men and women (p-values: * < 0.10, **< 0.05, and *** < 0.01).

Figure 5: Effects of admission to further education on cohabitation

(a) Secondary margin: cohabiting at age 38

(b) Tertiary margin: cohabiting at age 37

(c) Secondary margin: cohabitation

(d) Tertiary margin: cohabitation

Notes: Figures (a) and (b) plot the share of men and women who are cohabiting by standardized admissions score. Figures (c) and (d) show the RDD estimates of the effects of admission to further education on cohabiting over the life-cycle, as well as their 90-percent confidence intervals. Figures (a) and (c) focus on students at the margin of admission to secondary education, while Figures (b) and (d) focus on students on the margin of admission to tertiary education. Results are reported separately for men and women. Significance stars are used to denote whether we are able to detect statistically significant differences in the effects for men and women (p-values: * < 0.10, **< 0.05, and *** < 0.01).

4.2 Robustness

We check to see that our results are not sensitive to the specific model we use. Estimates from alternative specifications are plotted alongside those from our main results in Figure A.14. First, while the current understanding in applied econometrics argues that standard errors should be clustered at the individual – rather than cutoff – level in designs like ours (Abadie et al., 2023), we also estimate our results with more conservative standard errors. While clustering standard errors at the cutoff level leads to slightly larger confidence intervals, these changes are small and do not push the new p-values across any thresholds for statistical significance.

We also re-estimate our regression discontinuity model, allowing there to be different slopes on either side of the admissions threshold – not just for both genders – but also for every single cutoff. If anything, the results from these specifications suggest that we slightly under-estimate the magnitudes of our main effects. That said, the results from these more flexible models do not change the statistical significance or qualitative nature of our main results. Since we cannot rule out that the results from the much more computationally demanding mode are any different from those from a sparser model, we choose to use the more sparse model in our main results. This speeds up the computational time required to run our estimates by several orders of magnitude. Moreover, while the fully interacted model does provide a more flexible design, it is more empirically demanding – and rests on the assumption that any differences in slopes that vary by both gender and cutoff are real – something we do not have statistical power to ensure.

Even though Table 1 shows few signs of imbalance observable characteristics of applicants at the cutoff, we re-estimate our model including a rich array of controls. These estimates do almost nothing to change our main results, suggesting that our results are not driven by differences in the characteristics of individuals across the cutoffs.

Next, we study whether our choice of estimation sample might drive our main results. In our main estimates, we require that there are at least two applicants of the same gender on each side of the cutoff. When we tighten this requirement by including only cutoffs with more applicants on either side of the threshold our results remain remarkably stable. This is despite the sample size changing from 10,599 to 6,304 when we jump from two to five applicants on either side at the secondary margin, and from 35,120 to 30,237 when we jump from two to five applicants on either side at the tertiary margin.

Finally, we test for sensitivity to the bandwidth we use for our regression discontinuity design (Figure A.15). To ensure that our sample is consistent both across outcomes as well as across years within outcomes, in our main estimates we fix our bandwidth to 0.5 in both the secondary and tertiary education samples. The results are robust for the range bandwidths, suggesting that our estimates are not sensitive to the choice of bandwidth.

5 Our results in light of established theories and new hypotheses

Our results suggest that education increases family formation outcomes for women, but not for men. In this section, we examine how these findings relate to existing theories concerning education, gender, and family formation. After discussing the challenges that existing literature face in explaining our findings, we propose new hypotheses that we pre-registered after obtaining our main results. Further, we use both newly collected survey and existing registry data to help gauge which of our theories are best supported in the data.

5.1 Situating our results in existing literature

Becker (1981) provides a starting point for much of the contemporary literature in economics on family formation and fertility.[11] A key idea from this work is that if women typically specialize in household production, higher wages increase the opportunity costs associated with having children for women, but not for men. Extended to education, this model predicts that if education increases wages, it reduces obstacles men face when forming families, while potentially decreasing family formation for women. This idea is borne out in data from the United States in the 1990's: the pattern between education and fertility is linear and increasing for men, while hump-shaped for women (Baudin et al., 2015).[12]

Counter to the predictions from this model, we find that education does not increase the likelihood that men form families even though education increases their earnings (A.16). This is a surprising result. Still, the existing empirical literature contains almost no estimates that show that education increases men's rates of family formation. And, the pattern of results we see resembles those from Huttunen and Kellokumpu (2016), who find that despite having larger negative effects on men's labor market outcomes, job displacement reduces women's but not men's later chances of having children. Although our main results do not suggest that education increases the rates at which men form families, further analysis provides some support that education could increase the value of men in the marriage market. We find that while men admitted to tertiary education are no more likely to form families, they form families with higher income partners (Figure A.17). But, these results could be explained by several dynamics. First, men who go to tertiary education might simply be

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[11]Becker (1960), studying the relationship between economic growth, industrialization and fertility decline is the seminal work in economics on fertility. This work argued that parents care about investing in the quality of their offspring rather than just the quantity. This work has been important for a strand of research in macroeconomics focused on fertility and economic growth (Galor and Weil, 2000).

[12]Further, experimental evidence supports the idea that women perceive a cost to appearing ambitious in front of potential partners (Bursztyn et al., 2017). Also supporting this idea, data from online dating platforms show that women are much more likely than men to value the education of their prospective partners (Neyt et al., 2019; Egebark et al., 2021). It is important to note that the effects identified in these papers might be underlied by a mix of dynamics stemming from both more casual dating as well as family formation.

exposed to higher earning peers. Second, men might change their preferences such that they place more value on career oriented women than otherwise. Third, education might shape the extent that men are attractive to potential partners, such that even holding men's preferences constant, these men are more attractive for career oriented women.

Our results, showing that education raises the likelihoods that women in recent cohorts form families, also challenge common theories regarding how education might shape women's family formation outcomes. We see that family formation are paired with increases in short term earnings (A.16), indicating that the opportunity costs of specializing in household production increase. As such, theories centered around opportunity costs or economic resources are unlikely to explain our results. However, the empirical patterns underlying these theories regarding women's family formation have begun to shift as discussed in Section 1.2. For example, Isen and Stevenson (2010) show that the skilled-unskilled marriage gap amongst women in the United States has reversed, and today highly educated women are more likely to marry than their less educated counterparts. And, Goldin (2021) argues that highly educated women in the United States today are increasingly likely to want both a career and family.

A focus of recent research has been to explain these changes. Bertrand et al. (2021) observe that these shifts do not extend to countries with strong gender norms, and suggest weakened gender norms regarding household specialization may explain the changes in the relationship between women's education and family formation. As they also point out, the Nordic countries stand out in terms of gender equality, even compared to other European countries (Figure A.18). Alongside weaker gender norms, Doepke et al. (2023) highlight the importance of policies promoting the well-being of families and improving women's job security as important factors making it possible for women to have both successful careers and help raise a family. Both these channels suggest that women in relatively egalitarian societies with strong family policies may not experience a penalty in terms of family formation, and can help explain why we do not find that education lowers female rates of family formation. Still, neither of these channels explains why we see positive effects of education on family formation for women but not for men.

5.2 Testing new hypotheses

Since our main results are not easily explained by existing models relating education and family formation, we propose new hypotheses which might explain our results. These were pre-registered at the Open Science Foundation before we collected new survey data to test these in a representative panel of over two thousand Finnish adults. Our hypotheses are the following:

1. Education may provide women with access to more flexible work arrangements, making it easier to combine career and family;

2. As social skills have become more important over time, and parental – particularly mother's – inputs are crucial in shaping social skills, education may increase the demand for women in the marriage market;

3. Education may not raise men's likelihoods of forming families if education is associated with increased costs of leisure time for men;

4. Education may increase the demand for men in the dating market so much that men do not feel pressure to settle down with any one partner.

We pair the newly collected survey data with additional analyses from the registry data to examine these new hypotheses in light of the existing literature.

Before turning to this analysis, it is important to be clear on what we can and cannot learn from the survey data. If we believe that education has a causal relationship with some measure we observe in the survey, we might expect that measure to vary by educational level. At the same time, the same processes of selection underlying the descriptive patterns we show using the administrative data apply to the survey data. In this sense, descriptive patterns in the survey data that align with our hypotheses are not necessary or sufficient to identify a channel as relevant, nor do they, if conflicting, definitively reject our hypotheses. But, the more the stylized facts in the survey data support (/or oppose) a hypothesis, the less (/more) heterogeneity and the less (/more) causal story-telling are required for that hypothesis to be compelling.

Some recent papers suggest that white collar jobs may provide more flexible work arrangements for women. For example, Adams-Prassl et al. (2022) show that white collar jobs are also more flexible in providing opportunities to work from home, and Harrington and Kahn (2023) show that the pandemic-induced ability to work from home reduced motherhood gaps in labor market outcomes considerably. If education shifts women into more flexible jobs or those with more family supports, education may be a factor which lowers the costs of family formation for women, like the society-wide policies such as childcare described by Doepke et al. (2023).

To see if access to more flexible jobs might explain the positive effects we see for women, we follow Goldin (2014) and Bang (2022), and link our data to measures of job flexibility based on O*NET. Descriptively, these data show us that women with higher levels of education enter jobs that offer more flexibility over scheduling, greater room to make decisions, and an increased ability to use ICT technologies such as email; at the same time, however, higher educated women end up in jobs with more face-to-face contact and a higher intensity of group-work (Figure A.19a). Estimates using our regression discontinuity design suggest that access to secondary education shifts women into jobs which have flexible schedules and that are more amenable to working remotely, but also jobs that require more face-to-face contact (Figure A.19b). Access to tertiary education appears to have less of an effect on these measures of job flexibility – except for email-use (Figure A.19c). Of

course, there may be other dimensions of job flexibility that are important for combining career and family, but which we do not measure.

To further understand how education relates to the compatibility of career and family, we turn to our newly collected survey data (Figures A.20-A.28). Figure A.20a shows the portion of women ages 29-54 without kids who indicate that the following issues represented obstacles to their ability to form families.[13] Women with tertiary education are no less likely to report economic insecurity as an obstacle for having children, and are more likely to report a lack of job flexibility and career concerns as getting in the way of having children. While these responses are from a slightly broader set of cohorts than we use in our analysis and cannot be restricted to the set of individuals at the margin of admission to tertiary education, the pattern of results in all three of these responses go against the idea that women with higher levels of education are less likely to be constrained in family formation due to work.

Next, we build on prior research and offer an alternative – skill-based – explanation for why education might increase the rates of family formation for women in particular. The past decades have seen a rapid increase in social skills and, if anything, a decrease in the importance of cognitive skills (Deming, 2017; Jokela et al., 2017; Edin et al., 2022). While schools are still working on ways to target social skills – parents have been recognized as a crucial input for the development of these types of higher order skills (Doepke and Zilibotti, 2017; Black et al., 2018). Moreover, recent research from Sweden suggests that parents are aware of these shifts in skill-demand (Hermo et al., 2022). At the same time, parenting has become more intensive. Around the world highly educated parents are spending more time in childcare related activities even though they enjoy childcare related activities less than their less-educated peers (Dotti Sani and Treas, 2016; Kalil et al., 2023).[14] And, although household activities have become more equal, women bear the brunt of childcare responsibilities – even in relatively gender equal countries like Finland (Kleven et al., 2023). Together, these findings highlight the increased importance of maternal education in shaping their children's life chances.

If educated women are perceived to be more capable parents, the increased demand for social skills could increase the demand for highly educated women in the marriage market even in the absence of increased labor market returns. In India, for example, Andrew and Adams-Prassl (2022) show that parents invest in girls' education because of the returns in the marriage – and not the labor – market. Given the strong correlation between education and latent parenting ability, education could signal better parenting ability even if education had no causal effect on parenting practices (Choo and Siow, 2006; Anderberg et al., 2022). In contexts like Finland, where women are over-represented at

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[13]The same figure is shown in A.21 for all women aged 29-54.

[14]Relatedly, Lundberg et al. (2016) shows that highly educated mothers are the least likely to divorce, another potential dimension by which maternal education can improve children's life chances.

higher levels of education, women with low educational qualifications may be perceived as negatively selected in terms of parenting ability.

To study this hypothesis, we test for whether the stylized facts underlying the story pictured above hold up in our survey data. Figure A.22 suggests that more recent cohorts of adults perceive a greater relative return to social rather than academic skills. Moreover, we see that adults perceive parents to be more important in the development of social rather than academic skills (Figure A.23), and that mothers are perceived as more important than fathers in skill development (Figure A.24). Most importantly, our data show that while less than thirty percent of men born in 1950 indicated a preference for partners with tertiary education, more than half of young men today indicate a preference for a college educated partner (see Figure 6). Together, these pieces of evidence support our hypothesis that education could increase the likelihood that women form families in today's Finland, as educated women are increasingly in demand as potential partners with which to form families. At the same time, we show that while men benefit enormously in the labor market from access to higher education (Figure A.16), effects on women's earnings are more muted. This could be due to the demands women regarding intensive parenting at home.

Figure 6: Share of men indicating a preference for college-educated partners
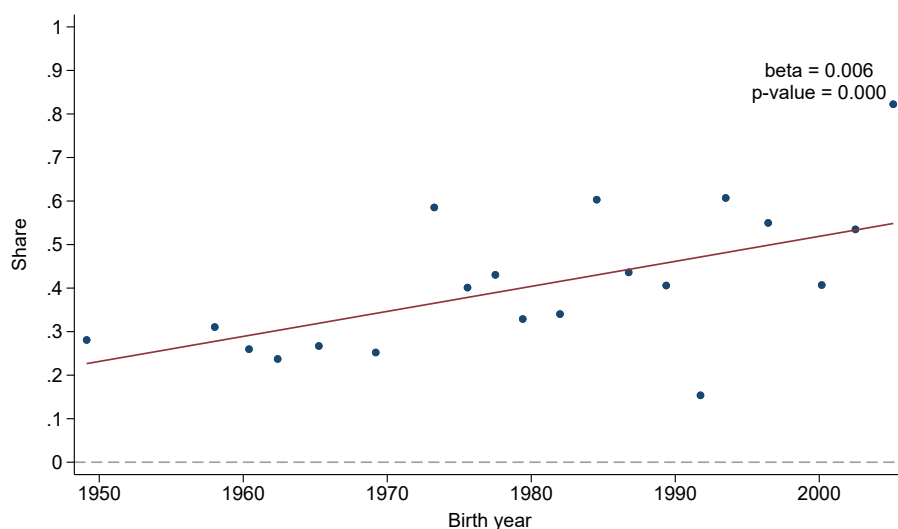
Notes: This figure reports the share of men who indicate a preference for a college-educated partner by birth year. N = 2,087.

We then use our survey data to examine why education might not increase the likelihood that men form families. Within the framework laid out by Becker (1981), one potential explanation could be that higher incomes increase the value men experience by remaining single (Lerman, 1989). Earnings could increase the value of leisure time – making family life less attractive. Our survey data

suggest that almost half of men without children indicate that the change in lifestyle associated with forming a family represents an obstacle for having children (Figure A.21b). Nonetheless, men with tertiary education are no more likely to fear the change in lifestyle associated with having children than their peers with lower levels of education. These results do not support the idea that education increases the value men attach to leisure time.

Another explanation for why we do not detect that education increases men's likelihoods of forming a family is that if the earnings premium resulting from higher education makes men more attractive on the marriage market, men may perceive a lower risk to remaining single and delay cohabitation – potentially until it is too late to find a suitable spouse. This theory aligns with our RDD estimates, which show that admission to tertiary education delays childbearing for men. However, if anything, the share of men with tertiary education who report the lack of a suitable partner as an obstacle for having children is higher than for those without tertiary education (Figure A.21b). Moreover, men with tertiary education are far less likely to report trouble committing to a relationship as an obstacle for having children (Figure A.21b). And, if anything, men with higher education are more likely to want to have kids (Figures A.25-A.26).

Finally, we examine whether there is demand for men with tertiary education. Roughly forty percent of women in the cohorts we study would like a partner with tertiary education (Figure A.27).[15] This is similar to the supply of college educated men in the relevant cohorts (Figure A.4). While our survey data does not allow us to parse out whether education itself is valued, rather than say income, we find that these two aspects move in tandem for our estimation sample. Even if educated men were valued for the fact that they have higher earnings, not for the education in and of itself, we should expect to see effects of education on men's likelihood of forming families.

Together, our survey results support our second hypothesis, that one reason education might increase women's rates of family formation in Finland today is because there is demand for educated women as partners. Of course, other explanations may also play a role in explaining our results for women. And, for men, the relationship we observe in the descriptive data, whereby educated men are more likely to form families, is likely to be driven by selection – going against our pre-registered hypotheses.

6   Discussion

We study the effects of education on men's and women's family formation outcomes using regression discontinuity designs generated by centralized application systems to secondary and tertiary education in Finland. Our results show that while admission to further education increases family formation for women, it has no effect on men's probabilities of cohabiting or having children.

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[15]Additionally, we observe strong evidence for homophily in partner preferences by education levels (A.28).

These results are challenging to explain using traditional theories that assume family formation increases with education for men but follows a hump-shaped for women, where the likelihood of having a family should decrease at higher education levels. For example, following Becker (1981), access to education should increase the opportunity costs of women's household production, thereby reducing family formation for women. In contrast, by raising wages, education could reduce economic obstacles to family formation and make men more attractive as potential partners. However, as gender inequalities in the labor market have begun to decline and technological changes have reduced the need for one partner to specialize in household production, educated women today are likely to want both a career and family (Kleven and Landais, 2017; Goldin, 2021; Doepke et al., 2023). To account for these changes, Bertrand et al. (2021) extend this model such that progressive gender norms can reduce the penalty that educated women face in terms of family formation. Further, Doepke et al. (2023) suggests that factors that make career and family more compatible may increase fertility.

While these newer theories no longer predict a child penalty for more educated women, the increase in rates of family formation experienced by educated women is still difficult to explain even within these frameworks. Our results for men are even more surprising given the prior that theoretical work unanimously assumes improvements in men's education and labor market position should increase rates of family formation.

To make progress on how education might affect men's and women's rates of family formation today, we proposed and pre-registered four new theories relating education, gender, and family formation before acquiring survey and register data with which to test them. For women, our estimates are consistent with the idea that, as the increased returns to social skills shift the burden of child development from schools to parents and particularly mothers, education can make women more attractive as potential partners. We also proposed that education could increase women's rates of family formation by shifting women into careers that are more compatible with family. Nonetheless, further analysis of both registry and survey data did not support this idea.

For men, our results are likely to be driven by selection. We had proposed that mechanisms by which education might increase men's rates of family formation could be counteracted if education increased the value that men attach to leisure time and consumption outside the family or if men responded to the increased demand in the marriage market by delaying cohabitation. We did not, however, find support for these hypotheses in the survey data. Still, the underlying selection process by which our RDD estimates differ from the observational differences in family formation by education apply to the survey results, underscoring the need for further research on why men's family formation patterns vary by education.

Overall, these results help bridge the existing empirical and theoretical literatures on how education can shape family formation, offering new results for recent cohorts. Since Becker (1981),

a central prediction of models of education and family formation is that factors like education which improve men's labor market position should increase their rates of family formation. Still, prior empirical work has primarily focused on women, providing little insight on how increases in educational attainment affect men (Breierova and Duflo, 2004; Black et al., 2008; Monstad et al., 2008; Silles, 2011; Cygan-Rehm and Maeder, 2013; Amin and Behrman, 2014; Fort et al., 2016; Tan, 2017; Chen and Guo, 2022; Koebe and Marcus, 2022). We show that the positive association between education and family formation observed in the data is likely to be driven by selection. Likewise, where common theories of how educational attainment might affect women center around women with higher education (Becker, 1981; Baudin et al., 2015; Greenwood et al., 2016; Bertrand et al., 2021), little empirical work exists identifying the effects of access to higher education on women's family formation outcomes over the life-cycle (Brand and Davis, 2011; Humlum et al., 2017). Our results extend this literature, challenging existing theories, and showing that access to further education can increase rates of family formation for women.

Beyond the academic literature on education and family formation, our results have important implications for policy. As countries around the world are grappling with rapid fertility decline, men with low levels of educational attainment and women with post-secondary education are typically two groups of particular focus (Sobotka et al., 2019; OECD, 2021). Our results offer new insights regarding both groups. For men with low levels of education, our results suggest that factors like education, which improve their position in the labor market, may not be a panacea for increasing the rates of family formation. For women, they show that post-secondary education may not lower rates of family formation, and can even increase rates of family formation.

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A   Appendix

A.1   Tables

Table A.1: Mean characteristics: secondary margin

	All applicants		Estimation sample	
	Women	Men	Women	Men
	Panel A: Background characteristics			
GPA	8.0	7.4	7.2	7.0
Finnish speaking	0.94	0.94	0.95	0.95
Swedish speaking	0.05	0.05	0.02	0.03
Other language	0.01	0.01	0.02	0.02
Finnish	1.00	1.00	1.00	0.99
Urban	0.54	0.53	0.79	0.78
Suburban	0.18	0.18	0.10	0.10
Rural	0.26	0.27	0.09	0.09
Mother's income	24,246	24,392	24,276	26,164
Mother in NEET	0.09	0.09	0.10	0.09
Mother has secondary degree	0.69	0.70	0.65	0.70
Mother has tertiary degree	0.11	0.11	0.08	0.14
Father's income	34,624	34,877	34,726	37,726
Father in NEET	0.09	0.09	0.10	0.08
Father has secondary degree	0.61	0.61	0.57	0.63
Father has tertiary degree	0.16	0.17	0.13	0.22
	Panel B: Field of study			
Academic track	0.71	0.53	0.83	0.72
Vocational track	0.29	0.47	0.17	0.28
	Panel C: Outcomes at age 36			
Has child	0.72	0.59	0.69	0.54
Number of children	1.55	1.22	1.44	1.03
Age at first birth	27.5	28.7	27.2	28.9
Married	0.50	0.43	0.43	0.36
Has partner	0.74	0.69	0.70	0.64
Months of unemployment	0.8	0.9	0.9	1.2
Annual income (€)	27,659	32,883	25,776	29,563
Observations	150,118	151,970	5,300	6,095

Notes: This table reports mean background characteristics, distribution of application requests by field of study, and outcomes by gender for the full sample (columns 1 and 2) and the estimation sample (columns 3 and 4). The full sample includes all 15 to 17 years old applicants to secondary schools in 1996-2000. The estimation sample is restricted to those within the fixed bandwidth used in the RDD estimations.

Table A.2: Mean characteristics: tertiary margin

	All applicants		Estimation sample	
	Women	Men	Women	Men
Panel A: Background characteristics				
GPA	8.2	7.8	8.2	7.7
Finnish speaking	0.95	0.94	0.95	0.95
Swedish speaking	0.04	0.05	0.04	0.03
Other language	0.01	0.01	0.01	0.01
Finnish	1.00	1.00	1.00	1.00
Urban	0.53	0.54	0.51	0.56
Suburban	0.19	0.19	0.19	0.18
Rural	0.27	0.26	0.29	0.25
Mother's income	24,976	25,813	24,640	26,112
Mother in NEET	0.09	0.09	0.09	0.09
Mother has secondary degree	0.69	0.70	0.69	0.69
Mother has tertiary degree	0.10	0.12	0.10	0.11
Father's income	35,816	37,538	34,878	37,509
Father in NEET	0.11	0.10	0.11	0.10
Father has secondary degree	0.62	0.63	0.62	0.63
Father has tertiary degree	0.15	0.17	0.14	0.17
Panel B: Field of study				
Humanities and Education	0.02	0.00	0.02	0.00
Culture	0.16	0.10	0.09	0.05
Business and Admin	0.20	0.19	0.22	0.21
Natural Sciences	0.01	0.05	0.01	0.04
Technology and Transportation	0.07	0.51	0.08	0.53
Natural Resources and Environment	0.03	0.03	0.04	0.03
Social Services and Health	0.38	0.09	0.38	0.08
Tourism and Hospitality	0.12	0.04	0.17	0.05
Panel C: Outcomes at age 36				
Has child	0.70	0.57	0.71	0.58
Number of children	1.43	1.11	1.47	1.12
Age at first birth	28.5	29.6	28.4	29.6
Married	0.50	0.44	0.51	0.44
Has partner	0.76	0.71	0.77	0.72
Months of unemployment	2.3	3.2	2.3	3.1
Annual income (€)	32,475	44,822	32,622	45,415
Observations	38,448	28,622	19,671	15,424

Notes: This table reports mean background characteristics, distribution of application requests by field of study, and outcomes by gender for the full sample (columns 1 and 2) and the estimation sample (columns 3 and 4). The full sample includes all 19 to 23 years old applicants to UAS in 2003 and 2004. The estimation sample is restricted to those within the fixed bandwidth used in the RDD estimations.

Table A.3: Main results: secondary margin

	Has children	Number of children	First birth age	Has partner	Married
			Women		
Effect of admission	0.07	0.15	0.19	0.07	0.14*
	(0.07)	(0.18)	(0.94)	(0.07)	(0.07)
Mean below	0.74	1.57	26.96	0.65	0.39
Observations	4,900	4,900	3,533	4,900	4,900
			Men		
Effect of admission	-0.01	-0.04	-0.66	-0.09	-0.04
	(0.07)	(0.17)	(0.88)	(0.07)	(0.07)
Mean below	0.57	1.13	28.90	0.60	0.34
Observations	5,699	5,699	3,291	5,699	5,699
			Women-Men difference		
Effect of admission	0.08	0.18	0.85	0.16*	0.18*
	(0.10)	(0.25)	(1.29)	(0.10)	(0.10)
Total observations	10,599	10,599	6,824	10,599	10,599

Notes: This table reports regression discontinuity estimates of the effects of admission to secondary education on measures of family formation for men and women separately. The third panel in the table reports the differences in the effects for men and women (p-values: * < 0.10, ** < 0.05, and *** < 0.01).

Table A.4: Main results: tertiary margin

	Has children	Number of children	First birth age	Has partner	Married
			Women		
Effect of admission	0.06**	0.02	-0.06	0.03	-0.01
	(0.03)	(0.07)	(0.29)	(0.02)	(0.03)
Mean below	0.73	1.56	28.53	0.74	0.50
Observations	19,703	19,703	14,536	19,703	19,703
			Men		
Effect of admission	-0.02	-0.14	0.36	-0.02	-0.10**
	(0.05)	(0.13)	(0.54)	(0.05)	(0.05)
Mean below	0.63	1.26	30.00	0.71	0.46
Observations	15,417	15,417	9,556	15,417	15,417
			Women-Men difference		
Effect of admission	-0.08	-0.16	0.42	-0.05	-0.09
	(0.06)	(0.15)	(0.61)	(0.05)	(0.06)
Total observations	35,120	35,120	24,092	35,120	35,120

Notes: This table reports regression discontinuity estimates of the effects of admission to tertiary education on measures of family formation for men and women separately. The third panel in the table reports the differences in the effects for men and women (p-values: * < 0.10, **< 0.05, and *** < 0.01).

A.2 Figures

Figure A.1: Years of schooling and fertility across countries

Notes: This Figure plots mean years of schooling in 2010 against total fertility rates in 2021, using data from the Barro and Lee (2013) on years of education and the World Bank on Total Fertility Rates. Country codes are plotted for select countries: Afghanistan, Morocco, Ghana, Peru, Finland, Denmark, Great Britain, and the United States of America.

Figure A.2: Educational pathways in Finland
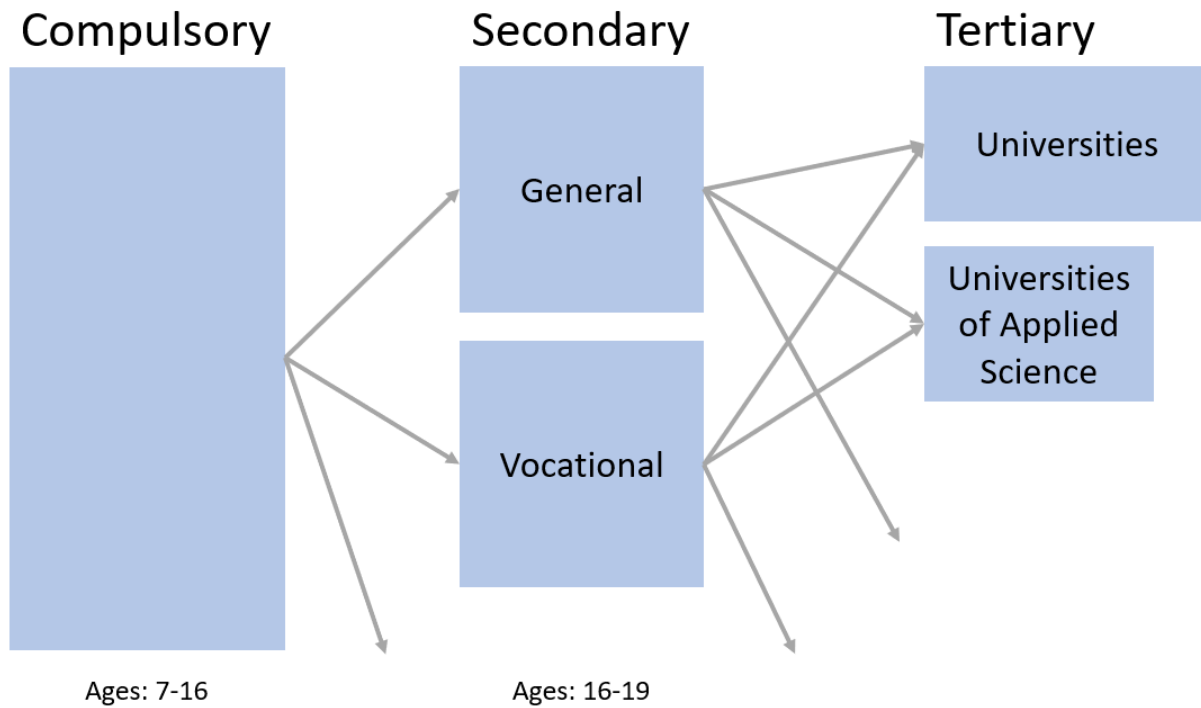
Notes: This figure depicts possible pathways through the Finnish education system. As the figure suggests, not everyone continues in education after compulsory schooling. Even fewer complete a tertiary degree.

Figure A.3: Female-male difference in higher education
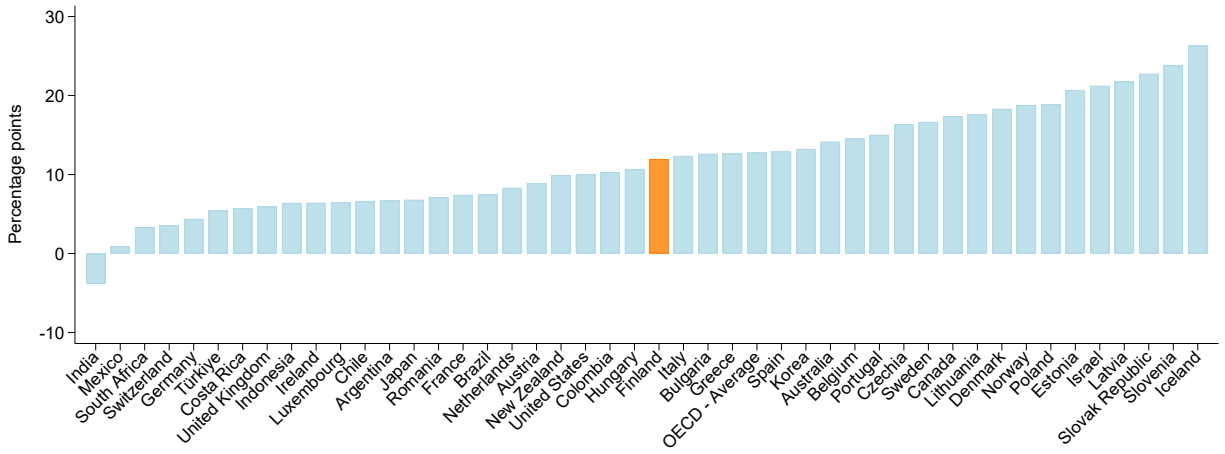
Notes: This figure plots the difference in higher educational attainment between men and women across OECD countries, for people aged 25-34. Data: OECD (2022).

Figure A.4: Cohort trends in educational attainment (by age 42) and gender

(a) Women   (b) Men
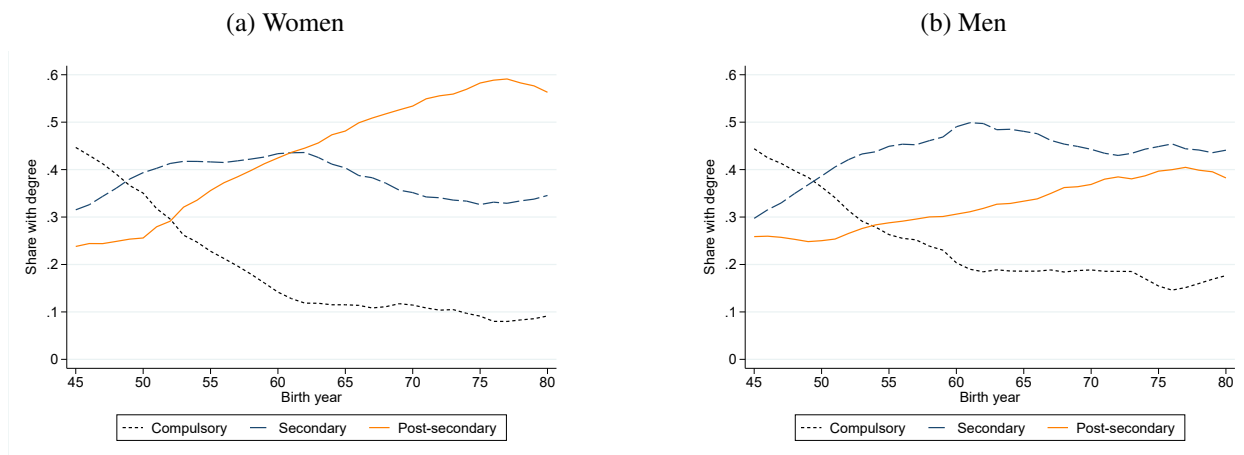
Notes: These figures show the shares of birth cohorts with various levels of educational attainment by gender.

Figure A.5: Cohort trends in fertility by education and gender

(a) Number of children (age 42), women

(b) Number of children (age 42), men
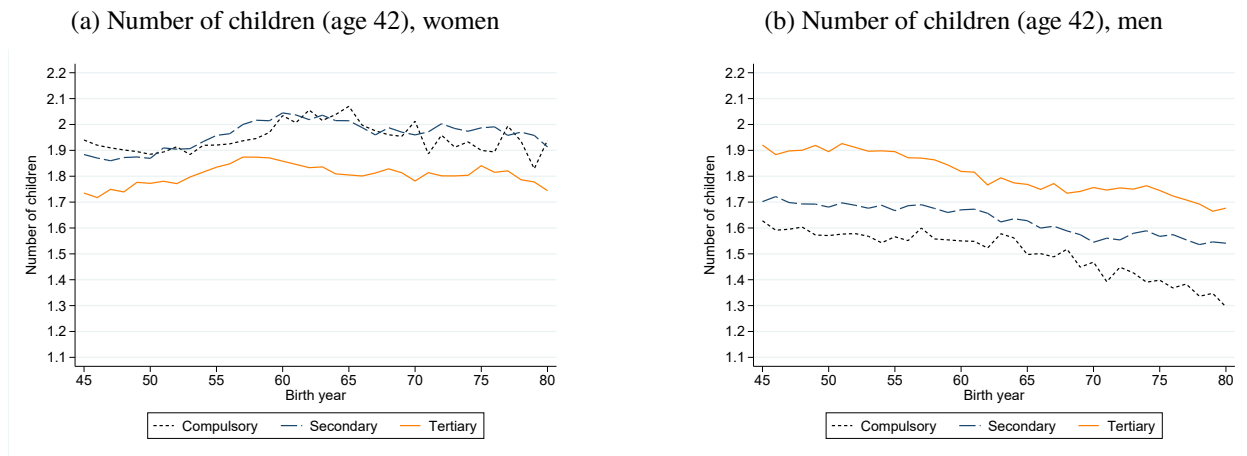
Notes: These figures show the portion of each birth cohort who have a child by the age of 42, by gender.

Figure A.6: Alternative measures of family formation through age 42

(a) Number of children, women

(b) Number of children, men

(c) Married, women

(d) Married, men
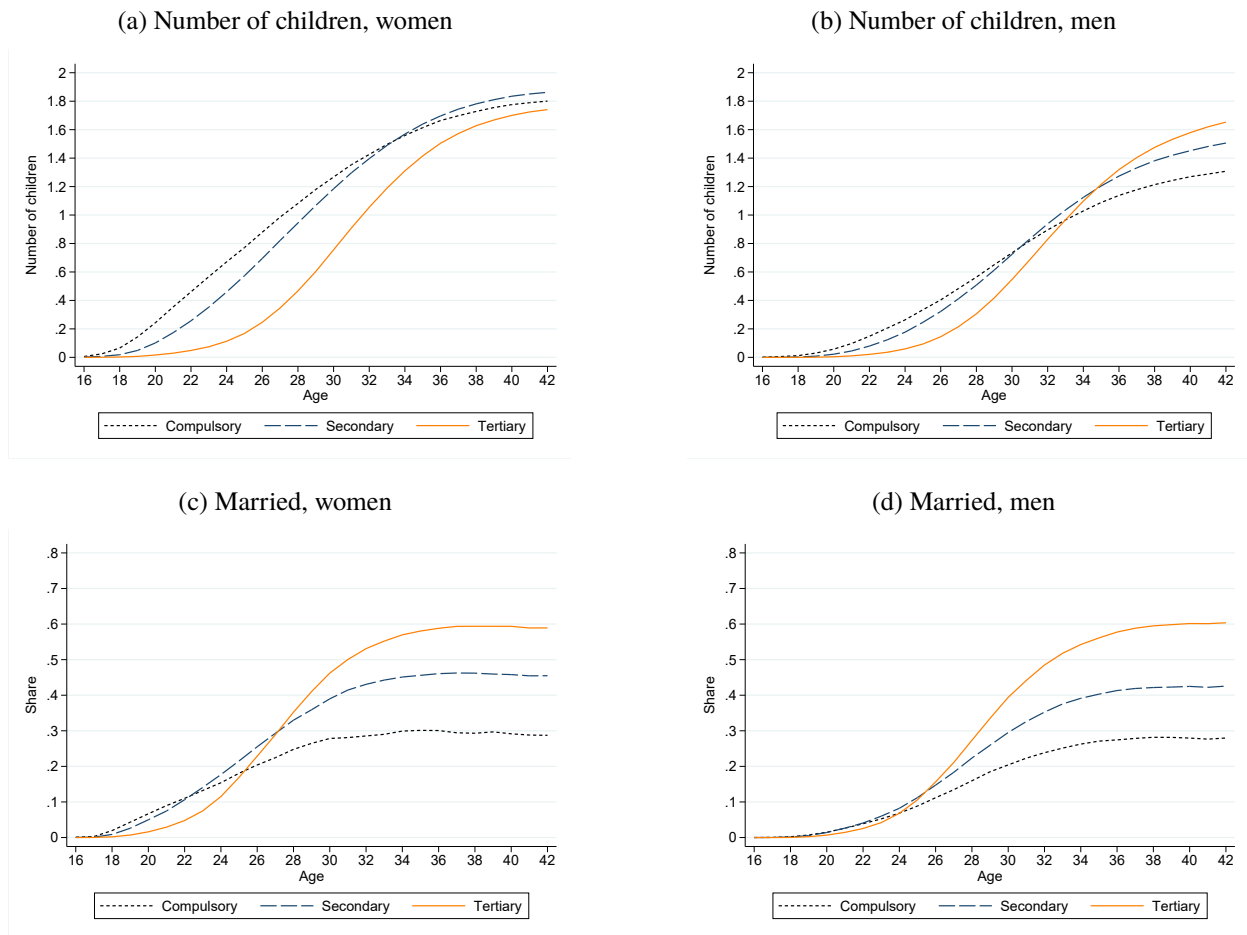
Notes: These figures plot our two alternative measures of family formation from ages 16 to 42 by each person's highest level of education and gender. Figures (a) and (b) plot the mean number of children each person has at each age – where having no children is coded as a zero. Figures (c) and (d) plot the portion of each cohort which is married at each age. So that we can follow this sample through age 42, these figures are based on cohorts born between 1979 and 1980.

Figure A.7: Family formation outcomes and more granular types of education

(a) Has children, women

(b) Has children, men

(c) Has partner, women

(d) Has partner, men
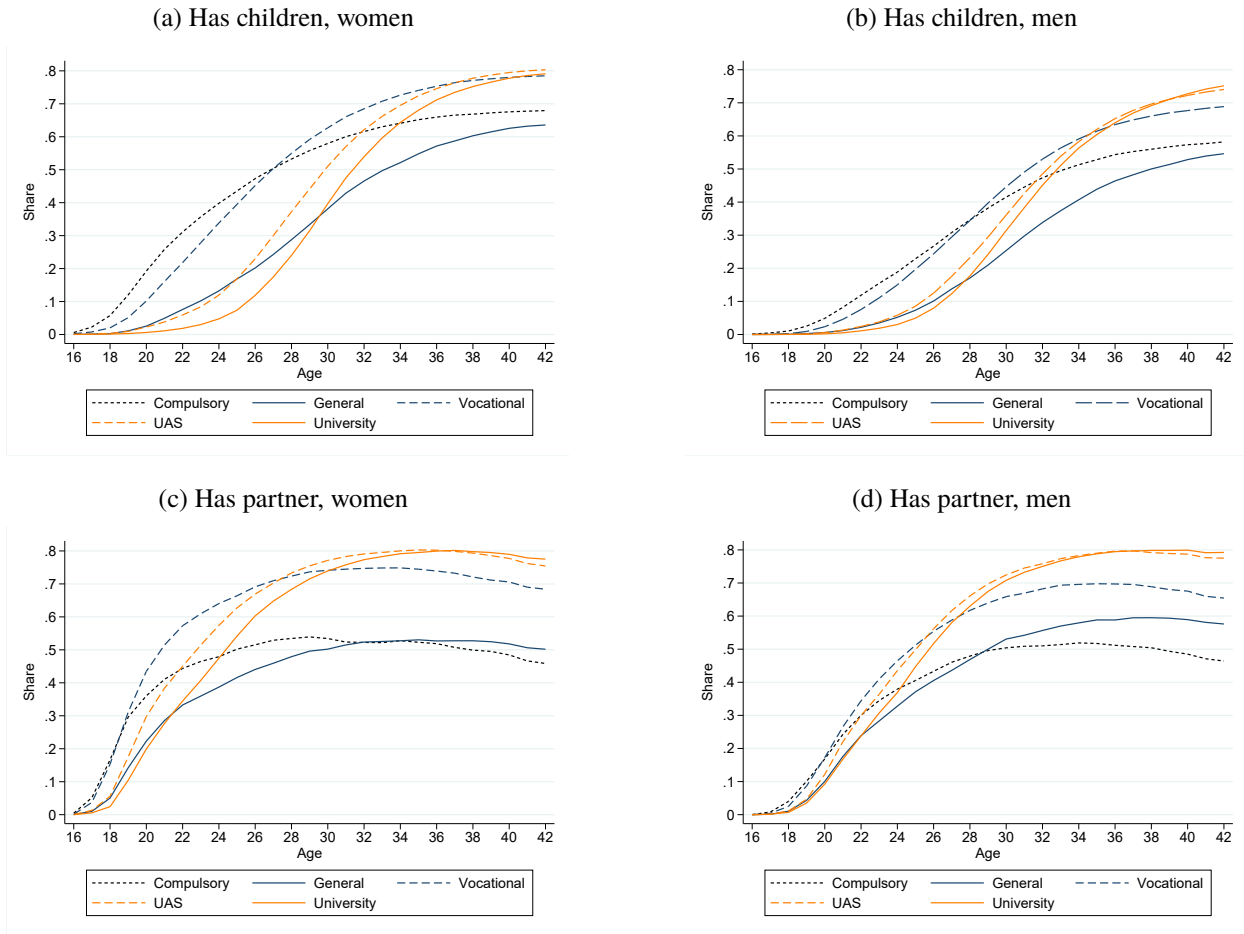
Notes: These figures plot our main outcomes from ages 16 to 42 by each person's highest level of education and gender, dividing the main samples further by type of degree – general versus vocational upper secondary programs, and universities of applied sciences versus more selective universities. Figures (a) and (b) plot the portion of each cohort which has a child at each age – where having no children is coded as a zero. Figures (c) and (d) plot the portion of each cohort which has a partner at each age. So that we can follow this sample through age 42, these figures are based on cohorts born between 1979 and 1980.

Figure A.8: Density of observations across the cutoff

(a) Women, secondary margin

(b) Men, secondary margin

(c) Women, tertiary margin

(d) Men, tertiary margin
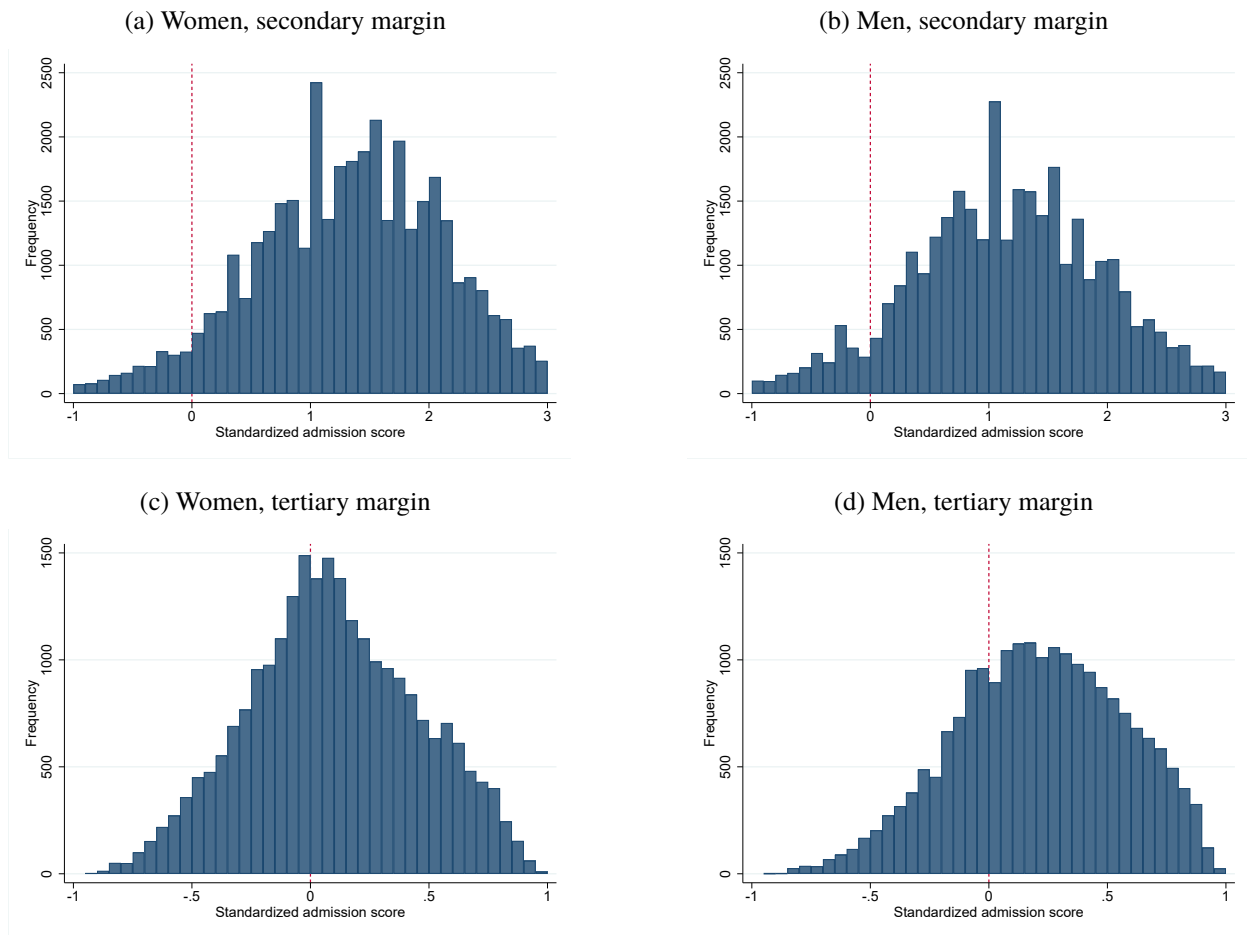
Notes: These figures plot the distribution of male and female applicants to secondary and tertiary education by their admissions scores in our two estimation samples. Panels (a) and (b) focus on admissions to secondary education. Panels (c) and (d) focus on admissions to tertiary education.

Figure A.9: Secondary margin: enrollment and graduation

(a) Enrollment to secondary education

(b) Secondary degree, age 36

(c) General secondary degree, age 36

(d) Tertiary degree, 36
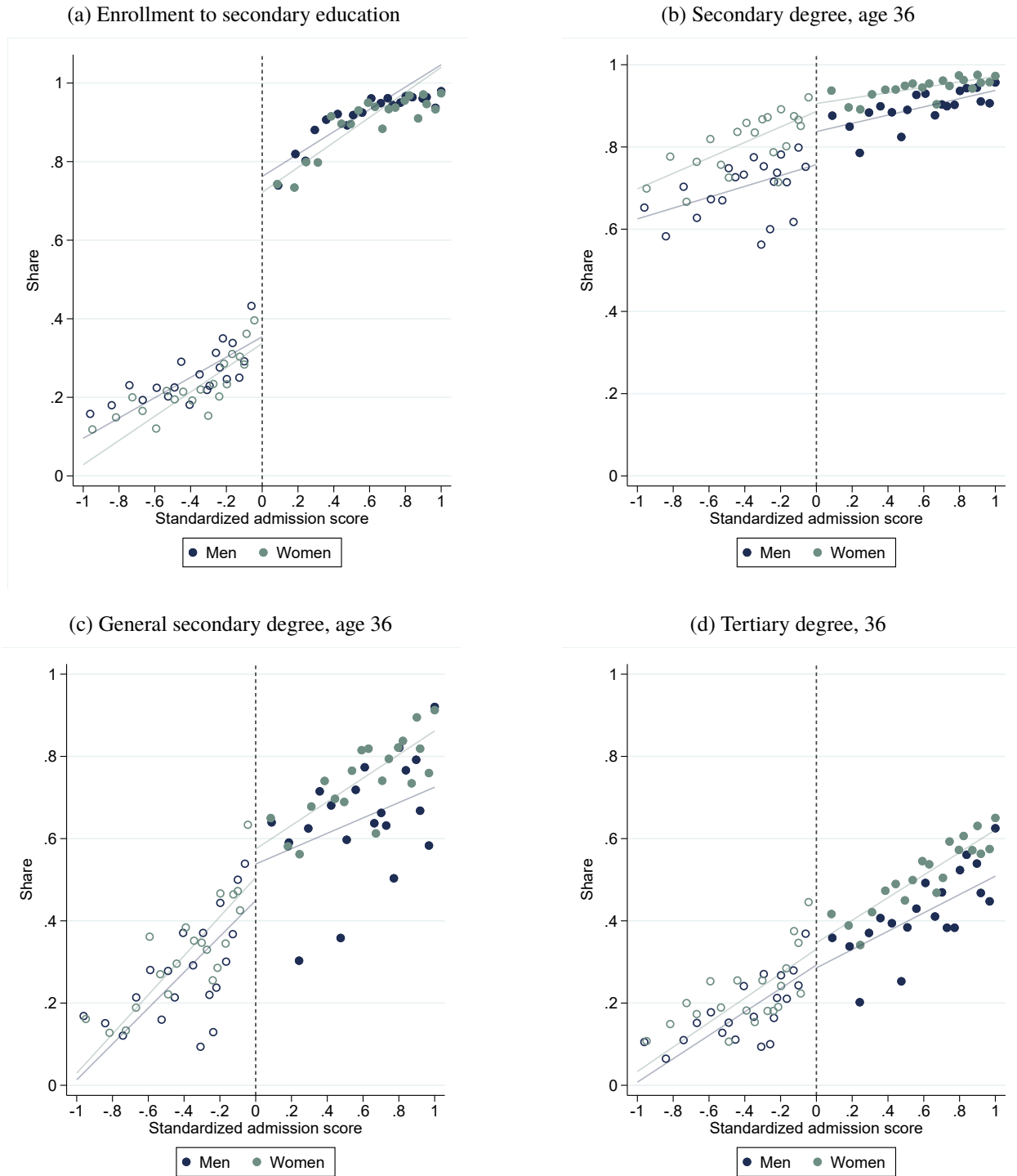
Notes: These figures use data from the secondary margin and plot the share of applicants enrolled in secondary education (a) and completing degree in secondary or tertiary education (b)-(d) based on their admissions scores. We set the number of bins based on admissions scores to 40 equally sized groups, and show these plots with linear fit-lines based on triangular weights.

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Figure A.10: Tertiary margin: enrollment and graduation

(a) UAS enrollment

(b) Tertiary degree, age 36

(c) UAS degree, age 36

(d) University degree, age 36
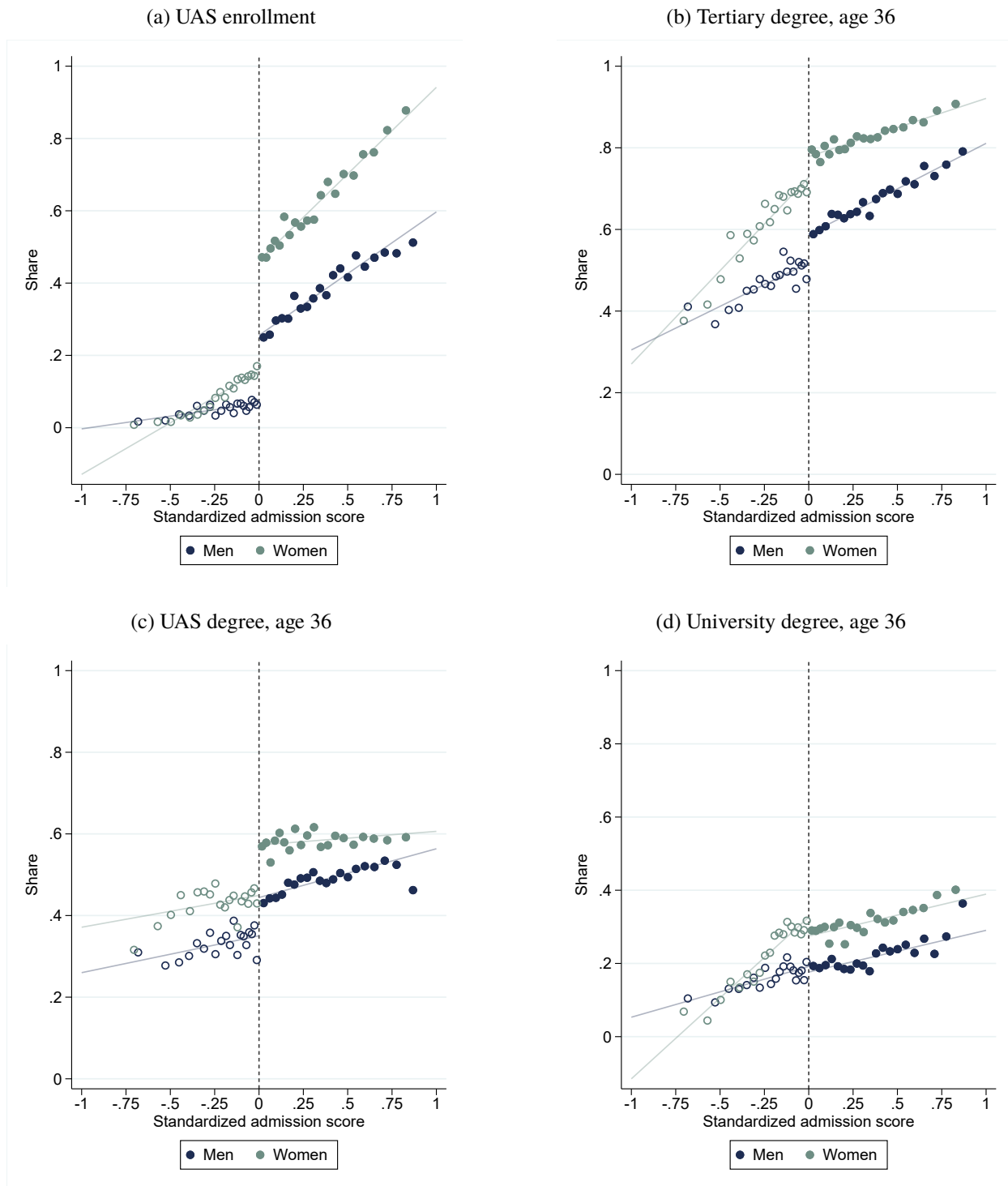
Notes: These figures use data from the tertiary margin and plot the share of applicants enrolled in university of applied sciences (a) and completing degree in tertiary education (b)-(d) based on their admissions scores. We set the number of bins based on admissions scores to 40 equally sized groups, and show these plots with linear fit-lines based on triangular weights.

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Figure A.11: Effects of admission to further education on enrollment and graduation
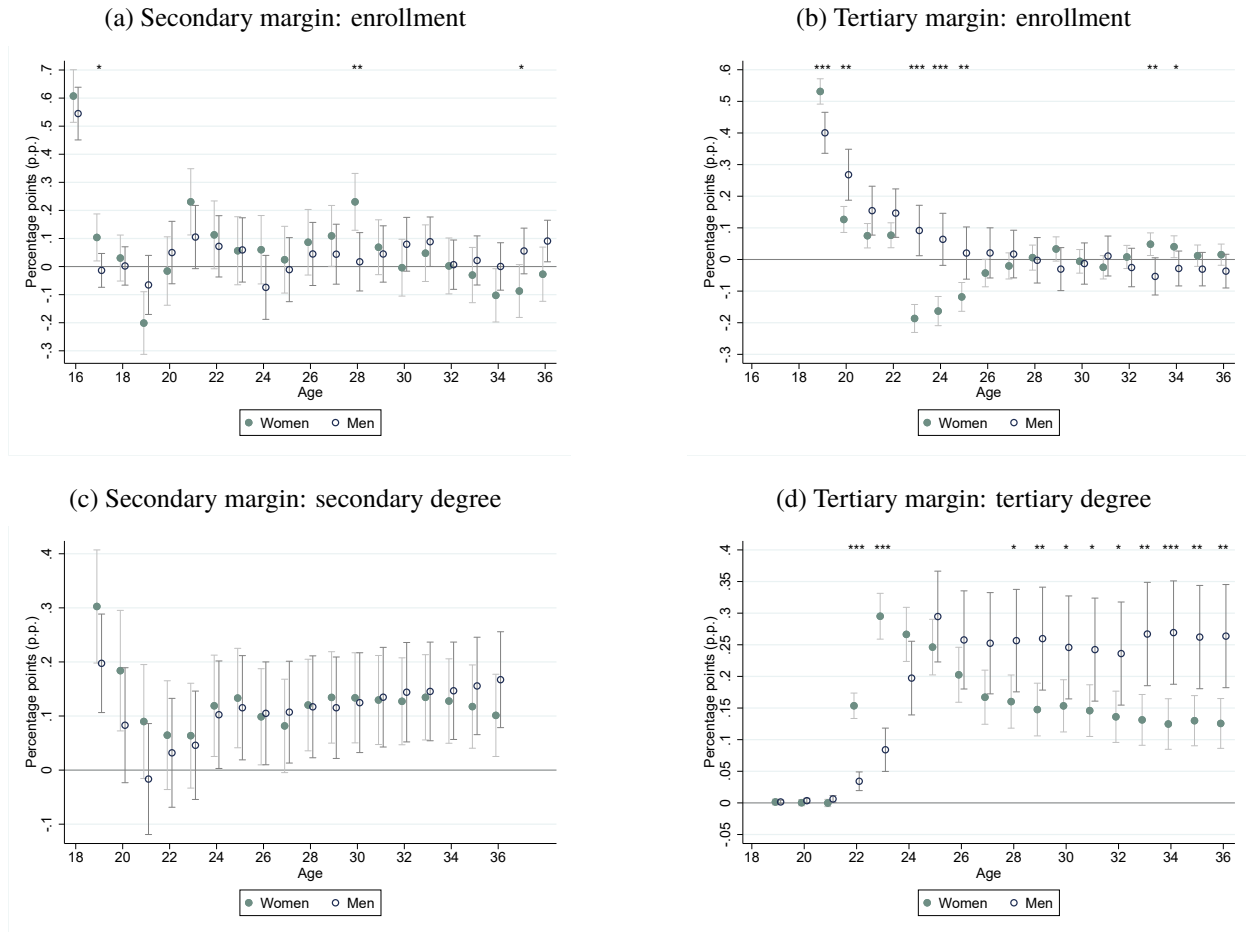
(a) Secondary margin: enrollment

(b) Tertiary margin: enrollment

(c) Secondary margin: secondary degree

(d) Tertiary margin: tertiary degree

Notes: Figures (a) and (b) show the RDD estimates of the effects of admission to further education on enrollment over the life-cycle, as well as their 90-percent confidence intervals. Figures (b) and (c) show the RDD estimates of the effects of admission to further education on earning a degree over the life-cycle, as well as their 90-percent confidence intervals. Results are reported separately for men and women. Significance stars are used to denote whether we are able to detect statistically different effects for men and women (p-values: * < 0.10, **< 0.05, and *** < 0.01).

Figure A.12: Effects of admission to further education on the number of children

(a) Secondary margin: number of children age 38
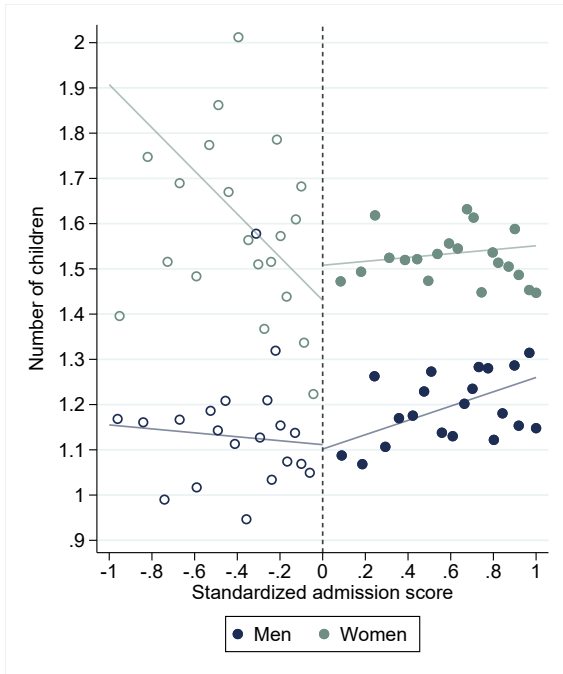
(b) Tertiary margin: number of children age 37
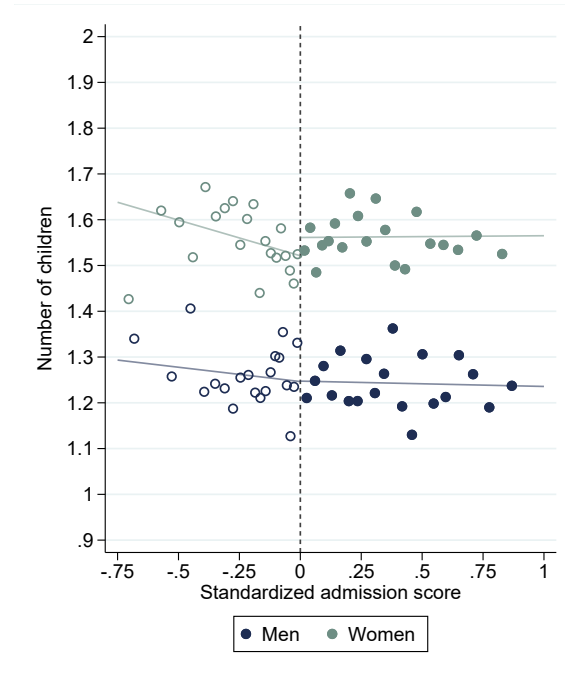
(c) Secondary margin: number of children
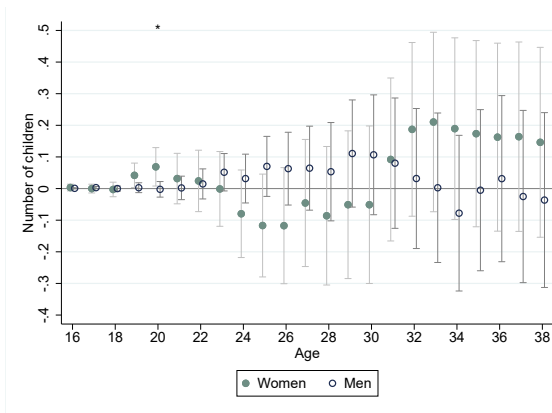
(d) Tertiary margin: number of children
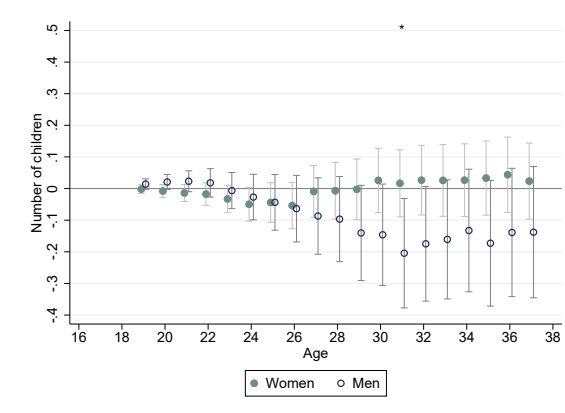
Notes: Figures (a) and (b) plot the number of children men and women have by standardized admissions score. Figures (c) and (d) show the RDD estimates of the effects of admission to further education on the number of children over the life-cycle, as well as their 90-percent confidence intervals. Figures (a) and (c) focus on students at the margin of admission to secondary education, while Figures (b) and (d) focus on students on the margin of admission to tertiary education. Results are reported separately for men and women. Significance stars are used to denote whether we are able to detect statistically significant differences in the effects for men and women (p-values: * < 0.10, **< 0.05, and *** < 0.01).

Figure A.13: Effects of admission to further education on marriage

(a) Secondary margin: married at age 38

(b) Tertiary margin: married at age 37

(c) Secondary margin: married

(d) Tertiary margin: married
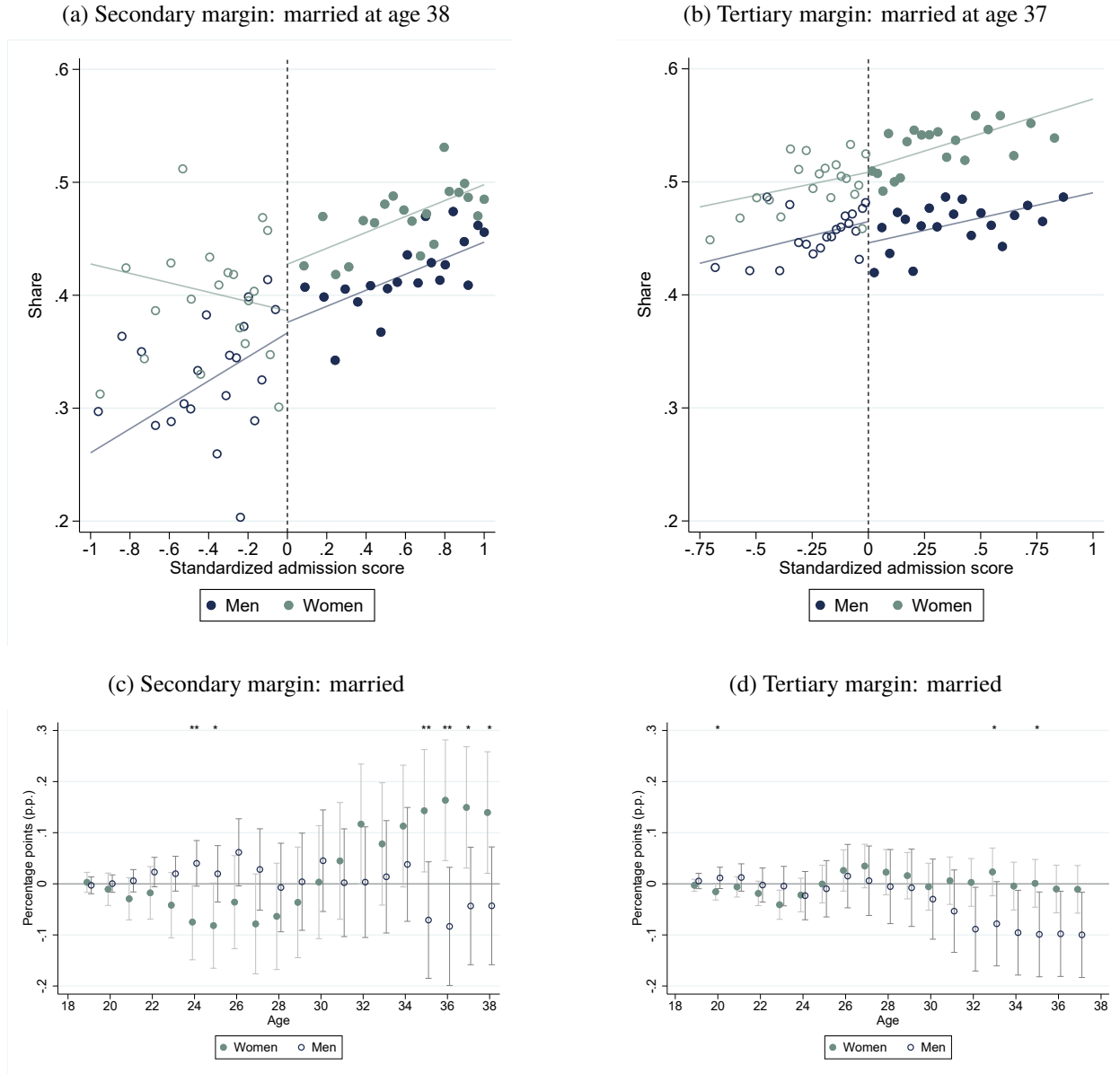
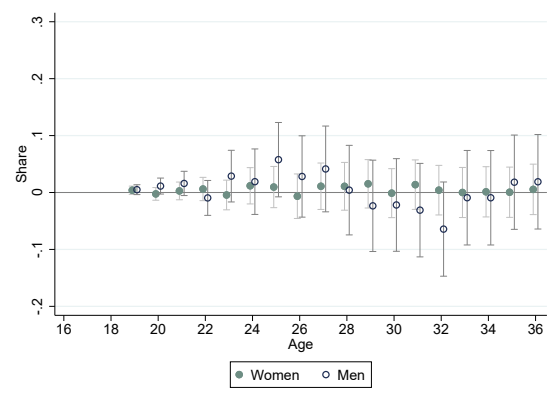*Notes*: Figures (a) and (b) plot the share of men and women who are married by standardized admissions score. Figures (c) and (d) show the RDD estimates of the effects of admission to further education on marriage over the life-cycle, as well as their 90-percent confidence intervals. Figures (a) and (c) focus on students at the margin of admission to secondary education, while Figures (b) and (d) focus on students on the margin of admission to tertiary education. Results are reported separately for men and women. Significance stars are used to denote whether we are able to detect statistically significant differences in the effects for men and women (p-values: * < 0.10, **< 0.05, and *** < 0.01).

Figure A.14: Robustness to choice of specification

(a) Secondary margin: has children by age 38
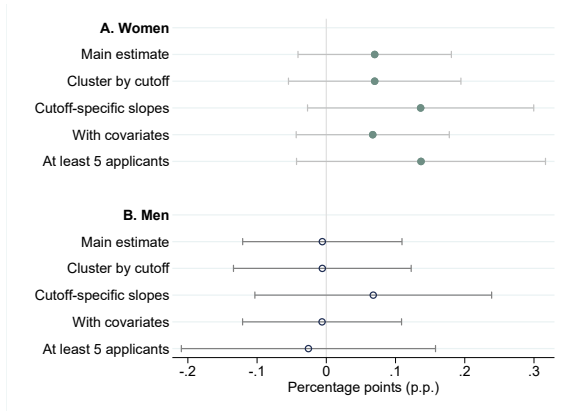
(b) Secondary margin: cohabitation at age 38
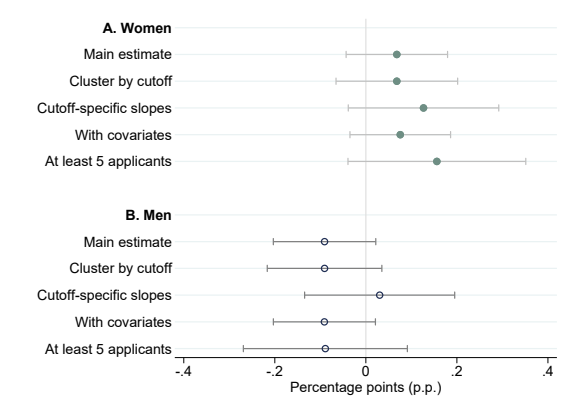
(c) Tertiary margin: has children by age 37
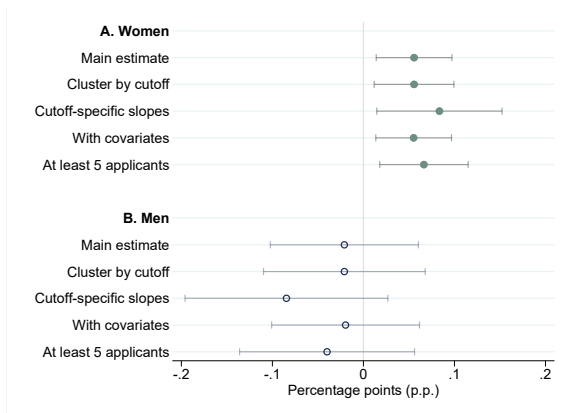
(d) Tertiary margin: cohabitation at age 37
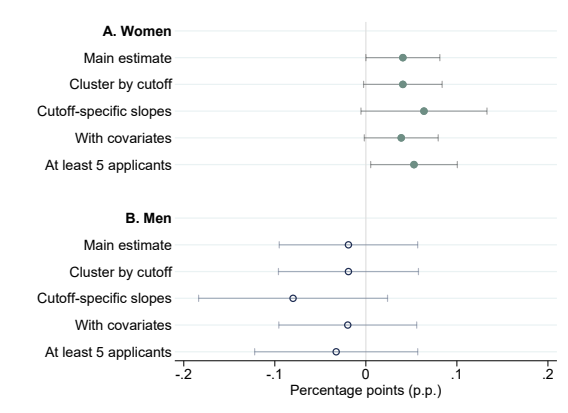
Notes: This figure compares results from our main specification to those from modified versions of the regression equation. First, we cluster our standard errors at the cutoff rather than individual level. Second, we allow there to be different slopes – not just on either side of the cutoff and by gender, but by gender and program-specific cutoff. Third, we add covariates to our baseline specification. Fourth, we restrict the set of cutoffs we include in our estimates to those with at least five applicants on either side of the admissions threshold (p-values: * < 0.10, **< 0.05, and *** < 0.01).

Figure A.15: Sensitivity to bandwidth

(a) Secondary margin: has children,

(b) Secondary margin: cohabitation

(c) Tertiary margin: has children

(d) Tertiary margin: cohabitation
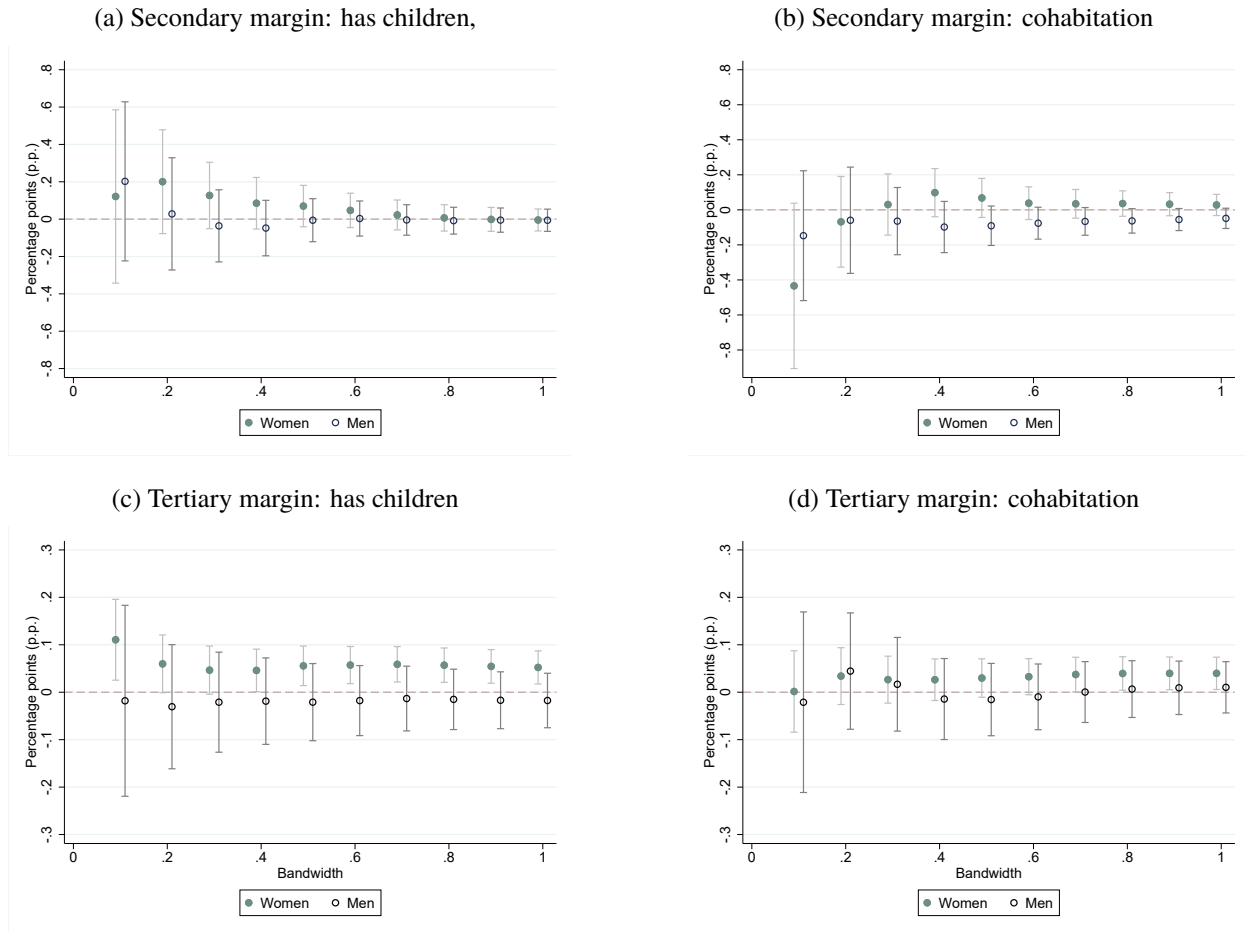
Notes: This figure tests for the sensitivity of our main results to the choice of bandwidth for the range of fixed bandwidths from 0.1 to 1 (p-values: * < 0.10, **< 0.05, and *** < 0.01). In our main estimates we fix our bandwidth to 0.5 in both the secondary and tertiary education samples.

Figure A.16: Effects of admission to further education on income
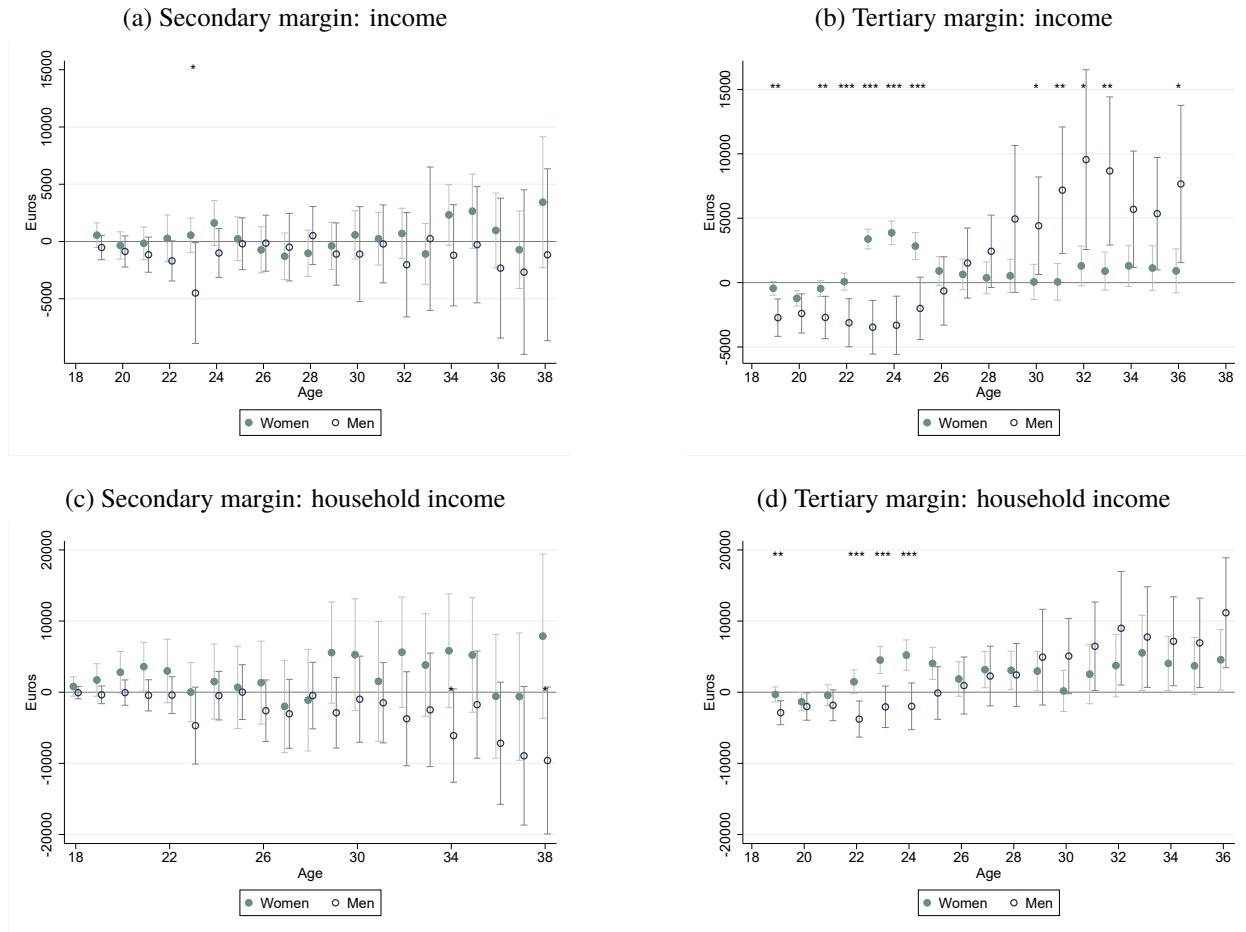
(a) Secondary margin: income

(b) Tertiary margin: income

(c) Secondary margin: household income

### (d) Tertiary margin: household income

Notes: Figures (a) and (b) show the RDD estimates of the effects of admission to further education on income over the life-cycle, as well as their 90-percent confidence intervals. Figures (b) and (c) show the RDD estimates of the effects of admission to further education on household income over the life-cycle, as well as their 90-percent confidence intervals. Results are reported separately for men and women. Significance stars are used to denote whether we are able to detect statistically different effects for men and women (p-values: * < 0.10, **< 0.05, and *** < 0.01).

Figure A.17: Effects of admission to further education on partner characteristics

(a) Secondary margin: partner with tertiary education
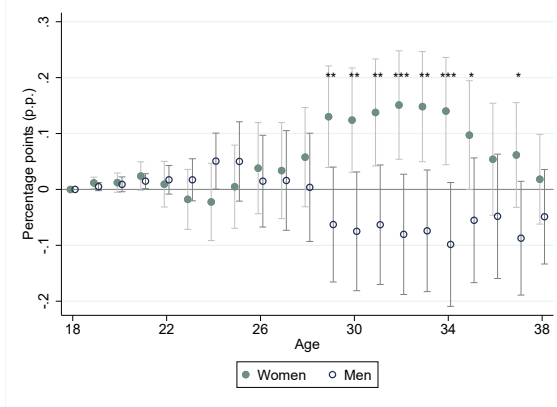
(b) Tertiary margin: partner with tertiary education

(c) Secondary margin: partner's income
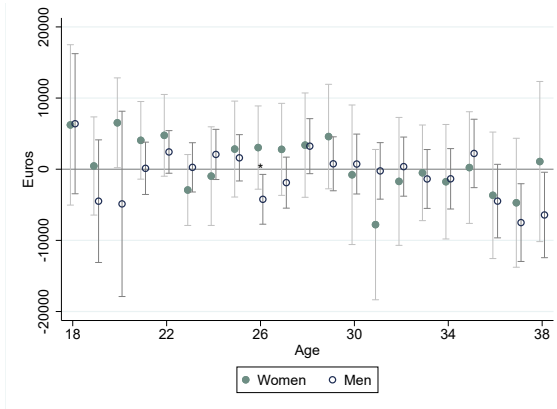
(d) Tertiary margin: partner's income
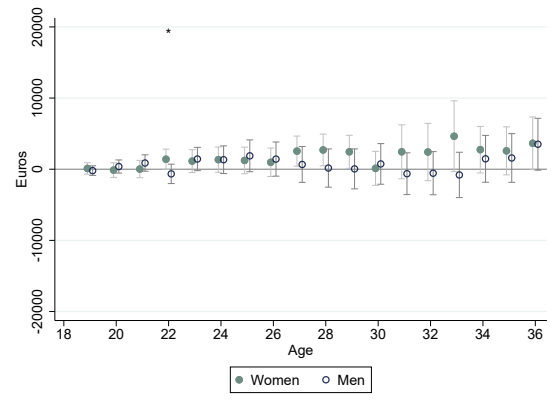
Notes: Figures (a) and (b) show the RDD estimates of the effects of admission to further education on the probability a person has a partner with tertiary education, as well as their 90-percent confidence intervals. Figures (c) and (d) show the RDD estimates of the effects of admission to further education on the partner's income - where the partner's income is coded as zero if a person does not have a partner, as well as their 90-percent confidence intervals. Results are reported separately for men and women. Significance stars are used to denote whether we are able to detect statistically different effects for men and women (p-values: $* < 0.10$, $** < 0.05$, and $*** < 0.01$).

Figure A.18: Gender equality in Finland and other EU countries
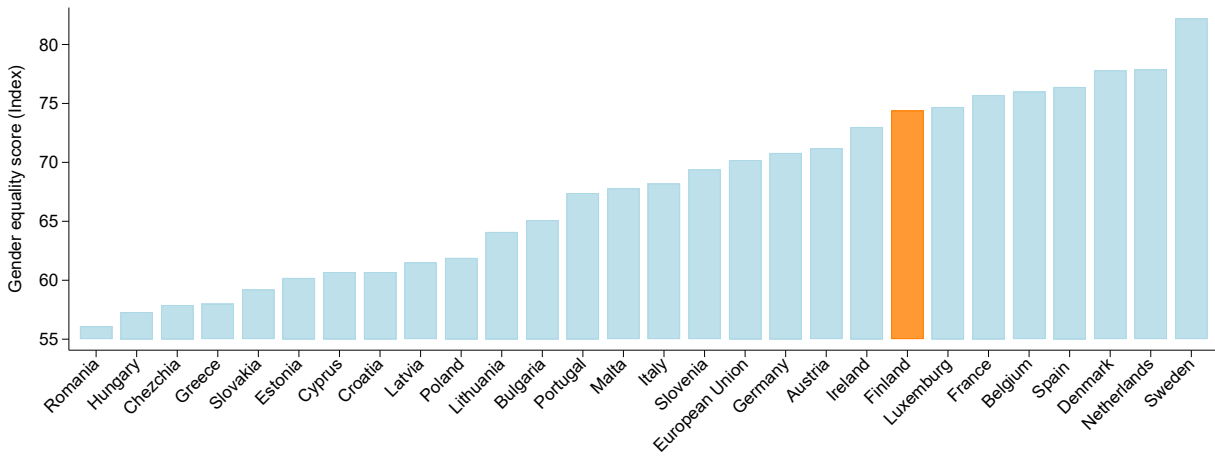
Notes: This figure plots national scores on gender equality, as measured by the European Institute for Gender Equality. Data: EIGE (2023).
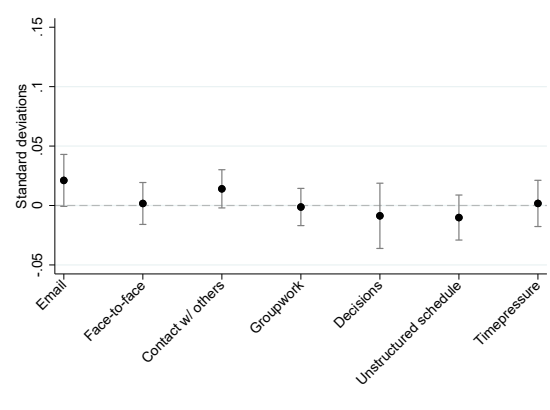
Figure A.19: Education and women's job flexibility across various dimensions

(a) Mean job flexibility by education level
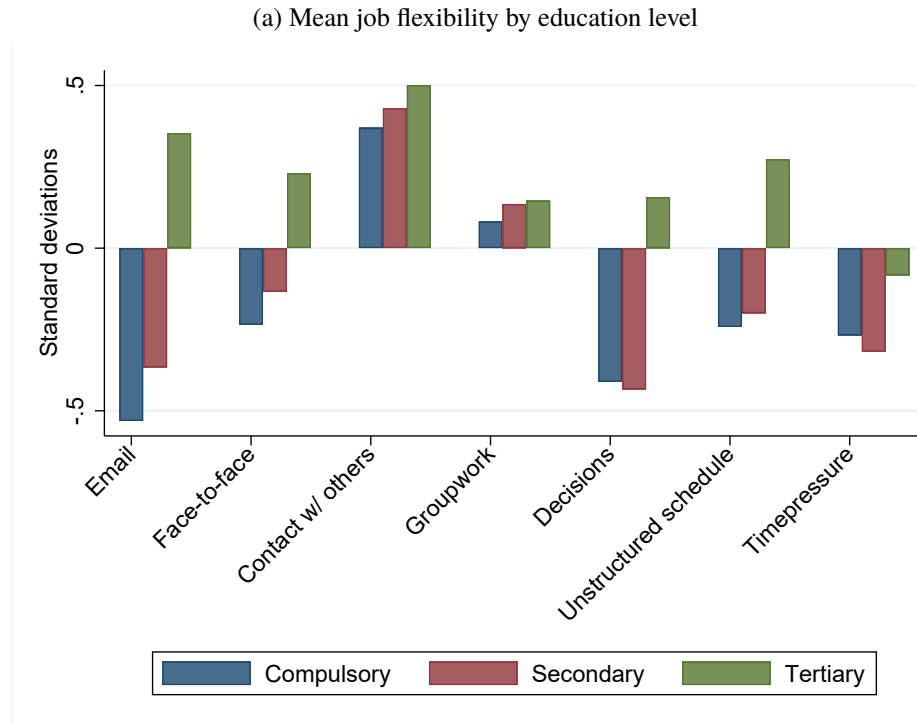
(b) Job flexibility, admission to secondary education
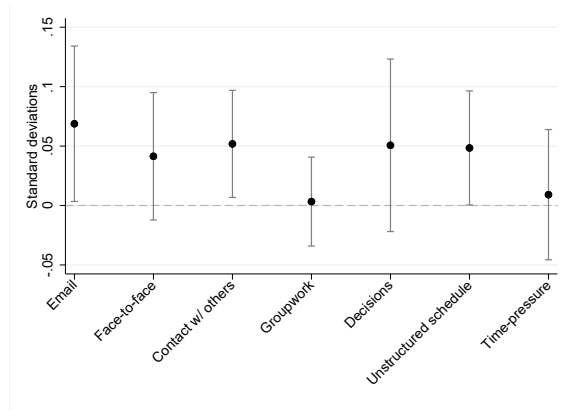

(c) Job flexibility, admission to tertiary education

Notes: Figure (a) shows the mean levels of various dimensions of potential job flexibility by women's education level. Job flexibility is measured using data from O*NET, and merged to registry data at Statistics Finland using four-digit ISCO-2008 codes. We define the potential job flexibility for each six-digit educational degree as the mean job flexibility measured for women who are employed at age 35 with that degree. Figure (b) shows how admission to secondary degree for the marginal applicant effects these measures of job flexibility. Figure (c) shows how admission to tertiary degree for the marginal applicant effects these measures of job flexibility.

Figure A.20: Self-reported obstacles for family formation in survey sample - respondents without kids
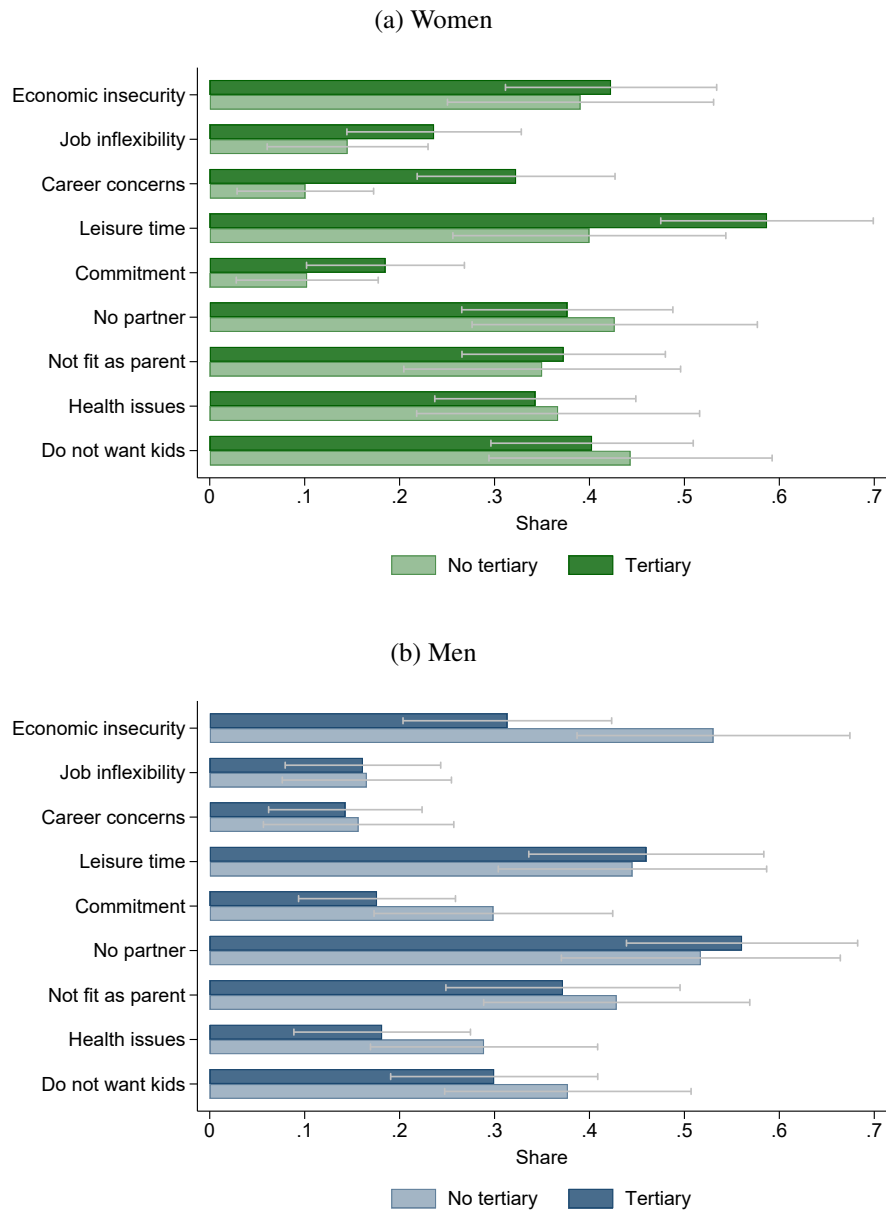
(a) Women

(b) Men

Notes: This figure reports the share of men and women with and without tertiary education who report various issues as having been obstacles to forming families. In these figures we restrict the sample to survey respondents born between 1970 and 1995 who do not have kids.

Figure A.21: Self-reported obstacles for family formation in survey sample - all respondents
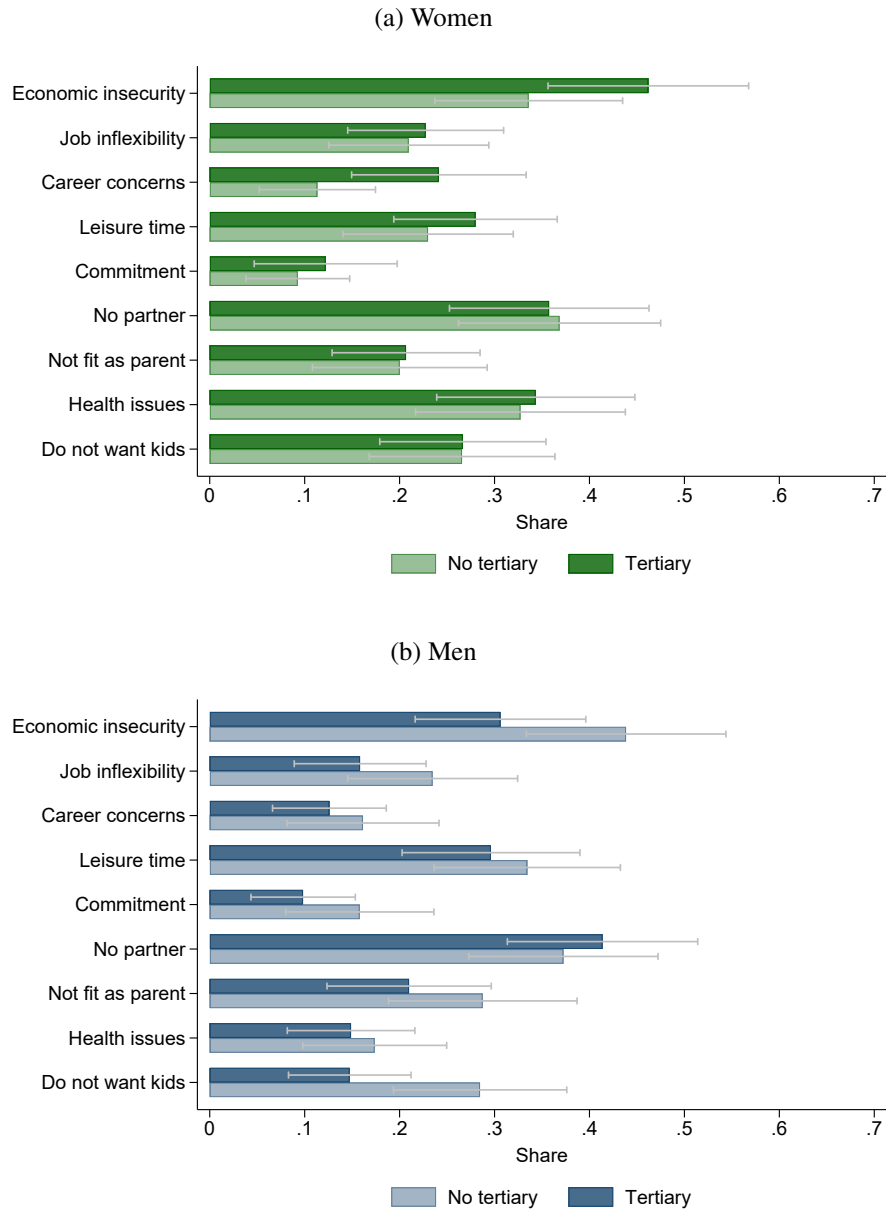
(a) Women

(b) Men

Notes: This figure reports the share of men and women with and without tertiary education who report various issues as having been obstacles to forming families. In these figures we restrict the sample to survey respondents born between 1970 and 1995.

Figure A.22: The perceived importance of social versus academic skills in the labor market
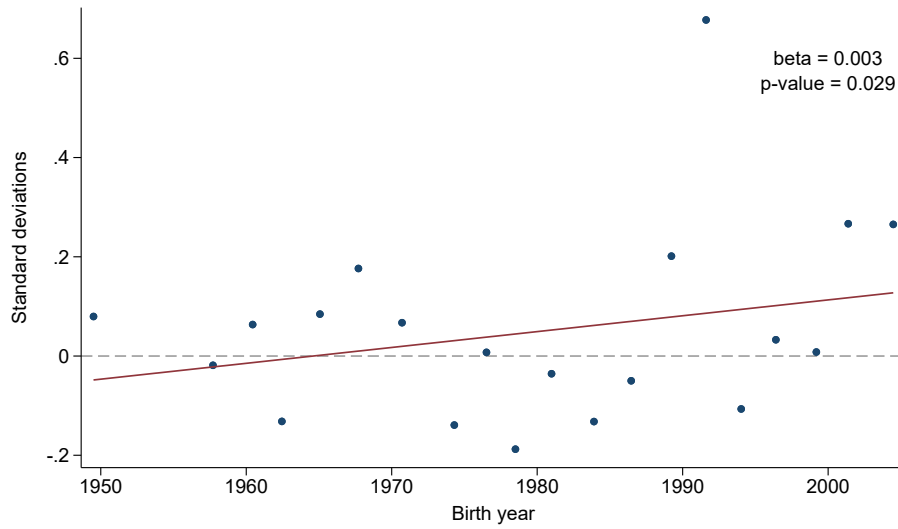
Notes: This figure reports the mean difference in the extent that respondents ascribe social skills versus academic skills as being important in the labor market by birth year.

Figure A.23: Perceived relative importance of parental versus school inputs in skill development
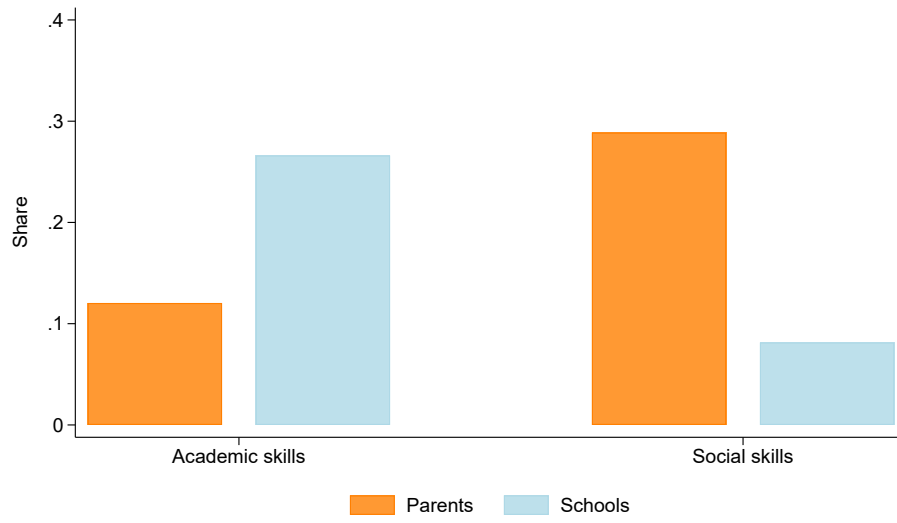
Notes: This figure reports the share of survey respondents who report that schools are more important than parents or parents are more important than schools in developing either academic or social skills.

Figure A.24: Perceived importance of mothers and fathers for skill development
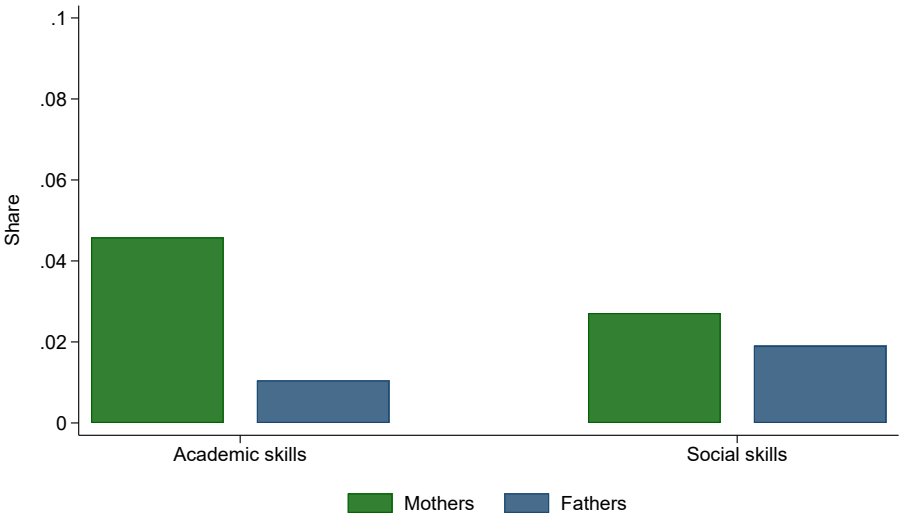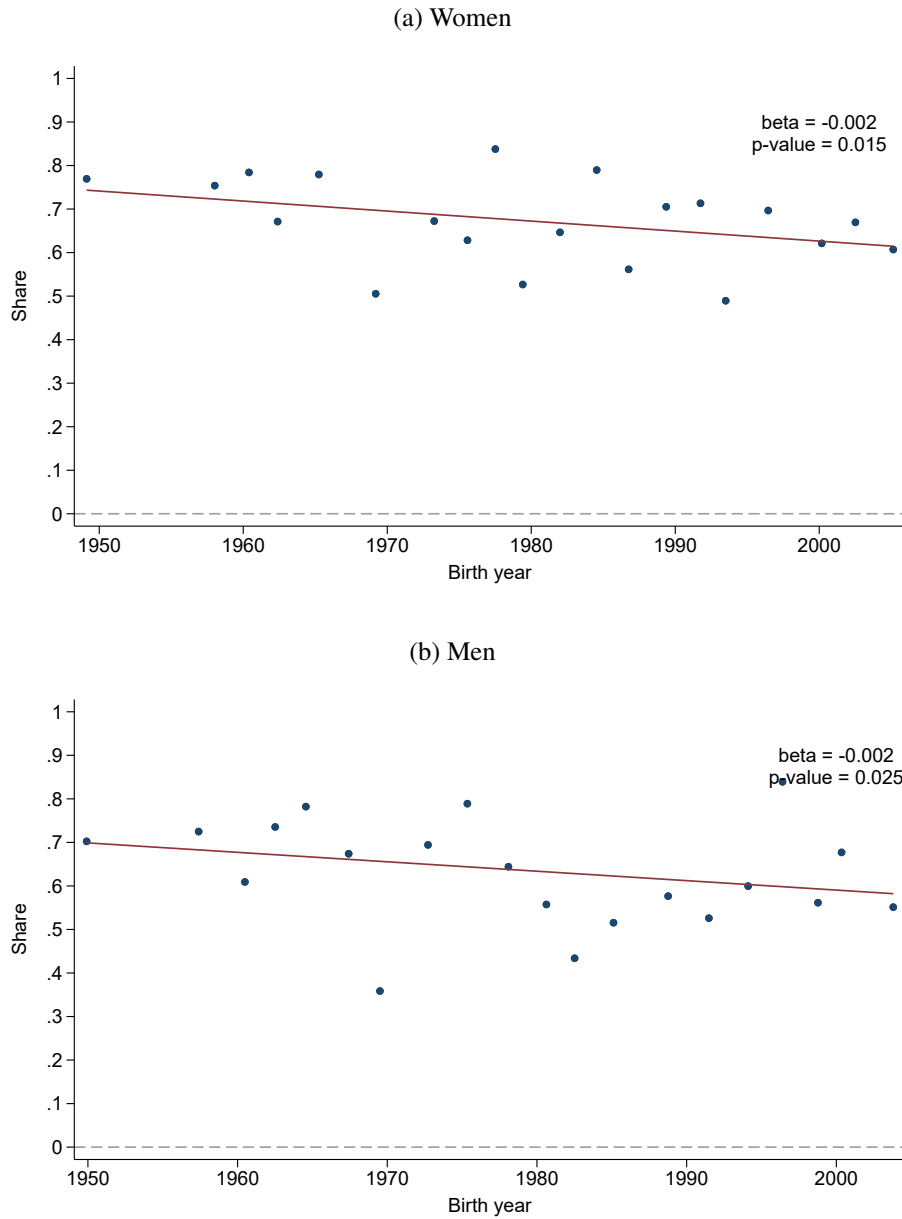

Notes: This figure reports the share of survey respondents who report that mothers are more important than fathers or fathers are more important than mothers in developing either academic or social skills.

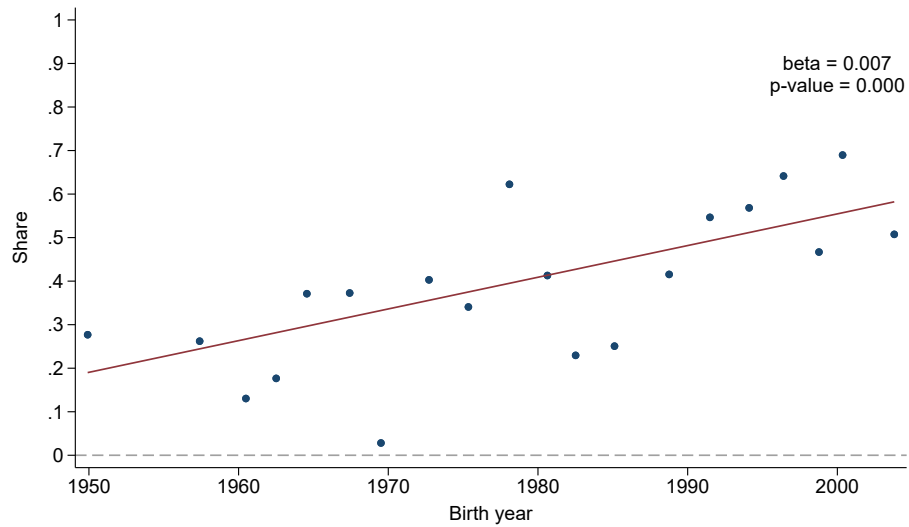Figure A.25: The share of men and women who want kids, by education level
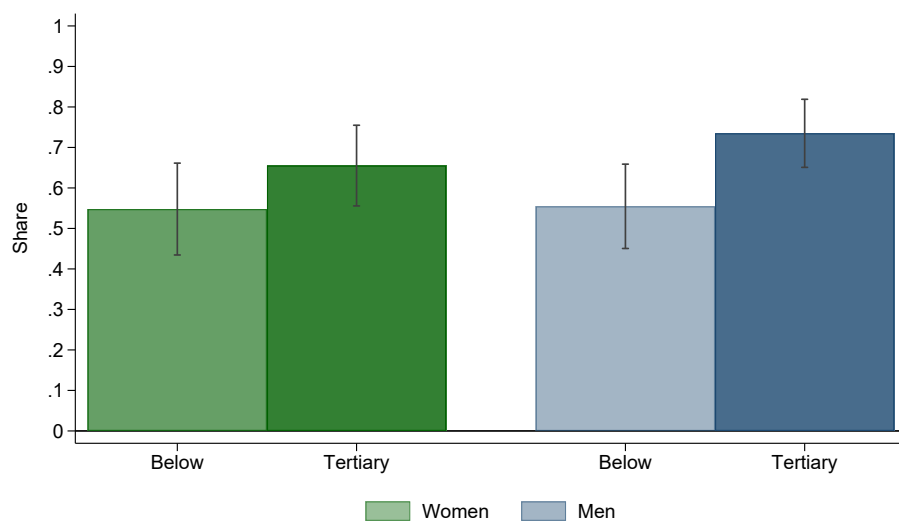
Notes: This figure reports the share of men and women who want kids, by highest level of education. The sample is restricted to respondents born between 1970 and 1990.

Figure A.26: The share of men and women who want kids, by birth cohort
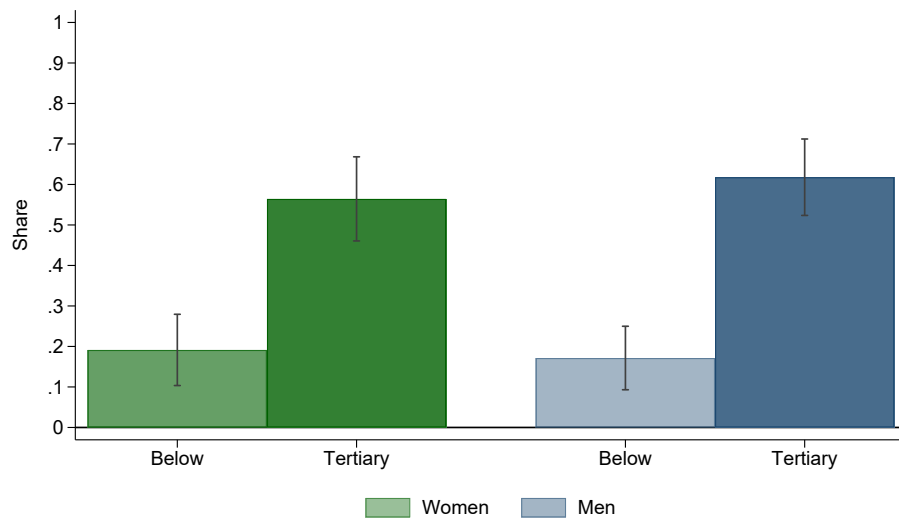
(a) Women

(b) Men

Notes: This figure reports the share of men and women whose ideal partner has tertiary education, by highest level of education.

Figure A.27: Share of women indicating a preference for college-educated partners

Notes: This figure reports the share of women who indicate a preference for a college-educated partner by birth year.

Figure A.28: The share of men and women who want a partner with tertiary education, by education level

Notes: This figure reports the share of men and women whose ideal partner has tertiary education, by highest level of education. The sample is restricted to respondents born between 1970 and 1990.

B Survey instrument

We provided nine questions to EVA Research to include in their quarterly survey. They modified them slightly, before including them into their survey module. The English translations of the final questions are presented below.

The following questions concern family and children. You can respond to them regardless of whether you are in a relationship or whether you have children.

1. How many children do you have?

   - None
   - One
   - Two
   - Three or more
   - I do not know how/want to respond

2. How many children would you have liked to have/or would you like to have in the future?

   - None
   - One
   - Two
   - Three or more
   - I do not know how/want to respond

3. Do you have a partner or are you married?

   - Yes
   - No
   - I do not know how/want to respond

4. What would the ideal education level of your partner be?

   - Compulsory education
   - Secondary education (general or vocational upper secondary school)
   - Tertiary education (polytechnic or university)
   - I do not care about my partner's education
   - I do not know

5. To what extent do you experience the following as obstacles or constraints to having children? If you are past the period in your life when having children is relevant, respond as you would have when it was.

   - My economic resources are insufficient
     - Fully agree
     - Somewhat agree
     - Hard to say
     - Somewhat disagree
     - Fully disagree
   - My job does lacks the flexibility to combine with childcare responsibilities
     - Fully agree

- Somewhat agree
  - Hard to say
  - Somewhat disagree
  - Fully disagree

- I want to progress in my job or career
  - Fully agree
  - Somewhat agree
  - Hard to say
  - Somewhat disagree
  - Fully disagree

- I would have to give up my current lifestyle
  - Fully agree
  - Somewhat agree
  - Hard to say
  - Somewhat disagree
  - Fully disagree

- I do not believe I would make a suitable parent
  - Fully agree
  - Somewhat agree
  - Hard to say
  - Somewhat disagree
  - Fully disagree

- I do not have a suitable partner
  - Fully agree
  - Somewhat agree
  - Hard to say
  - Somewhat disagree
  - Fully disagree

- I am not yet ready to commit
  - Fully agree
  - Somewhat agree
  - Hard to say
  - Somewhat disagree
  - Fully disagree

- Health issues
  - Fully agree
  - Somewhat agree
  - Hard to say
  - Somewhat disagree
  - Fully disagree

- I do not want children
  - Fully agree
  - Somewhat agree

- – Hard to say
- – Somewhat disagree
- – Fully disagree

6. How important do you perceive the following three things to be for developing children's academic skills (ex. reading and writing, math, coding, or language skills).

- School
  - – Very important
  - – Somewhat important
  - – Not very important
  - – Not important at all
  - – I do not know
- Father
  - – Very important
  - – Somewhat important
  - – Not very important
  - – Not important at all
  - – I do not know
- Mother
  - – Very important
  - – Somewhat important
  - – Not very important
  - – Not important at all
  - – I do not know

7. How important do you perceive the following three things to be for developing children's social skills (ex. listening, teamwork, behavior, leadership, or performance).

- School
  - – Very important
  - – Somewhat important
  - – Not very important
  - – Not important at all
  - – I do not know
- Father
  - – Very important
  - – Somewhat important
  - – Not very important
  - – Not important at all
  - – I do not know
- Mother
  - – Very important
  - – Somewhat important
  - – Not very important
  - – Not important at all

        – I do not know

8. How important do you perceive academic skills (ex. reading and writing, math, coding, or language skills) are to succeed professionally?

- 7 Very important
- 6
- 5
- 4
- 3
- 2
- 1 Not at all important

9. How important do you perceive social skills (ex. listening, teamwork, behavior, leadership, or performance) are to succeed professionally?

- 7 Very important
- 6
- 5
- 4
- 3
- 2
- 1 Not at all important