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ABSTRACT

Beyond the Degree: Fertility Outcomes of 'First in Family' Graduates*

This paper looks at the relationship between higher education and fertility, focusing on how intergenerational educational mobility shapes this dynamic. Using the 1970 British Cohort Study, we estimate gaps in completed fertility, distinguishing between those who are the first in their family to graduate from a university (FiF), graduates with a graduate parent, and non-graduates. Our findings reveal that while on average, graduate women have fewer children than non-graduates, this difference is driven by FiF graduates. FiF women tend to have fewer children than both non-FiF graduates and non-graduates, who exhibit similar fertility rates. The fertility gap between FiF and non-FiF graduates emerges after age 35, mainly on the extensive margin: FiF women are more likely to remain childless, but those who become mothers have an equal average number of children. Similar patterns are observed among men, although the gaps are smaller and not statistically significant. We identify child-related preferences, self-esteem, and maternal employment in childhood as potential explanations behind the FiF fertility gap, while labour market outcomes, financial constraints, partnerships, and health do not appear to play a role. These findings underscore important considerations for supporting inter-generational mobility and fertility.

JEL Classification: I26, J13, J16, J24

Keywords: first in family graduates, fertility, childlessness, inter-generational educational mobility, gender economics

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1 Introduction

The trend of declining fertility is prevalent across the globe. The average Total Fertility Rate (TFR), reflecting the lifetime number of children per woman, plummeted from 2.84 to 1.58 between 1970 and 2020 across the OECD countries (OECD, 2023b). Despite the evident heterogeneity amongst different countries, the TFR remains beneath the replacement level of 2.1 in all OECD nations. In 2011, the proportion of childless women aged between 40-44 in the UK stood at 20%, a figure speculated to increase in subsequent years (OECD, 2016). Concurrently, there has been a notable rise in educational attainment; the percentage of individuals between 30-34 possessing a tertiary degree has doubled from 1995 to 2019 in the EU, exceeding 40% (OECD, 2023a). As a result, a considerable proportion of recent university graduates in the UK, around two-thirds (Henderson et al., 2020), represent the first in their families (FiF) to attain a degree. This is a surprisingly large social group. According to our estimates, there are about 3-4 million FiF graduate women (and roughly the same number of men) aged between 25 and 49 in the UK.[1] Given these trends, we investigate the relationship between higher education and fertility, with an eye on the role of intergenerational educational mobility. We explore whether FiF graduates exhibit different fertility outcomes compared to their non-FiF graduate counterparts and those who did not graduate from a university.

Human capital theory suggests that women decide whether and when to have children based on the perceived costs and benefits of childbearing (Becker, 1960). In Becker's model, having a tertiary degree increases women's labour market prospects and thus the opportunity cost of childbearing, leading to their lower fertility (substitution effect). On the other hand, it may increase fertility by making childbearing more affordable (income effect). Furthermore, through assortative mating, higher education may change relationship patterns as well. There is an emerging literature that explores the relationship between higher education and fertility outcomes. James and Vujić (2019) exploit higher education expansion in England and Wales during the late 1980s to early 1990s and find that attending post-compulsory education leads to postponing motherhood, but they do not look at the completed fertility of women. Kamhöfer and Westphal (2019) find that college reduces the probability of childbearing, but graduate women who decide to have children have more children on average than non-graduates. Currie and Moretti (2003) find that tertiary education reduces fertility, but more educated mothers give birth to healthier children.

We add to this growing literature by providing new empirical evidence on the relationship between higher education and completed fertility, and assessing whether this relationship differs by FiF status, i.e. parental education. FiF graduates face particular challenges during their educational and career paths that may impact their fertility choices and outcomes. They often come from low-income and minority backgrounds, have less academic preparation and access to information, inadequate finances, heavier work and care obligations, lack support systems, and have less contact with faculty (Kim et al., 2021; Aruguete and Katrevich, 2017; King et al., 2019). FiF students must also navigate the "hidden curriculum," or set of unspoken norms, values, and beliefs conveyed in the classrooms and social environment (Margolis, 2001; Gable, 2021). Graduating from college as a FiF student requires great effort, which can impact their mental and physical health (House et al., 2020; Lipson et al., 2023). FiF graduates' preferences regarding careers and having children may be impacted by their efforts (high sunk costs). Differences may also arise after graduation, for example, FiF graduate women in England have been shown to suffer a wage penalty in the labour market (Adamecz-Völgyi et al., 2020).

In order to estimate gaps in completed fertility between FiF graduates, non-FiF graduates, and non-

[1] Source: Authors' calculations based on the 2021 Census and Henderson et al. (2020).

graduates, we rely on the 1970 British Cohort Study (BCS70) dataset, which follows the cohort born in 1970 in Great Britain until the age of 46 (CSL, 2023). The BCS70 includes rich data on individual characteristics, including birth circumstances, parental background, cognitive and non-cognitive skills, educational and labour market outcomes, and mental and physical health. We study two measures of fertility outcomes: the number of children and the probability of childlessness at age 46. We find that, conditional on background characteristics and various measures of human capital, FiF graduate women have 0.17 fewer children on average and are 7.5% more likely to be childless at age 46 compared to non-FiF graduate women. While non-FiF graduate women also delay having a child compared to non-graduates, they catch up to non-graduates after age 35 and have similar completed fertility, while FiF women do not. We find similar patterns among men, however, the fertility differences are smaller and mostly non-significant. Restricting the sample to mothers, we find no difference between the number of children of FiF and non-FiF graduates, suggesting that the FiF fertility gap is realized on the extensive margin, through childlessness. Further analysis shows that differences in childbearing-related preferences, maternal employment in childhood, and self-esteem appear to contribute to the FiF fertility gap, while surprisingly, economic challenges, partnership characteristics, health, and childhood family size do not.

These results contribute to the literature in three key ways. First, the finding that higher education only has negative fertility returns among FiF graduate women is a novel result that nuances the previous evidence on the relationship between higher education and fertility outcomes. It suggests that lower fertility is not a necessary consequence of women attaining higher education, but rather related to particular challenges faced by women for whom attending university represents a generational leap. Second, our findings draw attention to an important further consequence of inter-generational educational mobility, particularly for women. From an individual perspective, it is a loss if FiF graduates must sacrifice desired fertility for their participation in higher education and subsequent careers due to financial, time, or health constraints. From a societal perspective, policies that enable inter-generational mobility without a resulting sacrifice in fertility may be key for fulfilling the increasing demand for highly skilled labour, slowing declines in fertility and the ageing of the population, and achieving equal access to opportunities for women. Third, we show that the FiF fertility gap emerges after age 35 and is due to a higher probability of childlessness. We find that non-financial factors, such as preferences, role models, and self esteem play a role. Many higher education institutions are implementing programs aimed specifically at easing the unique challenges faced by FiF students, such as informational and mentoring programs, support groups, ad campaigns publicizing the perseverance of FiF graduates, financial and in-kind support, and community building events.[2] Empirical evidence of the impact of such programs is emerging, for example, financial aid tied to high grades combined with academic support services was shown to especially benefit FiF students, improving their academic performance (Angrist et al., 2022). Investments in student support programs are even more justified if they can help mitigate undesired negative impacts on completed fertility. Our study brings attention to this key aspect, and points to the importance of addressing challenges beyond economic ones.

The remainder of the paper is structured as follows. Section 2 presents the background, reviews the existing evidence on FiF graduates, and outlines the potential mechanisms through which FiF status may be related to fertility decisions and outcomes. Section 3 describes the dataset used in our analysis and the details of the empirical methodology. Section 4 starts by providing descriptive evidence of the relationship between graduation, FiF status, and our two main measures of fertility. It then presents our main empirical estimates of the fertility gaps. Section 5 utilizes the rich set of variables available in the BCS70 dataset to

[2]See for example: https://firstgen.naspa.org/ and http://www.firstinfamily.com.au/

carry out a heterogeneity analysis of the fertility gaps. Section 6 concludes with a discussion of the results and future research directions.

2 Background

2.1 Higher Education and Fertility

Figure OA1 in the Online Appendix presents the share of graduate women and the total fertility rate for various OECD countries between 1980 and 2020. It shows a steep increase in the share of women with degrees, and concurrent decline in fertility over the time period. While there is a negative correlation between educational attainment and fertility, the literature is ambiguous about whether this relationship is causal. There is plenty of evidence that being in school reduces the probability of teenage motherhood (Black et al., 2008). Still, the evidence regarding the effects on completed fertility is inconclusive (Fort et al., 2016; Monstad et al., 2008). Furthermore, most of the literature looks at the effects of growing educational attainment concentrating on those in compulsory education by exploiting exogenous changes in the related legislation (Fort et al., 2016), however, only a handful of papers study the effects of post-compulsory education (Currie and Moretti, 2003; James and Vujić, 2019; Kamhöfer and Westphal, 2019; Kountouris, 2020). Our study provides estimates of the impact of higher education on completed fertility, and highlights the role of inter-generational mobility in shaping the fertility returns to higher education.

2.2 Previous Literature on FiF Graduates

FiF individuals are known under different 'labels'. First in family or first-in-family (vs. non-FiF) is the dominant terminology in the UK and Australia. In the US, they are referred to as first-generation (vs. continuing-generation) graduates, or first-generation college students (FGCS). These terms refer to individuals who attend or graduate from college, but whose parents did not do so. The research to date shows that FiF students often face complex and multiple forms of disadvantage that shape their schooling and transition to university. Going to university can be daunting new territory for these students, their families and even their communities."[3] Patfield et al. (2022) argue that FiF status should be treated as an additional underrepresented target group within the national equity framework and be supported accordingly.[4]

There is very limited evidence on FiF graduates and their health and socio-economic characteristics in general, and for the UK in particular. For example, the recent paper of Henderson et al. (2020) uses cohort-study data for England and examines the individual and socio-demographic characteristics of those who are FiF graduates. The paper finds that ethnic minorities and those with higher levels of prior educational attainment are more likely to become FiF. At the same time, those who are FiF graduates are more likely to study law, economics, and management, as well as education, and less likely to study medicine, social sciences, arts and humanities. Further, FiF graduates are less likely to graduate from elite universities and are at a greater risk of dropout in general, pointing to their weaker 'inter-generational safety net'. The paper by Adamecz-Völgyi et al. (2020) examines how FiF graduates fare in the labour market in England. The authors show that female FiF graduates earn 7.4% less on average than non-FiF female graduates. A decomposition of this female FiF wage penalty reveals that two-thirds of the gap is explained by having lower educational

[3]Source: https://www.qtac.edu.au/first-in-family-students-pave-the-way-to-university-success/

[4]In the Australian context, existing six underrepresented target groups are Indigenous Australians, people from low socio-economic status backgrounds, people from regional and remote areas, people with disabilities, people from non-English speaking backgrounds, and women in non-traditional areas of study.

attainment, not attending an elite university, selecting particular degree courses (education), working in smaller firms, working in jobs that do not require their degree, and motherhood. The authors do not find a significant FiF wage penalty among men.

Studies like Stuart (2006), Capannola and Johnson (2022) and Apps and Christie (2023) use qualitative phenomenological designs to explore the role of friendship and family relationship experiences of FiF graduates as they transition to and persist through university (college). Drawing on life history methods to gather the data for the UK, Stuart (2006) examines the different experiences of working- and middle-class students and highlights the role of friendship as a key determinant in deciding to study in higher education as well as in creating student success once at university. Capannola and Johnson (2022) conclude in the US context that parents, despite lacking college experience, offer educational, financial, and emotional support which students consider essential to their success. Many first-generation college students also state that setting an example and forging a path for younger siblings helped motivate them to persevere through hardships. Both of these papers stress the importance of 'social' or 'cultural capital' (Apps and Christie, 2023) which can operate to offset the effects of middle-class cultural and economic capital. The paper by Groves and O'Shea (2019) discusses how the FiF students have had limited exposure to the higher education environment and offers practical insights into how we might support and engage this cohort and their parents (Apps and Christie, 2023) to improve student higher education application and retention.

Our study contributes to the literature on FiF students as it is the first to document the fertility outcomes of FiF graduates relative to other groups. Our findings highlight an important further aspect of the complex challenges faced by FiF individuals, particularly FiF women.

2.3 Potential Mechanisms Behind the FiF Fertility Gap

Building on the findings of previous literature, there are several potential mechanisms through which we may expect fertility differences to arise, particularly among women. This subsection reviews six potential mechanisms, the roles of which we will descriptively test in this paper.

1) *Labour market outcomes and financial constraints.* FiF graduates may differ in terms of debt upon graduation, or in other ways upon entering the labour market, such as employment, occupation, and earnings. This may lead to different financial constraints that impact fertility decisions. The impact of liquidity constraints on fertility has been a long-standing topic in economics. In his economic analysis of fertility, Becker (1960) uses a rational utility maximising framework to show that fertility decisions are influenced by economic factors: raising children offers potential future returns, but there are also costs involved, including the opportunity cost of the time spent raising children. Building on this foundation, Nakamura et al. (1979) focus on labour market outcomes of married women in Canada, linking fertility decisions to expected income levels and hours worked. In both studies, women with higher incomes tend to have fewer children due to the increased opportunity cost. Adamecz-Völgyi et al. (2020) find that FiF graduate women earn less compared to non-FiF women following graduation, but find no earnings penalty among men. Lower earnings may mean tighter liquidity constraints following graduation from a university, which could lead to different fertility decisions.

2) *Skills and human capital.* There is an established literature on the inter-generational transmission of cognitive and non-cognitive Skills (Anger, 2012; Grönqvist et al., 2017; Conti and Kopinska, 2018), showing that the educational attainment and labour market outcomes of children are strongly related to parents' cognitive and non-cognitive skills. FiF graduates may differ in cognitive or non-cognitive skills due to differences in family home environments and schooling quality. These differences may influence academic

success, aspirations, choice of university, field, and occupations. These, in turn, may also impact fertility decisions.

3) *Family background and gender roles.* Literature stresses the importance of the inter-generational transmission of family influence (Eshaghnia et al., 2022) and gender norms (Farré and Vella, 2013). For example, among children with highly educated parents, children of single mothers are less likely to be highly educated themselves relative to children who grow up with both biological parents (Martin, 2012). Women with partners who grew up with a working mother are more likely to participate in the labour force, work longer hours and earn higher labour income (Schmitz and Spiess, 2021). The paper by Bredtmann et al. (2020) examines whether the gender role attitudes of foreign-born mothers-in-law can explain the fertility and labor supply decisions of native US women. The authors show that women's labor market participation is significantly positively related to the gender role attitudes in her mother-in-law's country of origin, however they don't find evidence that inter-generationally transmitted gender role attitudes affect the fertility behavior of native women. In line with this literature, FiF graduates' fertility choices may be influenced by differing experiences and learned norms in their childhood. They may have had different numbers of siblings themselves, grown up in different family structures, or their parents may have had different views regarding the roles of mothers and gender equality. Differences in family background could then shape their fertility decisions.

4) *Mental and physical health.* The literature shows that education accumulation leads to delays in fertility (Wilson, 2012; Fort et al., 2016; James and Vujić, 2019). Advanced maternal age is associated with negative offspring health outcomes (Royer, 2004; Myrskylä and Fenelon, 2012; Fall et al., 2015) and may ultimately lead to childlessness. Bellés-Obrero et al. (2023) show that a reform which led to women's greater access to economic opportunities in Spain delayed fertility but did not impact the completed fertility of affected women. They also document a detrimental impact on the health of children at delivery, due to the postponement in the entrance of motherhood and the deterioration of mothers' health habits (such as smoking and drinking). However, in the medium run, these more educated mothers reverse the adverse health shocks through maternal vigilance and investment in their children's health habits. Therefore, FiF graduates, particularly women, may be more likely to face health issues that impact their ability or willingness to have children. These may arise due to differences in childhood background, or as a consequence of experiences during university, for example, due to added stressors. As a result, FiF women could be more likely to have fertility issues or miscarry. They may also have worse experiences when they give birth, and hence be less likely to choose to have further children. FiF graduate women may postpone having their first child, and so risk a higher chance of infertility and have less time to have more children, directly affecting completed fertility.

5) *Child-related preferences.* Bloemen and Kalwij (2001) suggest that the decline in fertility and the rise in female employment over the past decades can be attributed to a fundamental shift in unobserved preferences regarding work and family. This argument ties back to the works of Becker (1960) and Becker and Lewis (1973) about the quality-quantity trade-off that women face. Educated women prefer fewer children (quantity) but with higher human capital (quality), which they increase by providing better care at home (Kim, 2023). However, in his analysis of the demographic transition, Galor (2012) critiques these theories based on shifts in preferences, arguing that these shifts are for the most part unobservable. Despite Galor's critique (Galor, 2012), preferences play an important role in fertility decisions, and they get passed on through generations: the parents of individuals who have low taste for children relative to consumption are likely to have similar low taste (Gobbi, 2013).

It is important to differentiate between desired fertility, the number of children an individual would ideally like to have, and realized fertility, which is impacted by real life opportunities and constraints. University may impact desired fertility differently for FiF and non-FiF graduates, which is not necessarily a loss, and may even be seen as a positive consequence of women's empowerment. However, it may also impact realized fertility due to constraints resulting from challenges FiF graduates face, which is a loss from both an individual and societal perspective. Berrington et al. (2015) study gaps between intended and realized fertility (number of children and childlessness) in 19 European countries and the US based on a cohort approach, finding the highest gap among highly educated women, but with significant cross-country and regional differences that suggest that contextual factors such as norms, policies, and labour market conditions likely play a role. As FiF graduates face particular challenges, we may expect these to constrain their fertility, and lead to a larger gap between their desired and realized fertility.

Therefore, FiF graduate women (men) may prefer to have fewer children compared to non-FiF women (men). Differences in child-related preferences may arise prior to, during, or after university, and are a result of a complex set of factors. They may arise as a result of university attendance, or due to pre-existing differences between FiF and non-FiF students.

Differences in preferences could be a result of differences in learned parental roles and norms. Mothers of FiF graduates may have been less likely to work when they were children than the mothers of non-FiF graduates, so FiF graduates may be less likely to internalize the idea of a working mother. They may have different expectations regarding their ability to balance careers and motherhood. FiF graduates may value their careers relatively more highly due to the large investments they made into achieving their higher human capital (sunk costs), and choose to focus more on work rather than having children or more children. Because the opportunity cost of raising children for FiF graduates is higher than it was for their lower-educated parents, this might make them more likely to have fewer children or remain childless.

6) *The role of partnerships and family structure*. Classic economic theory predicts specialisation, where a high-income-potential partner works and a low-income-potential partner handles household tasks and child-rearing. This would make highly-educated men and low-educated women the most desired in the marriage market (Becker, 1960). On the other hand, we may instead observe assortative mating based on education, especially in recent decades with more women pursuing higher education than men (Greenwood et al., 2014). Additionally, changing societal values have both partners more likely to develop careers and share household chores equally. Consequently, marriage now serves as a commitment device for investing in children rather than for gender specialisation (Lundberg and Pollak, 2014; Fahn et al., 2016). The partner's level of education can impact fertility in different ways, depending on who bears the opportunity cost of raising children. If this only concerns the mother, the father's higher income, which is often associated with a higher level of education, could mainly compensate for the mother's opportunity cost (income effect). If the opportunity cost of both partners matters, then the education effects would reinforce each other, and the substitution effect would prevail (Davia and Legazpe, 2015).

3 Data and Methods

3.1 Data

In our analysis, we use the 1970 British Cohort Study (BCS70). The BCS70 is a nationally representative birth cohort study that follows the lives of 17,000 individuals born in England in a specific week in 1970.

The BCS70 collects rich data on family background, childhood and adolescent cognitive skills, preferences, and labour market and other life outcomes up until age 46.

To maximize available information, we pool information from all waves (age 26, 30, 34, 38, 42 and 46). By "children", we mean the biological children of cohort members, regardless of whether they live with their parents or not.[5] We use two main outcome variables: the total number of children, which is an integer, and childlessness, which is a binary variable. We also investigate the number of children among those who did have children, so we can differentiate between any gaps on the extensive (childlessness) and the intensive margin (number of children among parents).

The BCS70 captures the educational attainment of the cohort members' parents in the age 10 wave. A person is 'potential FiF', potentially the first in their family to go to university if neither of their parents earned a university degree, i.e. a BA/BSC degree or anything higher. Similarly, we define graduation among cohort members as earning a BA/BSc degree or anything higher by age 46, reported in any wave. By 'FiF graduates', we mean university graduates whose parents did not go to university (they are thus those potential FiF individuals who went on to university and earned a degree), and 'non-FiF graduates' are university graduates who had at least one graduate parents. Table A1 in the Appendix shows that 87% of individuals are potential FiF. Among them, 20% went to university, while the graduation rate among those with graduate parents is 56%.

We use the following control variables in our main models: region of birth, parental socio-economic status (SES) (high vs low-SES, based on the National Statistics Socio-economic Classification (NS-SEC) categorization of parents when the cohort member was born), ethnicity (white or not), mothers year of birth, cognitive skills (a summary measure of 18 tests on various facets of cognitive skills measured at ages 5, 10 and 16), and mathematics grades from age 16 (O-level examinations, CSE examinations, or equivalent). These variables are meant to capture demographic and family background as well as cognitive skills that might affect both graduation and fertility outcomes. While we are aware of the fact that all of these variables could be "bad controls" in the sense that could be affected by parental education, our goal is to look at the difference in fertility outcomes above these baseline characteristics. Controlling for background differences allows us to decrease the role of selection in determining fertility differences and estimate the statistical relationship between graduation and fertility outcomes in a meaningful way.

Our main analytical sample contains those who participated in the age 46 wave and reported information on the number of their biological children, have information on parental education (from the age 10 wave) and their own graduation from any waves ($N = 8,428$). For the control variables, we employ missing flags if needed, except for maternal year of birth, for which we employ mean imputation. The final sample consists of 4,351 women and 4,077 men when we look at the fertility returns of graduation, and 1,133 graduate women and 994 graduate men when we compare FiF and non-FiF graduates. We show that these sample restrictions (i.e., attrition and non-response) are not likely to drive our main results via three robustness tests detailed in the next subsection. The descriptive statistics of the graduate sample are presented in Tables A2 and A3 in the Appendix. Selection to graduation is investigated in Table OA7 in the Online Appendix.

3.2 Empirical Methods and Robustness Checks

As a first step in our analysis, we document the evolution of raw fertility outcomes (number of children and childlessness) of FiF graduates, non-FiF graduates, and non-graduates over their life cycle up to age 46,

[5] However, we also replicate our main results using the number of children in the household at age 46 as the dependent variable and find very similar results.

without controlling for any individual characteristics. This allows us to observe the age when differences in fertility emerge.

Second, we estimate the fertility returns to university graduation while controlling for the background characteristics detailed above. We estimate these models on the full sample of individuals separately for men and women as follows:

$$y_i = \alpha + \beta_1 * graduate_i + \beta_2 * potentialFiF_i + \beta_3 * FiFgraduate_i + \beta_4 * X_i + u_i, \quad (1)$$

where y_i stands for one of the two alternative fertility measures, $graduate_i$ is a dummy variable indicating the graduate status of individual i, $potentialFiF_i$ captures potential FiF individuals (a binary variable that equals 1 if none of individual i's parent had a degree and 0 otherwise), $FiFgraduate_i$ is the interaction term of the two previous variables ($graduate_i$ and $potentialFiF_i$), X_i is a vector of individual characteristics, and u_i is a usual heteroscedasticity-robust error term. This model allows us to estimate the overall relationship between graduate status and fertility in the sample, while β_3 captures its heterogeneity by FiF status. We estimate this model additively, by gender: in Model 1, we look at the unconditional relationship between fertility and graduation; in Model 2 we extend the model with the control variables and we introduce the interaction term of interest in Model 3. Lastly, for an easier interpretation, we re-estimate Model 3 separately on the subsample of potential FiF individuals (children of non-graduate parents) and the subsample of children of graduate parents. While Model 3 estimated on the pooled sample implicitly assumes that the fertility returns of individual characteristics are the same for these two groups, estimating it separately by groups relaxes this assumption. When we report our results in the next section, we report these last set of results (Model 3 estimated separately for the two subgroups, by gender) in the main text and present the estimates of Models 1-3 on the pooled sample (but by gender) in the Online Appendix.

Third, we restrict the analytical sample to graduates and explore completed fertility differences between FiF and non-FiF graduates only. We have emphasized above that as neither having graduate (or non-graduate) parents nor cohort member's graduation status are randomly allocated, we are not able to estimate the causal impact of graduation or being a FiF graduate. Still, as we can control for rich individual background characteristics, we believe that our results provide meaningful conclusions, similar to the vast literature looking at conditional wage returns. The main advantage of restricting the analytical sample to graduates is getting rid of one of the selection issues: selection to graduation. By comparing graduates only, we can make better-grounded comparisons so we consider these models providing our main results. Formally, we estimate the following models by gender:

$$y_i = \alpha + \beta_1 * FiFgraduate_i + \beta_2 * X_i + u_i, \quad (2)$$

where the estimated β_1 coefficient captures the fertility differences between FiF and non-FiF graduates. We use this specification to conduct a heterogeneity analysis of the FiF fertility gap as well.

We provide the following robustness tests to support our main results. First, we re-estimate Equation 2 with leaving out two control variables from the model: parental SES and age 16 math grades. Parental SES could theoretically bias our results towards zero as it is highly related to parental education. In the main specification, we are interested in the relationship between being a FiF graduate and fertility outcomes above and beyond parental SES, but we also want to test whether this control variable might mitigate the relationship we are after. Furthermore, age 16 math grades are missing for a large part of the sample, and we account for missing data with missing flags in our main model. In this robustness test we leave out math grades to make sure that our results are not affected by missing math grades.

Second, for simplicity, we use OLS to estimate our main results; however, the number of children is a count variable while childlessness is binary. Thus, we show that choosing OLS does not bias our results by re-estimating Equation 2 using Poisson regressions when the outcome is the number of children and probit models when the outcome is childlessness.

Third, we show that attrition and non-response in BCS70 does not bias our results via three methods. First, using the sample and the variables of the first two waves (ages 0 and 5: region of birth, socio-economic background of parents, whether their mother and father had any qualifications, ethnicity, low (< 2500 g) birthweight, mother's year of birth, being a first-born child, age when mother left education, whether mother was married when the cohort member was born, whether cohort member was conceived before or outside of marriage, number of siblings, being an only child in the household at age 5, whether mother worked at the time of the age 0 and age 5 waves), we directly model the probability of being in the analytical sample using a probit model separately by gender. Then, we re-estimate our main results using the inverse of these predicted probabilities as analytical weights. Second, we repeat this procedure applying random forest models instead of probit models to estimate the weights. Lastly, we employ a balancing technique, entropy balancing (Hainmueller, 2012) to re-weight the analytical sample to match the observable characteristics of the left-out observations. These procedures lead to similar conclusions as our main empirical strategy. As usual, we cannot exclude potential unobserved sources of sample selection.

Fourth, we apply a quasi-experimental identification strategy, inverse probability weighting (IPW) to increase the comparability of FiF and non-FiF graduates. We estimate logit models to predict the probability of being a FiF graduate on the subsample of graduates using the same control variables as detailed above, and use the inverse of these predicted probabilities to re-weight the regressions. Note that while this method does not solve any potential omitted variables bias, it is reassuring that our main results still hold after this procedure.

Fifth, we investigate how our main results would change in the presence of such an unobserved variable that is correlated with both fertility outcomes and being a FiF graduate. We follow the procedure of Masten et al. (2024) who provide a method to test the sensitivity of the main estimated coefficient to relaxing the conditional independence (unconfoundedness) assumption. In particular, they introduce the concept of *conditional partial independence* and a framework in which a single parameter c captures how far we deviate from conditional independence. Parameter c ranges from 0 to 1. When c equals 0, it corresponds to the assumption of conditional independence. For any c greater than 0, conditional independence is only partially satisfied, meaning the exact values of a treatment effect parameters cannot be determined. Instead, we can only establish bounds for these parameters. Masten et al. (2024) describe these bounds as a function of c, where smaller values of c result in narrower bounds, and larger values of c lead to wider bounds. Furthermore, the method estimates the value of c that would already result in changing the sign of the original estimate, termed as *breakdown c-value*. Using the `tesensitivity` package in Stata, we estimate c for all outcomes by gender, and investigate 1) the value of c that would change the sign of the estimated parameter, 2) the c values of our observed control variables as a point of comparison, and 3) how our main estimated coefficient would change if we left out each observed control variables (one at a time) as if it was unobservable. While the method does not give clear sensitivity thresholds in terms of how large c should be, we conclude that our estimates are fairly insensitive to potential omitted variable bias if 1) the estimated c is at least moderate and 2) leaving out observable characteristics with similar c's from the model would only cause a small change in the estimated coefficient.

3.3 Heterogeneity Analysis

After estimating the magnitude of the FiF fertility gap on average, we exploit the rich BCS70 data to explore the heterogeneity of our results. We split the data into subsamples based on the individual characteristics and interim outcomes of the individuals, and re-estimate Equation 2 within these subsamples. Note that as we mentioned earlier, most of these variables are "bad controls" as they could have been affected both by parental education and fertility intentions or outcomes. Therefore, for example, it doesn't make sense to control for employment outcomes in our main model to see whether these moderate the statistical relationship between being a FiF graduate and fertility outcomes, because education, employment and fertility decisions are made jointly. Thus, we cannot just extend our main model with a long list of controls for these potential moderators, rather conduct a heterogeneity analysis.

First, we gather all possible variables from BCS70 that could capture the mechanisms discussed in the previous section and investigate the FiF gap in all of these variables among men and women. These simple comparisons help us to understand the compositional differences between FiF and non-FiF graduates. Then, we re-estimate our main model (Equation 2), i.e. the conditional FiF fertility gap, on subsamples that appear to be important based on the group level mean gaps and compare the results. This heterogeneity analysis provides suggestive evidence of which variables may play a role in shaping the FiF fertility gap.

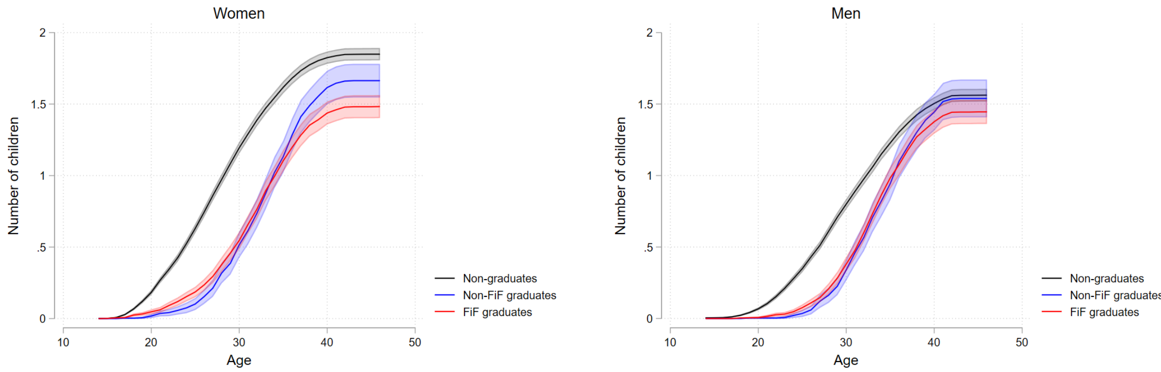
4 Results

4.1 Raw Fertility Outcomes by Age

Figure 1 shows the evolution of the average number of children of FiF graduates, non-FiF graduates, as well as non-graduates by age, separately for men and women. For men, non-graduates have a significantly higher number of children from around age 18, however, this difference decreases and the number of children of graduates catches up to that of non-graduates by age 46. This suggests that graduate men delay having children, but eventually catch up with non-graduates. FiF graduate men have a lower number of children on average at age 46, however, the difference is not statistically significant.

Among women, we also see that a large difference emerges between graduates and non-graduates in the number of children prior to age 20; however, unlike in the case of men, this difference remains significant even at age 46. This could mean that, similarly to men, graduate women also delay having children compared to non-graduates, however, they are not able to catch up at later ages as much as men do. FiF graduate women have a slightly higher number of children than non-FiF graduate women in their early twenties, during the time period when they are most likely to be studying in higher education. However, this trend reverses as they age: FiF graduates have a significantly lower number of children by the time they reach their forties. The fertility gap grows gradually after age 35. While both FiF and non-FiF graduate women postpone having children compared to non-graduates, non-FiF women later catch up to some degree, while FiF women do not.

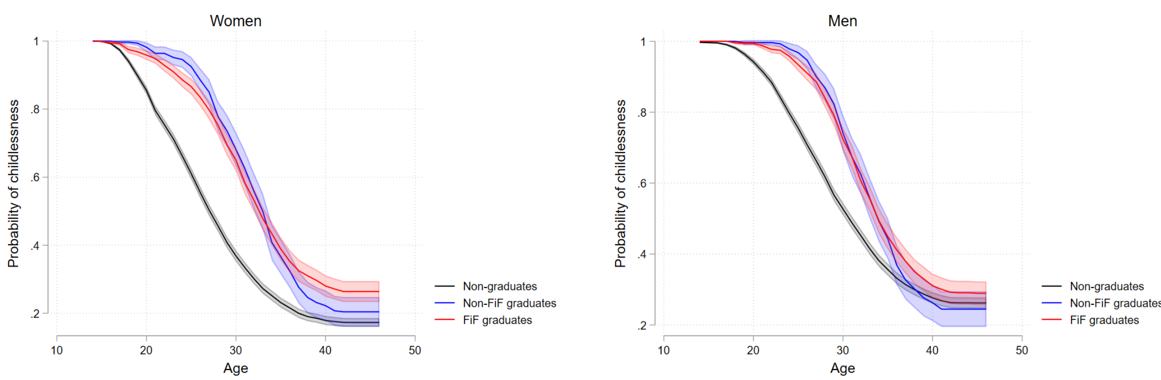
Figure 1: Number of children among FiF and Non-FiF graduates and non-graduates by age



Source: authors' calculations based on BCS70. The averages are plotted along with their 95% confidence intervals. No. of observations: 8,428.

Figure 2 shows a similar pattern in the probability of childlessness by age. Among men, graduates have a significantly higher likelihood of childlessness compared to non-graduates in their twenties and early thirties, however, the gap disappears by their forties. FiF graduates have a slightly higher probability of childlessness, though this difference is not significant. Among women, non-graduates have a significantly lower probability of childlessness compared to graduates from an early age. The gap between graduates and non-graduates decreases by age 46. We see a lower probability of childlessness for FiF graduates compared to non-FiF graduates in their twenties, however, this reverses in their thirties, leading to a higher probability of childlessness by age 46. FiF graduate women have lower completed fertility based on both the number of children and the probability of childlessness.

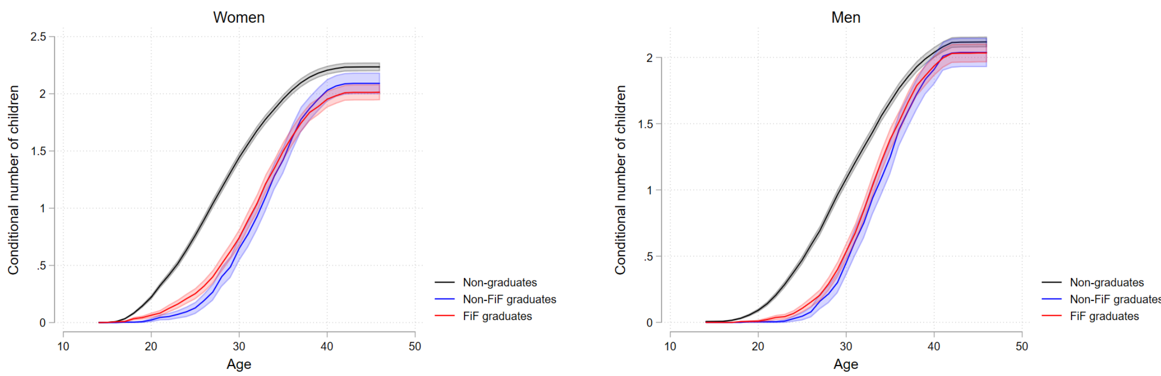
Figure 2: The probability of childlessness among FiF and Non-FiF graduates by age



Source: authors' calculations based on BCS70. The averages are plotted along with their 95% confidence intervals. No. of observations: 8,428.

Figure 3 concentrates only on those who have children, i.e. looks at the differences in the number of children among mothers and fathers. In this subsample, there are hardly any differences between graduate and non-graduate men. Among women, graduate mothers have slightly fewer children than non-graduate mothers, but there is no significant difference between FiF- and non-FiF graduates. This suggests that the fertility gaps observed in the number of children are due to FiF graduates' higher probability of childlessness, rather than FiF parents having a lower number for children.

Figure 3: Number of children among FiF and Non-FiF graduate and non-graduate mothers and fathers by age



Source: authors' calculations based on BCS70. The averages are plotted along with their 95% confidence intervals. Subsample of those who have children. No. of observations: 6,510.

4.2 Fertility Returns to Graduation

We now investigate the fertility returns of graduation based on the full sample of individuals (both graduates and non-graduates) and Equation (1), controlling for their background characteristics. Table 1 summarizes our main results for women, separately for potential FiF women (those whose parents are not graduates) and for women whose parents are graduates[6]. Among potential FiF women, university graduates have a significantly lower number of children (-0.272, Column 1); however, among women who are children of graduate parents, graduation is not associated with having fewer children at age 46 (0.022, Column 2). The pooled model (Column 3 in Table OA1 in the Online Appendix) shows that non-FiF graduates do not differ significantly from non-graduates in terms of number of children, but have 0.35 more children on average compared to FiF graduates. Interestingly, while graduate women have 0.31 fewer children on average than non-graduate women (Column 1 in Table OA1 in the Online Appendix), differentiating by parental graduation reveals that graduation is only associated with having fewer children among those who are first in their families to graduate from a university. Among children of graduate parents (Column 2 in Table 1), graduation is not correlated with the number of children.

[6]Tables OA1 - OA3 in the Online Appendix provide more detailed estimates of Equation (1), including the interaction term of potential FiF*graduation (β_3 in Equation 1) for each outcome.

Table 1: Fertility returns to graduation: women (age 46)

	(1)	(2)	(3)	(4)	(5)	(6)
	No. of children		Childlessness		No. of children, parents only	
	Potential FiF	Children of grad. parents	Potential FiF	Children of grad. parents	Potential FiF	Children of grad. parents
Graduation	-0.272***	0.0222	0.0803***	-0.0588	-0.130***	-0.129
	(0.0515)	(0.107)	(0.0184)	(0.0395)	(0.0460)	(0.0902)
Constant	-34.78***	-41.27*	12.03***	15.41*	-10.66	-8.413
	(8.173)	(24.48)	(2.627)	(8.685)	(7.211)	(20.93)
Observations	3,786	565	3,786	565	3,072	444
R-squared	0.043	0.071	0.024	0.068	0.036	0.071
Controls	Yes	Yes	Yes	Yes	Yes	Yes

*Source: BCS70. Regressions based on the BCS70 dataset. Additional control variables: region of birth, parental background (SES), being a first born child, No. of siblings, ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Looking at the probability of childlessness as the outcome variable, Columns 3 and 4 in Table 1 show that while among potential FiF women, graduates are 8 percentage points more likely to stay childless than non-graduate women, this relationship is not significant among women whose parents are graduates (and even negative). The interaction term in the pooled version of Equation 1 is again significantly different from zero at 0.10 (Column 3 in Table OA2 in the Online Appendix), confirming that FiF and non-FiF women differ significantly in terms of how graduation relates to their fertility. Thus, we see the same pattern as we saw in the number of children: graduation is associated with a higher probability of childlessness among those whose parents did not have higher education, but not among women whose parents are graduates.

Lastly, we investigate the number of children among those who had children in Columns 5 and 6 of Table 1. These results control for the impact of the decision whether or not to have a child, and investigate the number of children among those who decided to have children. Interestingly, the association between graduation and the number of children is similar in terms of magnitude in the two groups (-0.130 among potential FiF women and -0.129 among children of graduate parents); however, it is only significant among the potential FiF. As the number of observations is relatively low among those whose parents are graduates, we conclude that looking at mothers specifically, the returns to graduation in terms of the number of children are negative, and do not differ by FiF status. These results suggest that the FiF fertility gap operates more through the increased probability of childlessness rather than through the number of children among those who have children.

Table 2: Fertility returns to graduation: men (age 46)

	(1)	(2)	(3)	(4)	(5)	(6)
	No. of children		Childlessness		No. of children, parents only	
	Potential FiF	Children of grad. parents	Potential FiF	Children of grad. parents	Potential FiF	Children of grad. parents
Graduation	-0.0870	0.131	0.0236	-0.0757*	-0.0503	-0.0346
	(0.0530)	(0.113)	(0.0205)	(0.0447)	(0.0448)	(0.0992)
Constant	-52.11***	-12.12	17.93***	10.86	-21.27***	12.48
	(8.576)	(29.18)	(3.055)	(10.40)	(8.007)	(26.13)
Observations	3,545	532	3,545	532	2,609	385
R-squared	0.025	0.048	0.018	0.058	0.030	0.060
Controls	Yes	Yes	Yes	Yes	Yes	Yes

*Source: BCS70. Regressions based on the BCS70 dataset. Additional control variables: region of birth, parental background (SES), being a first born child, No. of siblings, ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Table 2 shows the same set of results for men[7]. Graduation is not significantly related to the number of children among men, neither among those with no graduate parents, nor among those who have a graduate parent (Columns 1 and 2). Unlike what we observed among women, university graduation is not associated with a higher probability of childlessness among men without a graduate parent (Column 3); however, it is negatively correlated with childlessness among children of graduate parents (Column 4). When we re-estimate fertility returns in terms of number of children while restricting the samples to men who had at least one child by age 46 in Columns 5 and 6, we find that graduation is not related to the number of children in either group.

4.3 The FiF Fertility Gap Among Graduates

Next, we restrict the analytical sample to graduates as indicated by Equation (2) (Table 3). We find that for women, being a FiF graduate is significantly negatively related to the number of children (-0.17; Column 1) and positively related to the probability of childlessness (0.08; Column 3). Among graduate mothers, the relationship between being a FiF graduate and the number of children is insignificant (Column 6). This result again suggests that the large FiF gap in terms of the average number of children is mostly the consequence of their higher probability of childlessness.

We do not see a significant difference among graduate men in any of these three outcome variables. In terms of the average number of children (Column 2) and the probability of childlessness (Column 4), the estimated coefficients are smaller in magnitude than the same coefficient estimates for women, but they are not very close to zero. The coefficient for the number of children among fathers, however, is not just

[7]Again, more detailed estimates of Equation (1), including the interaction term of potential FiF*graduation (β_3 in Equation 1) for each outcome are reported in the Online Appendix, in Tables OA4 - OA5.

insignificant but also very close to zero. Overall, we conclude that we do not find evidence for the presence of a FiF fertility gap among graduate men.

Table 3: The FiF fertility gap among graduates (age 46)

VARIABLES	(1) No. of children Women	(2) No. of children Men	(3) Childless-ness Women	(4) Childless-ness Men	(5) No. of children Mothers	(6) No. of children Fathers
FiF graduate	-0.171**	-0.0812	0.0757***	0.0470	-0.0212	0.0147
	(0.0764)	(0.0852)	(0.0283)	(0.0320)	(0.0636)	(0.0725)
Constant	-7.625	-23.06	6.922	10.89*	9.170	-1.865
	(14.50)	(15.88)	(5.411)	(6.521)	(12.21)	(13.72)
Observations	1,133	994	1,133	994	854	719
R-squared	0.034	0.028	0.034	0.022	0.040	0.046

*Source: BCS70. Additional control variables: region of birth, parental background (SES), being a firstborn child, No. of siblings, ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

4.4 Robustness Checks

The results of all robustness tests described in the previous section are shown in the Online Appendix. They confirm that the choice of the control variables (Table OA9), the estimation methods (Table OA10), attrition and missing data in BCS70 (Table OA11), and observable selection to being a FiF graduate (Table OA12) are not likely to bias our results.

The results of the sensitivity analysis (i.e., how sensitive our results would be to the presence of unobservable selection and/or omitted variable bias) are less straightforward to interpret. Based on the considerations detailed in the previous section and the estimated c parameters reported in Table OA13, we conclude that our most robust finding is the association between childlessness and being a FiF graduate among women. While this result seems to be only moderately sensitive to potential omitted variable bias, the rest of our results are more sensitive. Thus, in the next section, we conduct a heterogeneity analysis for the relationship between childlessness and being a FiF graduate among graduate women, but we also report the heterogeneity analysis for all three outcome variables for both men and women in the Online Appendix.

5 Heterogeneity Analysis

We next investigate the role that the potential mechanisms described in Section 2 may play in shaping the FiF fertility gap. First, we look at mean differences between FiF and non-FiF graduates (the FiF gap) in various key characteristics that may impact fertility decisions. We plot the mean differences in these characteristics separately for women and men and present them in the Online Appendix. Next, we estimate FiF fertility gaps (according to Equation 2) within subsamples characterized by the most important differences. This allows us to evaluate whether any observed differences in characteristics are contributing to the FiF fertility gap. We present the estimated FiF gaps in the childlessness of graduate women in these subsamples in Figure 4 in six blocks, following the structure of subsection 2.3. The same results for the (conditional) number of children for women and for all outcome variables for men are reported in the Online Appendix.

5.1 Labour market outcomes and financial constraints

We rely on several variables to assess the role of labour market outcomes and financial constraints. Employment, hours worked and wages are reported in the age 26-46 waves. We create variables that capture the weekly wage of cohort members at the time of the data collection for each wave. As we are interested in the income constraints of cohort members, this variable is coded as zero if an individual doesn't work. We also create variables that capture the log hourly wage of cohort members, which is only defined for those who worked. Finally, we measure outstanding student loans. The information is only available at age 46, and is a binary variable that equals 1 if the cohort member still has an outstanding student loan and 0 otherwise.

Figure OA2 in the Online Appendix depicts the FiF gap in labour market and financial liquidity-related characteristics at various ages. Compared to non-FiF graduate women, FiF women have higher student debt at age 46, and lower employment, hourly, and weekly pay at age 26. These differences could point to tighter liquidity constraints following graduation from a university, which, in turn, could lead to different fertility decisions.

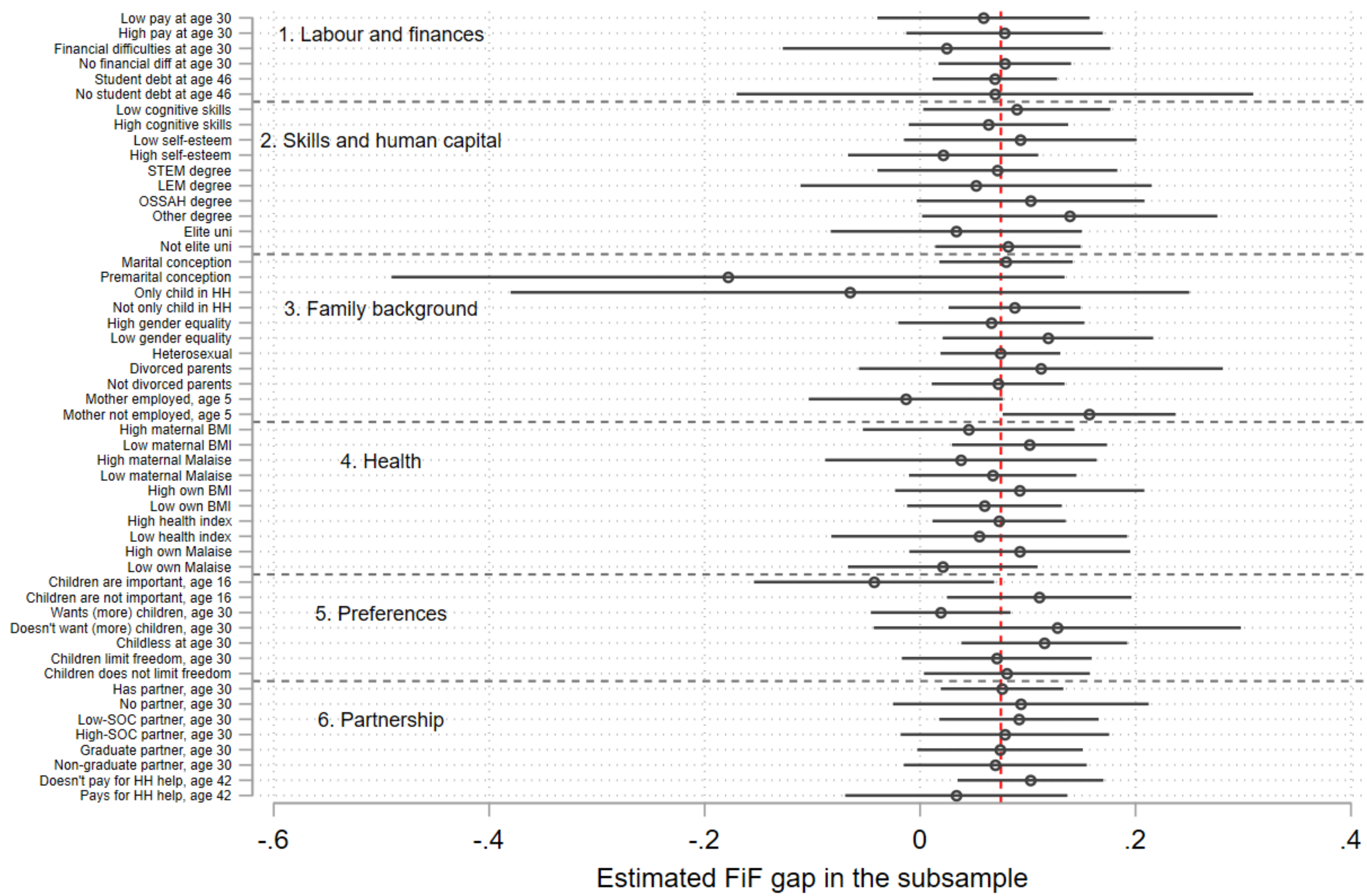
Based on these differences, we split the sample to three times two subsamples: those whose log hourly pay was below (low pay group) or above (high pay group) at age 30; those who reported or not reported financial difficulties at age 30; and those who still had or did not have outstanding student loans at age 46. If these labour market and financial gaps contribute to the FiF fertility gap, we expect the female childlessness gap to be different across these groups. However, this doesn't seem to be the case. Block 1 of Figure 4 shows that the FiF gap in childlessness is roughly the same in all of these subsamples[8]. Thus, the evidence does not point to labour market outcomes or financial constraints playing a role the observed FiF fertility gap.

5.2 Skills and human capital

We next investigate the role of skills and human capital. Cognitive skills (which we included as a control in our main models) are measured based on various test scores between age 5-16. Self-esteem is measured via the Lawrence's Self-Esteem Questionnaire (LAWSEQ) (Lawrence, 1981), assessing children's self-esteem in terms of their view of themselves as well as their interactions with teachers, peers, and parents. It consists of 10 questions, such as 'Do you feel silly when you have to talk in front of a teacher?' or 'Are there lots of things that you would like to change about yourself?'. Degree course (field) is reported in the age 42 waves. We categorize degrees into four categories: Science, Technology, Engineering and Mathematics (STEM); Law, Economics, and Management (LEM); Social Sciences, Arts, Humanities and Languages (OSSAH) and other degrees (OTHER). We examine differences in whether an individual attended an elite university, by which we refer to Russell Group institutions that are highly selective, research intensive institutions and are supposed to provide higher wage returns than other universities (although this is not a causal fact and may be the results of selection). We include a variable indicating whether the individual works in a high-ranked occupation, which includes managerial and professional occupations that are generally considered to

[8]The detailed estimation results behind Block 1 are reported in Table OA14 in the Online Appendix, for all outcome variables and for both women and men.

Figure 4: Heterogeneity analysis: the FiF gap in childlessness (graduate women, age 46)



Source: BCS70. All plotted coefficients are estimated in separate models according to Equation 1. The vertical red dashed line indicates the average FiF gap in childlessness as in Column 3 of Table 3.

be "graduate" jobs. We define these based on the NS-SEC categorization of occupations and use the top two categories (NS-SEC 1 and 2).

Figure OA3 in the Online Appendix shows that FiF graduates have lower cognitive skills and self-esteem in adolescence. They were more likely to obtain "other" degrees and less likely to obtain STEM and OSSAH degrees, and were less likely to study at elite universities compared to graduate children of graduate parents.

Block 2 of Figure 4 shows the estimated FiF gap in the probability of childlessness in ten subsamples: among those with low vs. high cognitive skills and self-esteem at age 16, and groups based on field of study and university types[9]. Overall, the estimated FiF gaps are very similar to the main average results and to each other as well in most subsamples - except for one. The childlessness gap is somewhat higher in the low self-esteem group, while it is small and insignificant in the high self-esteem group. Thus, FiF graduate women having lower self-esteem than non-FiF graduate women could play a role in the FiF fertility gap. Differences in degree field and elite university attendance also appear to play a role: those with OSSAH degrees and those who did not attend elite universities have somewhat higher FiF gaps.

5.3 Family background and gender roles

Next we investigate family background characteristics and gender roles in individuals' childhood homes as well as in their adult homes using the following variables. Parental views related to gender roles are measured in the age 5 wave based on a series of questions. We also investigate variables to capture the childhood family structure of individuals, including whether they were an only child in the household and whether their mother worked at ages 5 and 10; whether their mother was married when they were born; whether they were first-born children; whether they were conceived before their mother got married; and whether their parents got a divorce.

Figure OA4 in the Online Appendix depicts the FiF gaps in these characteristics. Parents of FiF graduates are more likely to have relatively negative (traditional) views related to gender equality compared to non-FiF graduates. We do not see significant differences in terms of having siblings, or the employment of women's mothers. FiF women however have a higher likelihood of having been conceived outside of marriage and having divorced parents.

Looking at the FiF gap in childlessness in subsamples based on these characteristics, Block 3 of Figure 4 shows that two relatively small subsamples stand out: those who were conceived out of marriage and those who did not have siblings[10]. Interestingly, although these results are imprecise, the FiF gap is smaller in these two groups than the average, not larger. Childhood home gender norms or parental divorce don‘t seem to matter, neither sexual orientation. While the number of homosexual individuals is very low in the sample, when we look at those who are heterosexual, the magnitude of the FiF childlessness gap is the same as the average. Thus, sexual orientation doesn‘t seem to contribute to the FiF fertility gap.

We can see a significant difference in the estimated FiF fertility gaps however based on whether their mother worked when they were aged 5. The FiF gap is positive and significant only among individuals whose mothers did not work when they were five years old while the gap is zero among those whose mothers worked. In other words, parental graduation only matters for childlessness among those whose mothers did not work in their childhood. This may suggest that FiF graduate women whose mothers did not work have particular difficulties reconciling the challenges of employment and careers with having children.

[9] Detailed results are reported in Table OA15 in the Online Appendix

[10] Detailed results are reported in Table OA16 in the Online Appendix.

5.4 Mental and physical health

We rely on several measures to explore the role of mental and physical health. To measure maternal health, we use the individual's mother's Body Mass Index (BMI) and a mental health indicator (Malaise score) captured when the cohort members were 5 years old. We examine two measures of individual health based on questions in the age 26-42 waves: a question on self-assessed health (How is your health in general? (Really poor, Poor, Fair, Good, Excellent), and an overall health score (0-100) included in the age 46 wave, which is a composite measure of health based on a series of indicators. The BMI is available for ages 26 and 46. We include measures of reproductive health collected at age 42 based on a series of self-reported measures, including heavy periods, irregular bleeding, pelvic pain, having fertility treatments, the success of fertility treatments, and miscarriages. A variable indicating having periods at age 42 and 46 is used as a proxy for fecundity at ages 42 and 46.

Figure OA5 in the Online Appendix depicts the FiF gap in overall measures of mental and physical health measures. These reflect significantly more negative health outcomes at various ages among FiF graduate women. FiF graduates have a higher average Malaise score, particularly in the years following graduation from university, indicating a higher frequency of mental health issues. They tend to have a higher BMI at both age 26 and 46. The composite health index indicates that FiF women tend to have lower overall health, especially at age 38 and 42, the time period when the FiF fertility gap appears. FiF women's mothers also have a higher BMI and Malaise score, suggesting that these impacts may be passed on across generations. Focusing on measures of reproductive health specifically (Figure OA6 in the Online Appendix), however, FiF and non-FiF graduate women don't appear to differ significantly.

Block 4 of Figure 4 shows the estimated FiF fertility gaps in subsamples based on the above-mentioned health measures[11]. Overall, even though FiF graduate women have somewhat poorer health than graduate children of graduate parents, the results do not point to health being an important contributor of the FiF fertility gap.

5.5 Child-related preferences

BCS70 captures child-related preferences at different ages. At age 16, cohort members were asked whether they thought having a child and whether marriage was important. Both questions have three potential answers: matters very much, matters somewhat, doesn't matter. We turn these into binary variables that equal 1 if the first possibility was stated and 0 otherwise. At age 30, cohort members were asked 1) whether they wanted to have (more) kids and 2) whether they agreed with the following statements: people are lonely in old age if they don't have kids; one can have a fulfilling life even without having kids; and having children interferes with parents' freedom.

Figure OA7 in the Online Appendix depicts the FiF gap in preferences related to having children. FiF women were less likely to want (more) children at age 30. They also tended to believe that having children interferes with parent's freedom, though this difference is not significant at the 95 percent level. There is no difference in childbearing preferences at age 16 between FiF and non-FiF graduates.

Block 4 of Figure 4 presents the FiF gaps in subgroups based on the above childbearing preference-related measures[12]. Child-related preferences appear to be a plausible explanation behind the FiF gap. The FiF childlessness gap is basically zero among those who stated at age 16 that children are important. However, among those who did not find children important at age 16, FiF graduate women have 0.23 fewer children

[11] Detailed results are reported in Table OA17 in the Online Appendix.
[12] Detailed results are reported in Table OA18 in the Online Appendix.

and are 11 percentage points more likely to stay childless than non-FiF graduate women (Table OA18 in the Online Appendix). Interestingly, age 16 preferences are not related to the probability of graduation among the potential FiF (Table OA8 in the Online Appendix).

The role of preferences at age 30 is similarly strong. Finally, as we have previously shown that the FiF fertility gap emerges after age 35, we investigate the subsample of individuals who did not yet have children at age 30. The results are in line with our expectations in that this is indeed the group that drives the FiF fertility gaps.

5.6 The role of partnerships and family structure

Lastly, we test the role of partnerships and family structure. A variable indicating whether cohort members had a co-habiting partner is available from the partnership history data file of BCS70 (UKDA-6941). Various measures of partner characteristics are available from several waves. We use (1) the age when the partner left school, (2) whether the partner works full-time, (3) the partner's pay, and (4) the partner's occupation code (SOC) from age 34. We also examine the number of children in the household as an alternative outcome variable. As opposed to the number of biological children, this variable could captures whether FiF women replace having biological children with adopted children and the children of partners.

Figure OA8 in the Online Appendix depicts the FiF gap in the characteristics of partnerships. FiF and non-FiF graduates have the same likelihood of having a partner and show similar levels of relationship happiness. Their partners have similar characteristics regarding employment and wages, but the partners of FiF graduates left education earlier than their non-FiF counterparts. The lower education level but equal income of partners might be because union formation happens later than it used to, and this has shifted focus from education to income as the primary indicator of economic prospects in partners (Van Bavel et al., 2018). Figure OA9 in the Online Appendix depicts the FiF gap in various chores carried out by women and men within households at age 42. We cannot observe FiF women carrying a systematically higher burden of household tasks withing the family; however, they are less likely to pay for certain chores to be carried out.

Subgroup FiF gap estimates by partnership measures and household work characteristics are presented in Block 6 of Figure 4. The FiF childlessness gap is very similar among those who had or did not have a co-habiting partner at age 30; had low-SOC or high-SOC or graduate or non-graduate partner[13]. The FiF gap appears to be somewhat lower and insignificant among those who did pay for household help, however.

Finally, we evaluate whether fertility gaps in terms of biological children may be related to differential patterns in terms of having adopted or step children in the household. One potential explanation behind the FiF fertility gap could be that FiF graduates substitute having biological children by adopted children or the children of their partners. However, this doesn't seem to be the case. Our FiF fertility gap estimates are very similar if we use the number of children in the household at age 46 instead of the number of the cohort member's biological children. As Table OA20 in the Online Appendix shows, the FiF gap in the number of children in the household is -0.19 while the FiF gap in childlessness is 7.4 percentage points among women, very similar to our results on the number of biological children.

5.7 Self-reported reasons of childlessness among FiF and non-FiF graduates

Lastly, the BCS70 offers a possibility to investigate and compare the self-reported reasons of childlessness among FiF and non-FiF graduates at age 42, when a related survey was conducted. Table OA21 in the Online

[13] Detailed results are reported in Table OA19 in the Online Appendix.

Appendix summarizes the answers given by women. There is no difference in the prevalence of health- or infertility related reasons given, neither regarding issues with partners, work, or finances. FiF women were somewhat more likely to say that they 'Have not wanted children' than non-FiF women (41 vs 31%); however, this difference is not statistically significant. There are only two reasons given with statistically significant differences between the two groups. FiF women were substantially less likely to say that they 'Haven't met right person to have children') than non-FiF women (22 vs. 41%). Furthermore, non-FiF women were more likely to say that they 'Don't want to answer' the question (6 vs 1%). Overall, there are no clear factors behind the female FiF fertility gap based on self-reported reasons.

The distribution of answers is very similar among men as well (Table OA22 in the Online Appendix). There are no significant differences between FiF and non-FiF graduates in the probability of any reasons given. There are two reasons in which there are some almost significant differences. FiF men are somewhat less likely to say that they did not want to have children than non-FiF men (31 vs 42%). Interestingly, this result is almost the exact opposite of the same question for women. Furthermore, FiF men are a little more likely to say that there is 'No particular reason' behind their childlessness than non-FiF men (13 vs 6%). Overall, neither women nor men reported any particular barriers that prevented them from having children.

6 Discussion

Our analysis evaluates the fertility returns to graduation, and fertility gaps among FiF and non-FiF university graduates. We use nationally representative panel survey data of a cohort born in 1970 in Great Britain and observe fertility outcomes at age 46 that represent completed fertility fairly well. We are the first to document that FiF graduate women, whose parents did not go to university, have fewer children on average than both non-FiF graduate women who had a university graduate parent and non-graduate women. Importantly, we do not find significant fertility gaps between the latter two groups, suggesting that negative fertility returns are not general, but rather specific to women who are the first to attend university in their families.

While we cannot identify the causal effects of graduation, we look at the fertility returns to graduation in a similar fashion to the Mincerian wage literature. Controlling for a rich set of individual characteristics, we find that graduation has large, negative returns for FiF women in terms of their number of children. FiF graduate women have on average 0.27 fewer children compared to women who did not graduate, and are about 8% more likely to be childless at age 46. When we look at graduates only, we find that FiF graduate women have 0.17 fewer children than non-FiF graduates and are 7.5% more likely to be childless. Interestingly, the FiF fertility gap comes from FiF graduate women being more likely to stay childless than non-FiF graduate women. Those who have children do not have a lower number of children by age 46. The difference in the number of children between FiF and non-FiF graduate women emerges between the ages of 35 and 40. While both men and women who attend university delay having children, men catch up in fertility outcomes after graduating, and non-FiF women catch up after the age of 35. However, FiF women do not increase their fertility at later ages, between ages 35 and 40, and therefore have lower completed fertility at age 46.

A comparison of key individual characteristics between FiF and non-FiF women reveals significant differences in earnings and employment after graduation, as well as in terms of outstanding student loans, which could point to liquidity constraints being a factor in fertility decisions. FiF women also have somewhat worse mental and physical health, which may also impact fertility decisions or lead to problems with infertility, yet lower access to fertility treatments. However, when we split the sample based on these characteristics, the estimated FiF gaps remain similar, so these differences do not seem to be driving the overall fertility gap. We find three potential explanations behind the FiF fertility gap. The FiF childlessness gap is lower among those who had high self-esteem or strong childbearing preferences at age 16, and basically zero among those whose mothers worked when they were aged 5. It is possible that FiF graduate women, especially those with low self-esteem and low childbearing preferences in adolescence, whose mother didn't work when they were children, think that they won't be able "to have it all", and be able to balance having a successful career and a family at the same time. We do not find a FiF fertility gap among women who said that "having children is important" at age 16. Thus, being a FiF or non-FiF graduate appears to only matter for fertility outcomes among those who place less importance on having children.

Overall, our results suggest that FiF graduate women face particular difficulties during inter-generational mobility, however, it is hard to pinpoint exactly how these materialize. Parental background is related not just to the labour market outcomes of graduates, but also their fertility. Our findings indicate that FiF graduate women might benefit from targeted policy interventions to aid their educational mobility, which might also contribute to closing the FiF fertility gap for them. These policies need to go beyond financial support, addressing more complex issues related to expectations, aspirations, and confidence.

Our findings represent a meaningful contribution to the literature. However, our results are not without caveats. First, we investigate one birth cohort from one particular country, and we do not know whether these findings generalize across countries and cohorts. Fertility outcomes are hard to predict, and institutional background is important. It is very likely that the same analysis would lead to different results in countries with different contexts. Future empirical research from further countries can shed light on the role of institutions in shaping the FiF fertility gap. Second, although we exploit a rich database and provide a series of robustness checks, we provide descriptive evidence and do not identify the causal effects of being a FiF graduate on fertility. Until recently, fertility seemed to be linearly related to educational attainment, but this trend seems to have reversed (Doepke et al., 2023). Thus, it would be very hard to guess the direction of omitted variable bias in our context. Third, as fertility decisions are made jointly with education and labour market decisions, pinpointing the potential mechanisms behind the FiF fertility gap is very challenging. Our initial exploration based on heterogeneity analysis of fertility gaps only opens the door for future research on this topic.

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Appendix

Appendix Table A1: The sample by own and parental graduation

Potential first graduate in family	Graduate, age 46 Non-graduate %	No.	Graduate %	No.	Total %	No.
Children of graduate parents	43.9%	482	56.1%	615	100.0%	1097
Potential first in family	79.4%	5819	20.6%	1512	100.0%	7331
Total	74.8%	6301	25.2%	2127	100.0%	8428

Notes: Source: BCS70

Appendix Table A2: Descriptive statistics of graduate women: main variables

	FiF N	FiF Mean	NonFiF N	NonFiF Mean	Diff	p-value
No. of children, age 46	800	1.48	333	1.66	-0.18	0.01*
Childless, age 46	800	0.26	333	0.20	0.06	0.03*
No. of children, parents	589	2.01	265	2.09	-0.08	0.22
UK or European	800	0.94	333	0.98	-0.04	0.00**
Other ethnicity	800	0.04	333	0.02	0.02	0.18
Ethnicity is missing	800	0.03	333	0.00	0.03	0.00**
Region at birth	800	11.23	333	9.61	1.62	0.25
Low and medium SES parents	800	0.54	333	0.18	0.37	0.00***
High SES parents	800	0.42	333	0.80	-0.37	0.00***
SES missing	800	0.04	333	0.03	0.01	0.49
Not first-born child	800	0.55	333	0.57	-0.02	0.52
First-born child	800	0.41	333	0.40	0.01	0.73
Birth order missing	800	0.04	333	0.03	0.01	0.42
No siblings	800	0.11	333	0.05	0.06	0.00***
One sibling	800	0.48	333	0.53	-0.05	0.11
Two siblings	800	0.21	333	0.27	-0.06	0.03*
Three+ siblings	800	0.14	333	0.15	-0.01	0.58
Sibling data missing	800	0.06	333	0.00	0.06	0.00***
No math O/CSE	800	0.10	333	0.03	0.07	0.00***
Grade A/1	800	0.14	333	0.27	-0.14	0.00***
Grade B/2	800	0.19	333	0.24	-0.05	0.07
Grade C/3	800	0.22	333	0.14	0.08	0.00**
Grade D/4	800	0.08	333	0.08	0.00	0.83
No math info	800	0.28	333	0.25	0.03	0.24
Cognitive skills	800	0.66	333	1.10	-0.44	0.00***
Mother's year of birth	800	1,943.48	333	1,942.37	1.11	0.00***
Mother's year of birth missing	800	0.04	333	0.03	0.00	0.67

Source: BCS70. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Appendix Table A3: Descriptive statistics of graduate men: main variables

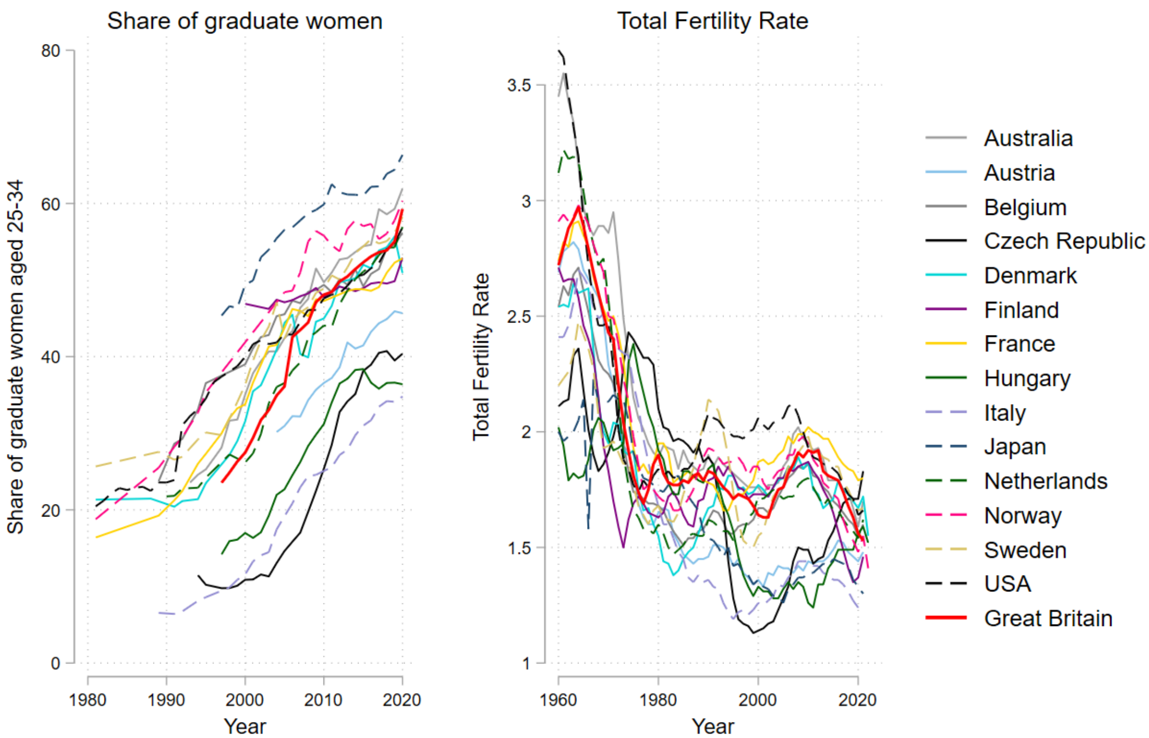
	FiF N	FiF Mean	NonFiF N	NonFiF Mean	Diff	p-value
No. of children, age 46	712	1.45	282	1.54	-0.09	0.24
Childless, age 46	712	0.29	282	0.24	0.04	0.16
No. of children, parents	506	2.03	213	2.04	-0.00	0.95
UK or European	712	0.92	282	0.97	-0.05	0.00**
Other ethnicity	712	0.04	282	0.03	0.01	0.35
Ethnicity is missing	712	0.04	282	0.00	0.04	0.00***
Region at birth	712	11.75	282	12.37	-0.62	0.70
Low and medium SES parents	712	0.52	282	0.15	0.37	0.00***
High SES parents	712	0.44	282	0.81	-0.38	0.00***
SES missing	712	0.04	282	0.04	0.00	0.82
Not first-born child	712	0.56	282	0.59	-0.03	0.41
First-born child	712	0.39	282	0.38	0.01	0.70
Birth order missing	712	0.05	282	0.04	0.02	0.31
No siblings	712	0.08	282	0.08	0.00	0.95
One sibling	712	0.48	282	0.53	-0.05	0.15
Two siblings	712	0.26	282	0.26	0.00	0.92
Three+ siblings	712	0.12	282	0.11	0.00	0.89
Sibling data missing	712	0.06	282	0.02	0.04	0.00**
No math O/CSE	712	0.04	282	0.05	-0.00	0.86
Grade A/1	712	0.20	282	0.30	-0.09	0.00**
Grade B/2	712	0.20	282	0.21	-0.00	0.86
Grade C/3	712	0.15	282	0.12	0.03	0.25
Grade D/4	712	0.05	282	0.03	0.02	0.11
No math info	712	0.35	282	0.30	0.05	0.14
Cognitive skills	712	0.70	282	1.08	-0.38	0.00***
Mother's year of birth	712	1,943.53	282	1,942.52	1.01	0.00**
Mother's year of birth missing	712	0.05	282	0.04	0.01	0.61

Source: BCS70. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

ONLINE APPENDIX

A. Detailed Results and Supporting Evidence

Figure OA1: Graduation and fertility rates over time in the OECD



Source: OECD

Table OA1: Returns to graduation: the number of children among women (age 46)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 3 potential FiF	(5) Model 3 children of grad. parents
Graduate, age 46	-0.313***	-0.213***	0.0717	-0.272***	0.0222
	(0.0404)	(0.0463)	(0.0969)	(0.0515)	(0.107)
Parents with no degree		-0.0518	0.130*		
		(0.0547)	(0.0787)		
FiF graduate			-0.348***		
			(0.107)		
Constant	1.849***	-35.06***	-35.17***	-34.78***	-41.27*
	(0.0220)	(7.730)	(7.725)	(8.173)	(24.48)
Observations	4,351	4,351	4,351	3,786	565
R-squared	0.012	0.040	0.042	0.043	0.071
Controls		Yes	Yes	Yes	Yes

*Source: BCS70. Regressions based on Equation 1. Additional control variables: region of birth, parental background (SES), being a first born child, No. of siblings, ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Table OA2: Returns to graduation: childlessness among women (age 46)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 3 potential FiF	(5) Model 3 children of grad. parents
Graduate, age 46	0.0735***	0.0566***	-0.0311	0.0803***	-0.0588
	(0.0144)	(0.0166)	(0.0355)	(0.0184)	(0.0395)
Parents with no degree		0.0158	-0.0402		
		(0.0200)	(0.0287)		
FiF graduate			0.107***		
			(0.0392)		
Constant	0.173***	12.12***	12.15***	12.03***	15.41*
	(0.00667)	(2.509)	(2.510)	(2.627)	(8.685)
Observations	4,351	4,351	4,351	3,786	565
R-squared	0.007	0.022	0.024	0.024	0.068
Controls		Yes	Yes	Yes	Yes

*Source: BCS70. Regressions based on Equation 1. Additional control variables: region of birth, parental background (SES), being a first born child, No. of siblings, ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Table OA3: Returns to graduation: the number of children among women who had children (age 46)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 3 potential FiF	(5) Model 3 children of grad. parents
Graduate, age 46	-0.197***	-0.116***	0.0125	-0.130***	-0.129
	(0.0348)	(0.0408)	(0.0808)	(0.0460)	(0.0902)
Parents with no degree		-0.0250	0.0579		
		(0.0456)	(0.0662)		
FiF graduate			-0.159*		
			(0.0898)		
Constant	2.235***	-10.95	-10.98	-10.66	-8.413
	(0.0196)	(6.854)	(6.849)	(7.211)	(20.93)
Observations	3,516	3,516	3,516	3,072	444
R-squared	0.008	0.033	0.033	0.036	0.071
Controls		Yes	Yes	Yes	Yes

*Source: BCS70. Regressions based on Equation 1. Subsample of women who had at least one child by age 46. Additional control variables: region of birth, parental background (SES), being a first born child, No. of siblings, ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Table OA4: Returns to graduation: the number of children among men (age 46)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 3 potential FiF	(5) Model 3 children of grad. parents
Graduate, age 46	-0.0903**	-0.0452	0.143	-0.0870	0.131
	(0.0428)	(0.0478)	(0.103)	(0.0530)	(0.113)
Parents with no degree		-0.00251	0.107		
		(0.0575)	(0.0790)		
FiF graduate			-0.232**		
			(0.113)		
Constant	1.562***	-47.73***	-47.76***	-52.11***	-12.12
	(0.0227)	(8.186)	(8.190)	(8.576)	(29.18)
Observations	4,077	4,077	4,077	3,545	532
R-squared	0.001	0.021	0.022	0.025	0.048
Controls		Yes	Yes	Yes	Yes

*Source: BCS70. Regressions based on Equation 1. Additional control variables: region of birth, parental background (SES), being a first born child, No. of siblings, ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Table OA5: Returns to graduation: childlessness among men (age 46)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 3 potential FiF	(5) Model 3 children of grad. parents
Graduate, age 46	0.0146	0.00501	-0.0793**	0.0236	-0.0757*
	(0.0163)	(0.0185)	(0.0397)	(0.0205)	(0.0447)
Parents with no degree		-0.00327	-0.0523*		
		(0.0223)	(0.0310)		
FiF graduate			0.104**		
			(0.0436)		
Constant	0.262***	16.96***	16.97***	17.93***	10.86
	(0.00792)	(2.904)	(2.905)	(3.055)	(10.40)
Observations	4,077	4,077	4,077	3,545	532
R-squared	0.000	0.014	0.016	0.018	0.058
Controls		Yes	Yes	Yes	Yes

*Source: BCS70. Regressions based on Equation 1. Additional control variables: region of birth, parental background (SES), being a first born child, No. of siblings, ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Table OA6: Returns to graduation: the number of children among men who had children (age 46)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 3 potential FiF	(5) Model 3 children of grad. parents
Graduate, age 46	-0.0822**	-0.0484	-0.0337	-0.0503	-0.0346
	(0.0367)	(0.0407)	(0.0872)	(0.0448)	(0.0992)
Parents with no degree		-0.0152	-0.00625		
		(0.0485)	(0.0663)		
FiF graduate			-0.0182		
			(0.0947)		
Constant	2.117***	-17.81**	-17.80**	-21.27***	12.48
	(0.0207)	(7.635)	(7.637)	(8.007)	(26.13)
Observations	2,994	2,994	2,994	2,609	385
R-squared	0.001	0.026	0.026	0.030	0.060
Controls		Yes	Yes	Yes	Yes

*Source: BCS70. Regressions based on Equation 1. Subsample of men who had at least one child by age 46. Additional control variables: region of birth, parental background (SES), being a first born child, No. of siblings, ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Table OA7: Selection to graduation: the role of being potential FiF

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3
Female	0.0189**	0.0248***	0.0245***
	(0.00933)	(0.00865)	(0.00866)
Parents with no degree	-0.354***	-0.215***	-0.214***
	(0.0137)	(0.0133)	(0.0133)
First-born child = 1			0.00421
			(0.0102)
First-born child = 99			-0.0285
			(0.0555)
Number of siblings = 1, 1			0.00750
			(0.0164)
Number of siblings = 2, 2			0.000525
			(0.0186)
Number of siblings = 3, 3 or more			-0.00481
			(0.0209)
Number of siblings = 99, data missing			0.0384*
			(0.0202)
Constant	0.552***	0.353***	0.346***
	(0.0136)	(0.0250)	(0.0297)
Observations	8,081	8,081	8,081
R-squared	0.077	0.223	0.224

*Source: BCS70. Model 2-4 contains additional categorical control variables (region, SES, ethnicity, cognitive CFA and math CSE). Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Table OA8: Selection to graduation: the role of childbearing preferences at age 16

VARIABLES	(1) Women with graduate parents	(2) Men with graduate parents	(3) Women potential FiF	(4) Men potential FiF
Having children is very important, age 16 = 1	0.0368	-0.131*	-0.00289	0.0149
	(0.0598)	(0.0739)	(0.0225)	(0.0264)
Having children is very important, age 16 = 99	0.130	0.0879	-0.0687	0.0239
	(0.245)	(0.261)	(0.0489)	(0.0930)
Getting married is very important, age 16 = 1	0.0332	0.0786	0.00586	0.0402
	(0.0610)	(0.0748)	(0.0247)	(0.0288)
Getting married is very important, age 16 = 99	-0.213	-0.191	0.0333	-0.0436
	(0.242)	(0.262)	(0.0488)	(0.0929)
Constant	19.73**	14.62	8.055***	7.116***
	(9.330)	(9.768)	(2.557)	(2.471)
Observations	565	532	3,786	3,545
R-squared	0.232	0.240	0.164	0.167

*Source: BCS70. Further control variables: region of birth, parental background (SES), being a first born child, No. of siblings, ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

B. Robustness Checks

First, we re-estimate our main models using fewer control variables. In particular, controlling for parental SES could be problematic as it might be highly correlated with parental education. Furthermore, age 16 math grades are missing for a substantial share of the sample. In the main models we use missing flags to account for missing grades, but in this robustness check we leave them out. Table OA9 shows that these results are very similar to our previous results and allow to draw the same conclusions.

Table OA9: Robustness test 1: The FiF fertility gap among graduates, fewer control variables

VARIABLES	(1) No. of children Women	(2) No. of children Men	(3) Childless-ness Women	(4) Childless-ness Men	(5) No. of children Mothers	(6) No. of children Fathers
FiF graduate	-0.180**	-0.0717	0.0791***	0.0484	-0.0226	0.0355
	(0.0756)	(0.0843)	(0.0281)	(0.0317)	(0.0629)	(0.0717)
Constant	-6.797	-25.25	6.518	11.33*	9.226	-3.849
	(14.39)	(15.59)	(5.408)	(6.415)	(12.08)	(13.48)
Observations	1,133	994	1,133	994	854	719
R-squared	0.031	0.024	0.029	0.019	0.039	0.028

*Source: BCS70. Additional control variables: region of birth, mother's year of birth, being a first-born child, No. of siblings, ethnicity, cognitive skills. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Second, as the number of children is a count variable while childlessness is binary, we re-estimate our main results using Poisson-regressions for the number of children and probit for childlessness. Table OA10 shows that the results are similar to our main results.

Table OA10: Robustness test 2: The FiF fertility gap among graduates, Poisson and probit models

VARIABLES	(1) No. of children Women Poisson	(2) No. of children Men Poisson	(3) Childless-ness Women probit	(4) Childless-ness Men probit	(5) No. of children Mothers Poisson	(6) No. of children Fathers Poisson
FiF graduate	-0.107**	-0.0547	0.269***	0.148	-0.0100	0.00766
	(0.0475)	(0.0556)	(0.0968)	(0.0994)	(0.0302)	(0.0348)
Constant	-5.553	-16.75	21.97	30.70	4.266	-1.261
	(9.515)	(10.94)	(17.07)	(18.76)	(5.907)	(6.644)
Observations	1,133	994	1,132	994	854	719

*Source: BCS70. Additional control variables: region of birth, mother's year of birth, being a first-born child, No. of siblings, ethnicity, cognitive skills. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Third, we re-estimate our main results, Table OA11, re-weighted by attrition weights constructed with three methods: via probit and random forest selection models and entropy balancing. These results are very similar to our main specifications. They confirm that for women, the previously shown significant statistical relationships are robust to taken selection to our analytical sample into account. The association between the number of children and being a FiF graduate is between -0.214 and -0.294 while the association between childlessness and being a FiF graduate is between 0.079 and 0.094 among women, all significant on a 5% level. Among men, however, none of these associations stay significant.

Table OA11: Robustness test 3: The FiF fertility gap among graduates, weighted estimates

	(1) No. of children Women	(2) No. of children Men	(3) Childless-ness Women	(4) Childless-ness Men	(5) No. of children Mothers	(6) No. of children Fathers
Probit weights						
FiF graduate	-0.186**	0.00806	0.0807***	0.0135	-0.0275	0.0427
	(0.0839)	(0.0935)	(0.0312)	(0.0364)	(0.0688)	(0.0796)
Constant	-1.143	-20.28	5.630	11.26	13.17	1.085
	(15.50)	(18.90)	(6.085)	(7.558)	(12.81)	(16.87)
Observations	1,078	929	1,078	929	811	669
R-squared	0.041	0.048	0.039	0.042	0.048	0.059
Random forest weights						
FiF graduate	-0.178**	-0.0947	0.0789***	0.0580*	-0.0272	0.0301
	(0.0769)	(0.0876)	(0.0292)	(0.0327)	(0.0656)	(0.0745)
Constant	-11.79	-23.03	9.647*	11.02*	10.39	-1.875
	(14.52)	(16.66)	(5.639)	(6.583)	(11.88)	(14.87)
Observations	1,133	994	1,133	994	854	719
R-squared	0.033	0.039	0.039	0.030	0.038	0.063
Entropy balancing						
FiF graduate	-0.266***	-0.0345	0.105***	0.0340	-0.0604	0.0528
	(0.0950)	(0.114)	(0.0341)	(0.0497)	(0.0760)	(0.0798)
Constant	3.628	-17.99	4.865	9.837	14.71	-2.518
	(18.71)	(28.04)	(7.721)	(10.72)	(15.66)	(23.32)
Observations	1,078	929	1,078	929	811	669
R-squared	0.082	0.090	0.074	0.111	0.152	0.101

*Source: BCS70. Additional control variables: region of birth, parental background (SES), mother's year of birth, being a firstborn child, No. of siblings, ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Fourth, we re-estimate our main results using IPW weighting in Table OA12. As mentioned above, while this method cannot take care of unobserved selection, it uses observed information in a more systemic way, thus it makes FiF and non-FiF graduates more comparable (conditional on their observed characteristics). Our main result are similar: FiF graduate women have 0.19 fewer children and are 9.1 percentage points more likely to stay childless at age 46 than graduate women whose parents are graduates. Interestingly, the estimated coefficient for male childlessness is also significant on a 10% significance level.

Table OA12: Robustness test 4: The FiF fertility gap among graduates, IPW estimates

	(1) No. of children women	(2) No. of children men	(3) Childlessness women	(4) Childlessness men	(5) No. of children mothers	(6) No. of children fathers
FiF graduate	-0.192***	-0.0528	0.0907***	0.0611*	0.000613	0.0815
	(0.0733)	(0.0905)	(0.0275)	(0.0333)	(0.0610)	(0.0806)
Observations	1,082	958	1,082	958	812	694

*Source: BCS70. Additional control variables: region of birth, parental background (SES), being a firstborn child, No. of siblings, ethnicity, cognitive skills, math grades from age 16, mother's year of birth. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Lastly, we investigate how these results would look like in the presence of such unobserved characteristic that is correlated with both fertility outcomes and being a FiF graduate, i.e. omitted variable bias. As mentioned in the main text, we follow the procedure of Masten et al. (2024) using the `tesensitivity` package of Stata. As Table OA13 shows, five out of our six main results are fairly sensitive to the potential existence of omitted variable bias, except for the FiF gap in childlessness among graduate women. In this case, the estimated coefficient on FiF graduate seems to be fairly robust to omitted variable bias.

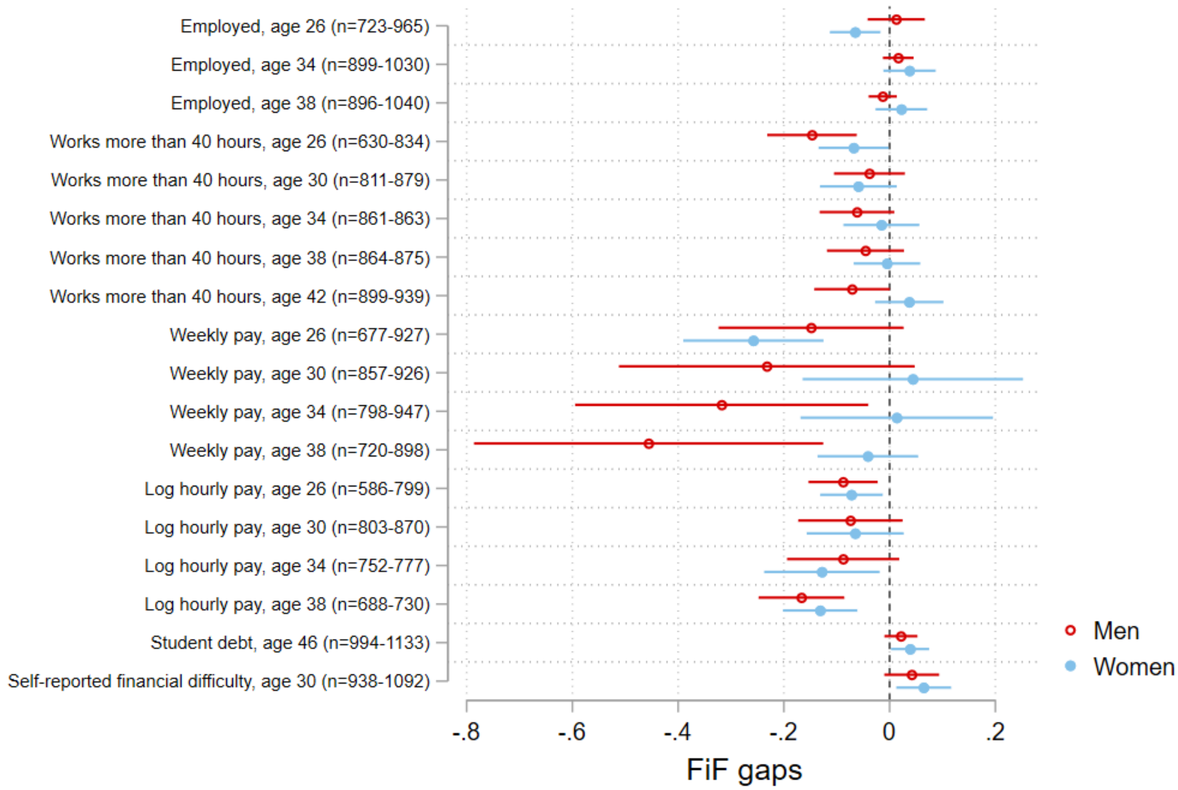
Table OA13: Robustness test 5: The sensitivity of the estimated FiF fertility gaps to omitted variable bias (breakdown c-values according to Masten et al. (2024)

	(1) Women	(2) Men
Number of chidren	0.018	0.001
Childlessness	0.042	0.011
Number of chidren among parents	0.002	0.002

Source: BCS70. Estimated using tesensitivity in Stata.

C. Heterogeneity Analysis

Figure OA2: The FiF gap in labour market outcomes



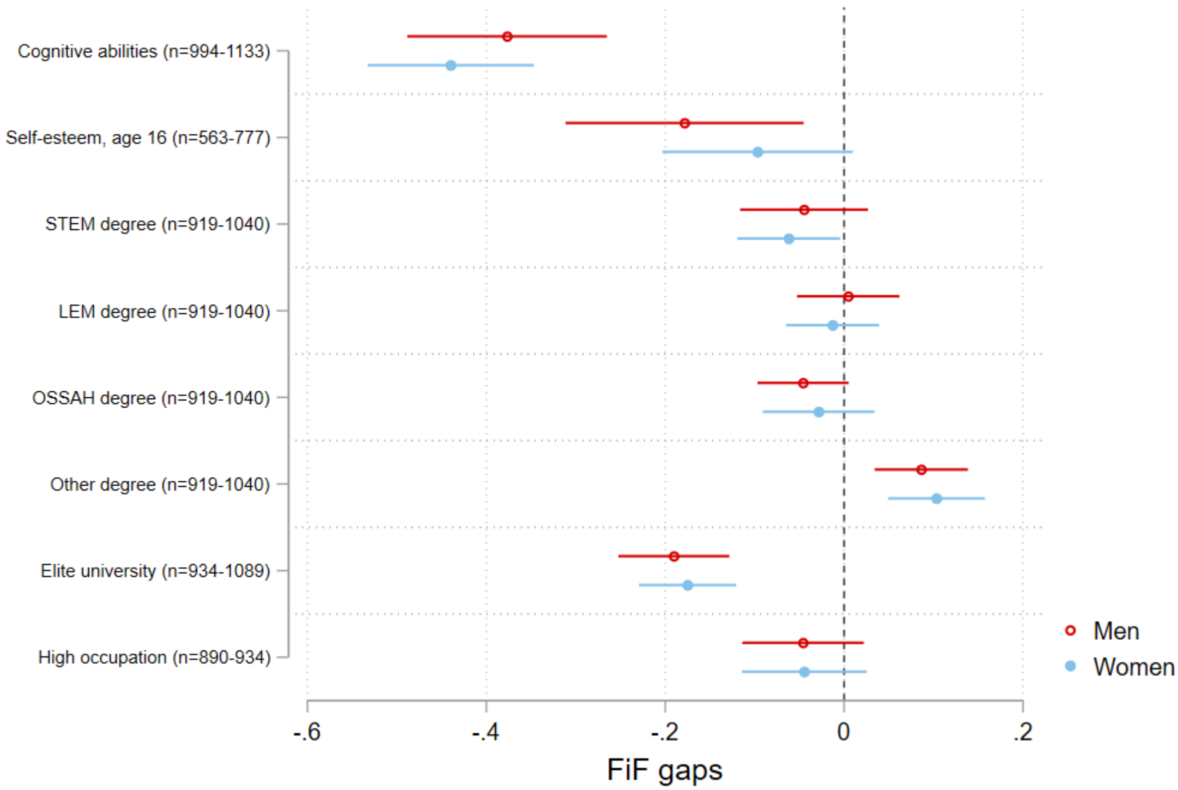
Source: BCS70. Sample of university graduates. Each data point captures the raw difference in these variables between FiF and non-FiF graduates, separately for men and women. All differences are plotted with their 95% confidence intervals. As all variables come from different waves of BCS70, the number of observations differ for each and indicated on the y-axis for men and women, respectively.

Table OA14: The role of labour market outcomes and financial constraints in the FiF fertility gap

	(1) No. of children Women	(2) No. of children Men	(3) Childless-ness Women	(4) Childless-ness Men	(5) No. of children Mothers	(6) No. of children Fathers
I. Low hourly pay, age 30	-0.165	0.253	0.0588	-0.00843	-0.0542	0.415***
	(0.119)	(0.155)	(0.0502)	(0.0683)	(0.106)	(0.135)
Observations	438	301	438	301	307	202
II. High hourly pay, age 30	-0.185	-0.0413	0.0784*	0.0120	-0.0102	-0.00497
	(0.123)	(0.112)	(0.0465)	(0.0413)	(0.0959)	(0.0963)
Observations	432	502	432	502	332	388
III. Financial difficulties, age 30	-0.270	0.152	0.0247	-0.0688	-0.338	-0.0171
	(0.249)	(0.304)	(0.0776)	(0.124)	(0.243)	(0.250)
Observations	217	150	217	150	157	94
IV. No financial difficulties, age 30	-0.157**	-0.0721	0.0694**	0.0441	-0.0191	0.0208
	(0.0783)	(0.0872)	(0.0295)	(0.0326)	(0.0641)	(0.0737)
Observations	1,034	940	1,034	940	778	684
V. Student debt, age 46	-0.527	-0.138	0.0695	0.116	-0.378	-0.0775
	(0.438)	(0.608)	(0.122)	(0.203)	(0.408)	(0.427)
Observations	99	54	99	54	76	35
VI. No student debt, age 46	-0.157**	-0.0721	0.0694**	0.0441	-0.0191	0.0208
	(0.0783)	(0.0872)	(0.0295)	(0.0326)	(0.0641)	(0.0737)
Observations	1,034	940	1,034	940	778	684

*Source: BCS70. Equation 2 estimated on specific subsamples of graduates as indicated in each block. The estimated coefficients on "FiF graduate" are reported in the table. All coefficients are estimated in separate models. Additional control variables: region of birth, parental background (SES), being a firstborn child, No. of siblings, ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Figure OA3: The FiF gap in skills and human capital



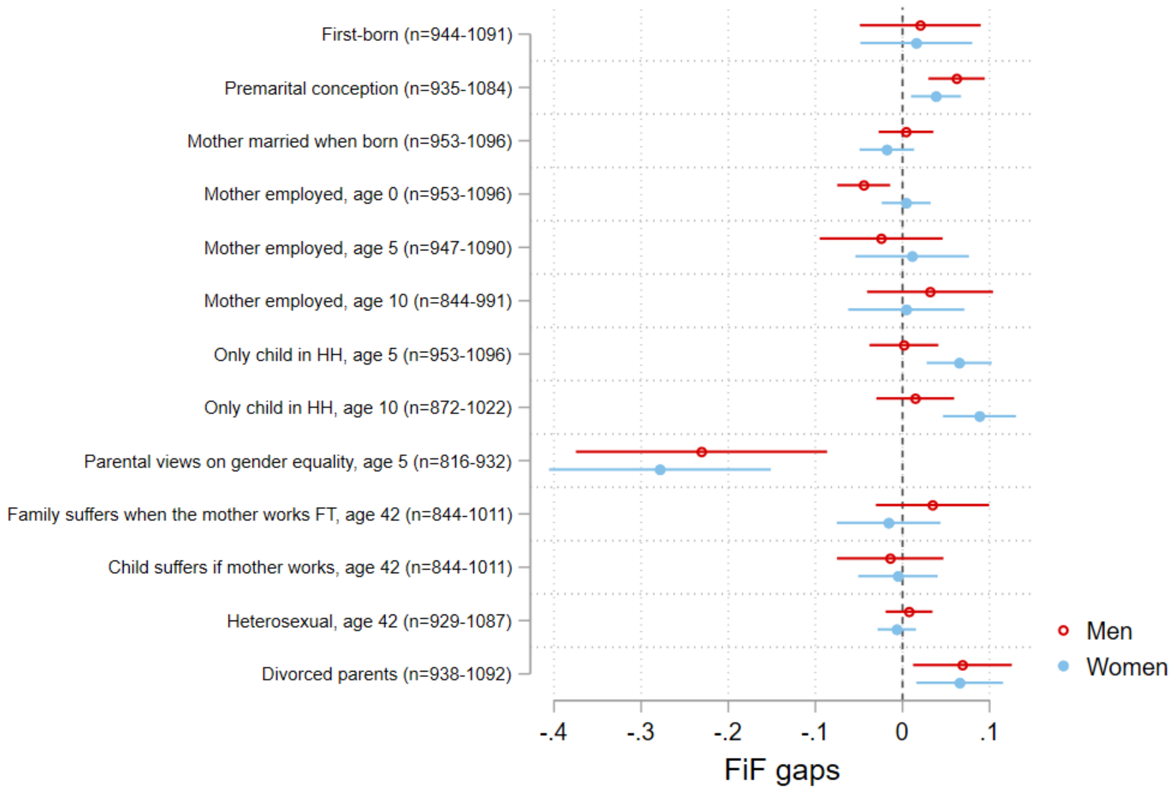
Source: BCS70. Sample of university graduates. Each data point captures the raw difference in these variables between FiF and non-FiF graduates, separately for men and women. All differences are plotted with their 95% confidence intervals. As all variables come from different waves of BCS70, the number of observations differ for each and indicated on the y-axis for men and women, respectively.

Table OA15: The role of skills and human capital in the FiF fertility gap

	(1) No. of children Women	(2) No. of children Men	(3) Childless-ness Women	(4) Childless-ness Men	(5) No. of children Mothers	(6) No. of children Fathers
I. Low cognitive skills	–0.215*	–0.214	0.090**	0.121**	–0.043	0.026
	(0.120)	(0.142)	(0.044)	(0.050)	(0.100)	(0.130)
Observations	535	442	535	442	407	322
II. High cognitive skills	–0.146	0.035	0.063*	–0.016	–0.011	–0.004
	(0.100)	(0.111)	(0.038)	(0.042)	(0.082)	(0.091)
Observations	598	552	598	552	447	397
III. Low self-esteem	–0.200	–0.066	0.093*	0.054	0.003	0.026
	(0.145)	(0.181)	(0.055)	(0.072)	(0.123)	(0.146)
Observations	360	248	360	248	257	172
IV. High self-esteem	–0.046	0.033	0.021	–0.008	–0.005	0.018
	(0.127)	(0.160)	(0.045)	(0.061)	(0.100)	(0.138)
Observations	417	315	417	315	323	220
V. STEM degree	–0.044	0.091	0.072	–0.015	0.123	0.079
	(0.158)	(0.121)	(0.057)	(0.048)	(0.144)	(0.099)
Observations	266	451	266	451	205	336
VI. LEM degree	–0.284	–0.358	0.052	0.076	–0.246	–0.274
	(0.204)	(0.237)	(0.083)	(0.081)	(0.164)	(0.213)
Observations	200	184	200	184	140	136
VII. OSSAH degree	–0.346**	–0.348*	0.103*	0.104	–0.178	–0.203
	(0.151)	(0.204)	(0.054)	(0.087)	(0.132)	(0.168)
Observations	349	137	349	137	265	98.
VIII. Other degree	–0.065	0.159	0.139**	0.053	0.243	0.376*
	(0.179)	(0.245)	(0.070)	(0.098)	(0.151)	(0.225)
Observations	225	147	225	147	167	107
IX. Elite uni	0.002	–0.136	0.034	0.031	0.059	–0.073
	(0.167)	(0.173)	(0.059)	(0.061)	(0.146)	(0.136)
Observations	257	251	257	251	201	185
X. Not elite uni	–0.192**	–0.025	0.082**	0.033	–0.027	0.051
	(0.088)	(0.106)	(0.034)	(0.041)	(0.070)	(0.089)
Observations	832	683	832	683	619	502

*Source: BCS70. Equation 2 estimated on specific subsamples of graduates as indicated in each block. The estimated coefficients on "FiF graduate" are reported in the table. All coefficients are estimated in separate models. Additional control variables: region of birth, parental background (SES), being a firstborn child, No. of siblings, ethnicity. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Figure OA4: The FiF gap in family background and gender roles



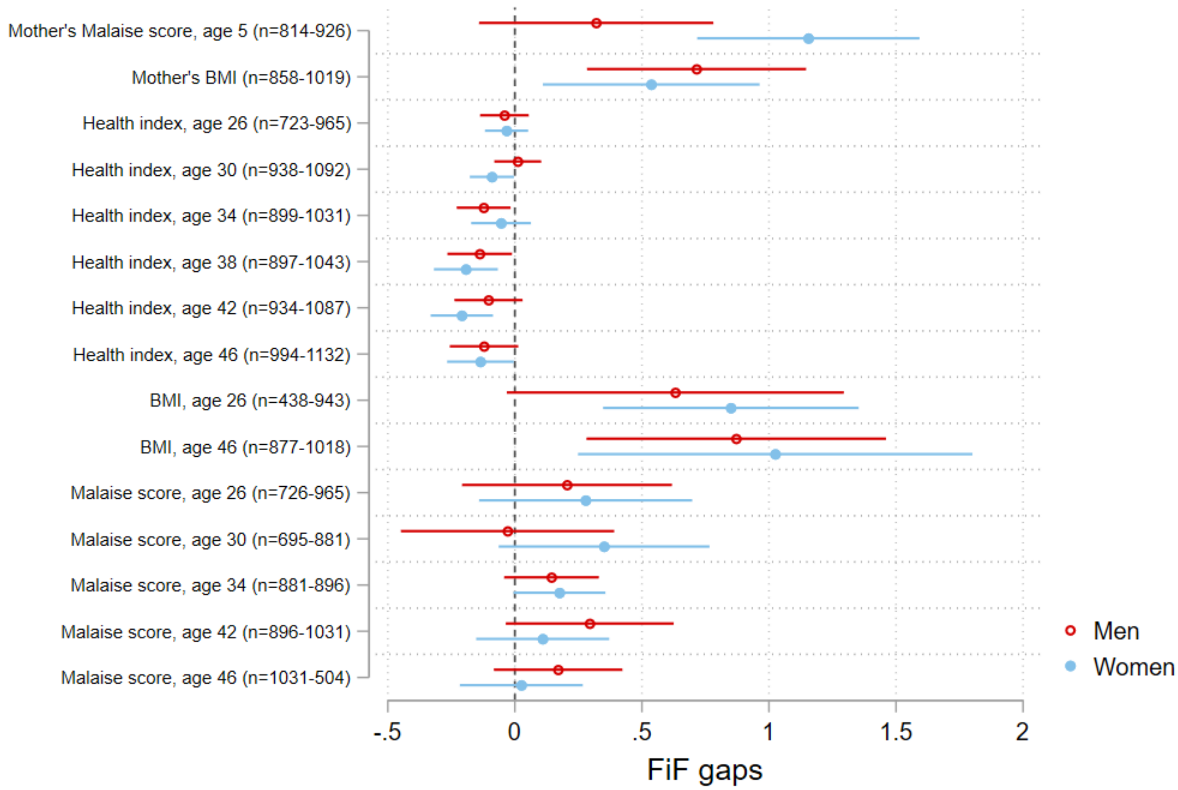
Source: BCS70. Sample of university graduates. Each data point captures the raw difference in these variables between FiF and non-FiF graduates, separately for men and women. All differences are plotted with their 95% confidence intervals. As all variables come from different waves of BCS70, the number of observations differ for each and indicated on the y-axis for men and women, respectively.

Table OA16: The role of family background in the FiF fertility gap

	(1) No. of children Women	(2) No. of children Men	(3) Childless-ness Women	(4) Childless-ness Men	(5) No. of children Mothers	(6) No. of children Fathers
I. Marital conception	–0.185**	0.006	0.080**	0.007	–0.027	0.026
	(0.085)	(0.092)	(0.032)	(0.035)	(0.070)	(0.078)
Observations	102	883	102	883	771	637
II. Premarital conception	0.124	–0.370	–0.178	0.058	–0.502*	–0.198
	(0.441)	(1.591)	(0.159)	(0.477)	(0.278)	(0.931)
Observations	56	52	56	52	45	37
III. Only child in HH	0.208	–0.218	–0.065	0.030	0.036	–0.170
	(0.401)	(0.358)	(0.161)	(0.143)	(0.330)	(0.311)
Observations	101	82	101	82	68	59
IV. Not only child in HH	–0.207**	0.033	0.088***	0.005	–0.038	0.052
	(0.085)	(0.095)	(0.031)	(0.036)	(0.070)	(0.082)
Observations	995	871	995	871	757	630
V. High gender equality	–0.145	0.079	0.066	0.012	–0.005	0.139
	(0.118)	(0.131)	(0.044)	(0.050)	(0.100)	(0.109)
Observations	541	441	541	441	401	315
VI.Low gender equality	–0.329**	–0.147	0.119**	0.044	–0.135	–0.081
	(0.135)	(0.152)	(0.050)	(0.058)	(0.106)	(0.123)
Observations	391	375	391	375	301	266
VII. Heterosexual	–0.174**	–0.106	0.075***	0.049	–0.031	–0.007
	(0.078)	(0.088)	(0.028)	(0.032)	(0.065)	(0.074)
Observations	105	895	105	895	809	681
VIII. Divorced parents	–0.310	–0.063	0.112	0.014	–0.099	0.009
	(0.253)	(0.204)	(0.086)	(0.078)	(0.250)	(0.187)
Observations	194	189	194	189	149	137
IX. Not divorced parent	–0.177**	–0.016	0.072**	0.025	–0.037	0.044
	(0.084)	(0.095)	(0.031)	(0.036)	(0.069)	(0.079)
Observations	898	749	898	749	672	544
X. Mother employed at age 5	0.047	0.144	–0.013	–0.038	0.017	0.091
	(0.117)	(0.124)	(0.046)	(0.049)	(0.097)	(0.105)
Observations	562	485	562	485	423	357
XI. Mother not employed at age 5	–0.370***	–0.137	0.157***	0.055	–0.039	–0.045
	(0.115)	(0.138)	(0.041)	(0.050)	(0.095)	(0.117)
Observations	528	462	528	462	397	327

*Source: BCS70. Equation 2 estimated on specific subsamples of graduates as indicated in each block. The estimated coefficients on "FiF graduate" are reported in the table. All coefficients are estimated in separate models. Additional control variables: region of birth, parental background (SES), ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Figure OA5: The FiF gap in general health



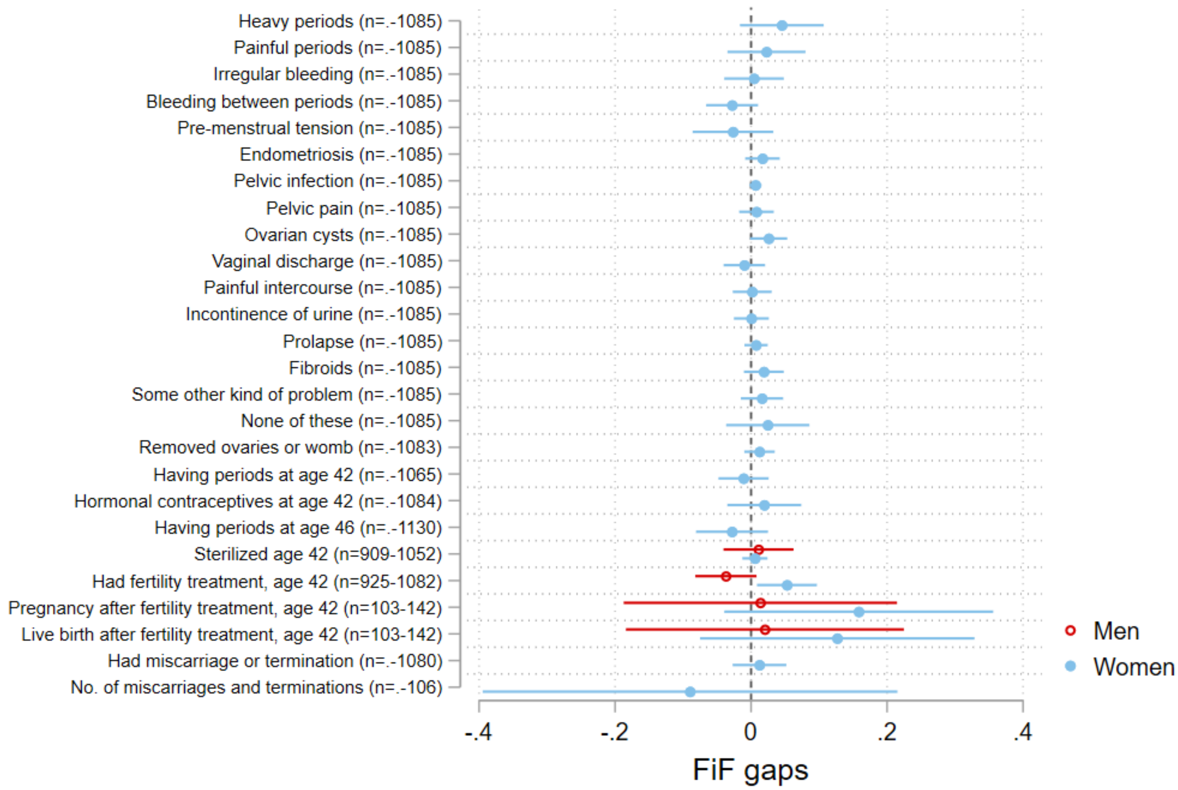
Source: BCS70. Sample of university graduates. Each data point captures the raw difference in these variables between FiF and non-FiF graduates, separately for men and women. All differences are plotted with their 95% confidence intervals. As all variables come from different waves of BCS70, the number of observations differ for each and indicated on the y-axis for men and women, respectively.

Table OA17: The role of health in the FiF fertility gap

	(1) No. of children Women	(2) No. of children Men	(3) Childlessness Women	(4) Childlessness Men	(5) No. of children Mothers	(6) No. of children Fathers
I. High maternal BMI	–0.151	0.069	0.045	–0.023	–0.095	0.017
	(0.144)	(0.157)	(0.050)	(0.057)	(0.121)	(0.134)
Observations	410	357	410	357	304	263
II. Low maternal BMI	–0.234**	–0.128	0.102***	0.051	–0.032	–0.045
	(0.097)	(0.111)	(0.037)	(0.042)	(0.086)	(0.095)
Observations	609	501	609	501	458	364
III. High maternal Malaise	–0.100	–0.147	0.038	0.083	–0.027	0.052
	(0.160)	(0.152)	(0.064)	(0.056)	(0.143)	(0.140)
Observations	372	326	372	326	275	236
IV. Low maternal Malaise	–0.164	0.116	0.067*	–0.027	–0.032	0.063
	(0.109)	(0.132)	(0.040)	(0.051)	(0.086)	(0.109)
Observations	554	488	554	488	422	344
V. High own BMI	–0.236	–0.208	0.092	0.091	–0.086	–0.046
	(0.158)	(0.190)	(0.059)	(0.066)	(0.135)	(0.163)
Observations	330	247	330	247	238	184
VI.Low own BMI	–0.109	–0.130	0.060	–0.046	0.023	–0.372*
	(0.098)	(0.223)	(0.037)	(0.088)	(0.083)	(0.203)
Observations	613	191	613	191	477	119
VII. High health index	–0.143	–0.117	0.073**	0.062	0.021	0.007
	(0.089)	(0.101)	(0.032)	(0.039)	(0.072)	(0.083)
Observations	759	651	759	651	601	479
VIII. Low health index	–0.111	0.054	0.055	–0.050	–0.038	0.038
	(0.172)	(0.199)	(0.070)	(0.071)	(0.155)	(0.179)
Observations	284	246	284	246	195	175
IX. High own Malaise	–0.103	–0.187	0.093*	0.045	0.076	–0.088
	(0.133)	(0.206)	(0.052)	(0.074)	(0.112)	(0.174)
Observations	387	246	387	246	282	178
X. Low own Malaise	–0.072	0.039	0.021	0.023	–0.027	0.132
	(0.117)	(0.117)	(0.045)	(0.049)	(0.095)	(0.095)
Observations	494	449	494	449	379	317

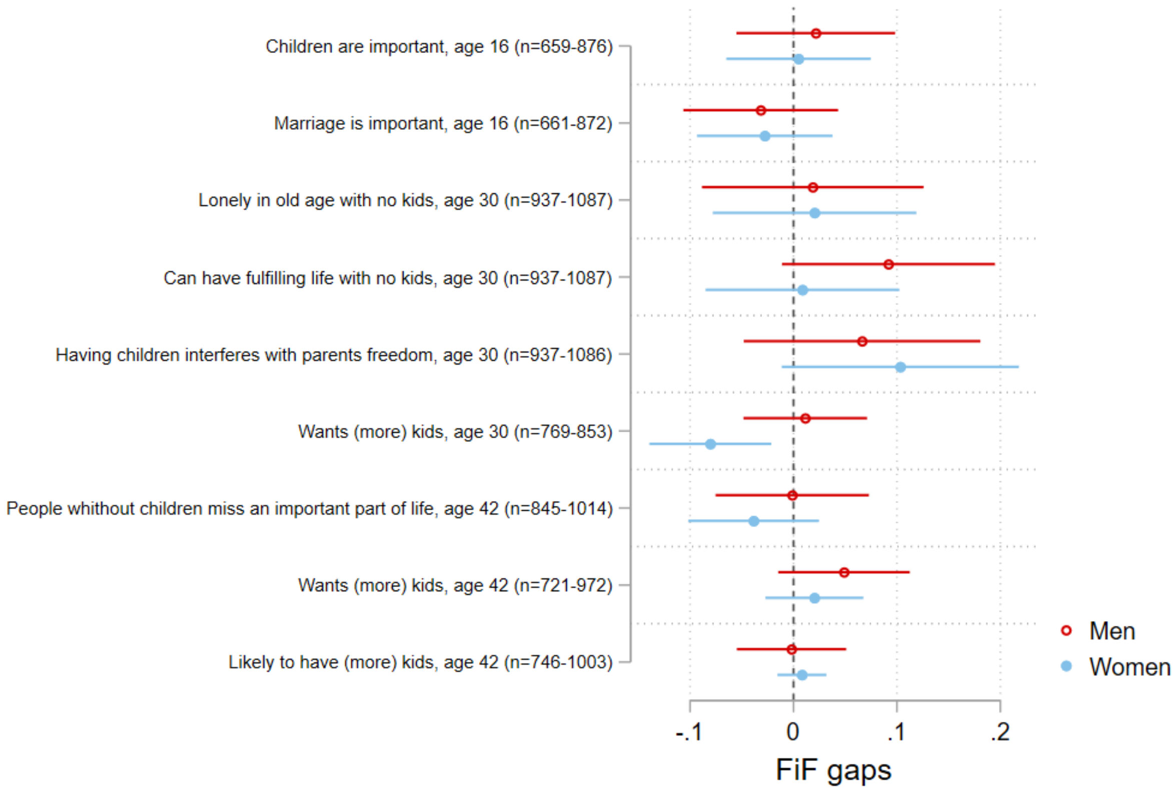
*Source: BCS70. Equation 2 estimated on specific subsamples of graduates as indicated in each block. The estimated coefficients on "FiF graduate" are reported in the table. All coefficients are estimated in separate models. Additional control variables: region of birth, parental background (SES), being a firstborn child, No. of siblings, ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Figure OA6: The FiF gap in reproductive health



Source: BCS70. Sample of university graduates. Each data point captures the raw difference in these variables between FiF and non-FiF graduates, separately for men and women. All differences are plotted with their 95% confidence intervals. As all variables come from different waves of BCS70, the number of observations differ for each and indicated on the y-axis for men and women, respectively.

Figure OA7: The FiF gap in child-related preferences



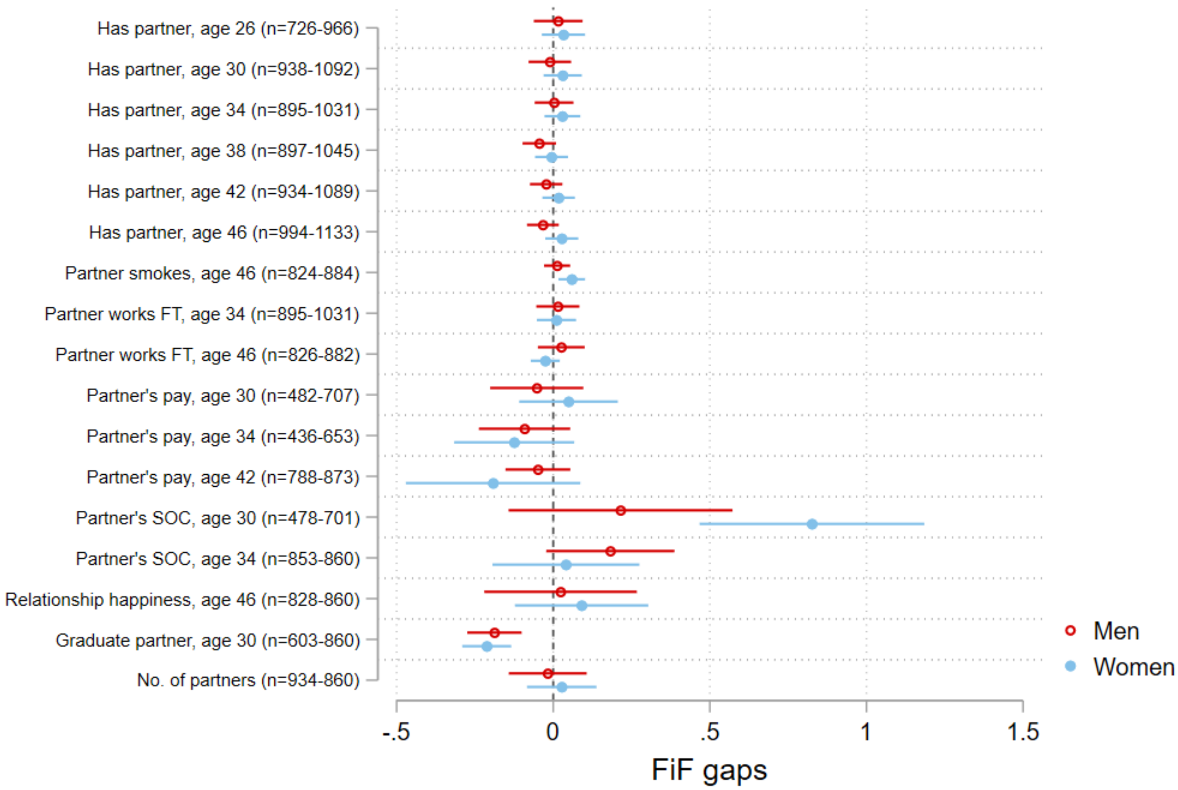
Source: BCS70. Sample of university graduates. Each data point captures the raw difference in these variables between FiF and non-FiF graduates, separately for men and women. All differences are plotted with their 95% confidence intervals. As all variables come from different waves of BCS70, the number of observations differ for each and indicated on the y-axis for men and women, respectively.

Table OA18: The role of child-related preferences in the FiF fertility gap

	(1) No. of children Women	(2) No. of children Men	(3) Childless- ness Women	(4) Childless- ness Men	(5) No. of children Mothers	(6) No. of children Fathers
I. Children are	0.162	–0.267	–0.043	0.065	0.063	–0.165
important age 16	(0.156)	(0.220)	(0.057)	(0.079)	(0.115)	(0.196)
Observations	329	202	329	202	266	153
II. Children are not	–0.228**	–0.021	0.111**	0.029	–0.018	0.045
important, age 16	(0.106)	(0.130)	(0.044)	(0.049)	(0.087)	(0.116)
Observations	547	457	547	457	386	315
III. Wants (more)	–0.033	–0.058	0.019	0.041	0.019	0.020
children, age 30	(0.094)	(0.105)	(0.033)	(0.035)	(0.080)	(0.088)
Observations	680	631	680	631	547	502
IV. Doesn't want	–0.440*	0.574**	0.127	–0.244**	–0.300	–0.012
children, age 30	(0.240)	(0.261)	(0.087)	(0.116)	(0.191)	(0.305)
Observations	173	138	173	138	111	81.
V. Childless,	–0.253***	–0.114	0.115***	0.062	–0.071	–0.012
age 30	(0.087)	(0.095)	(0.039)	(0.041)	(0.070)	(0.082)
Observations	747	724	747	724	468	449
VI. Children limit	–0.137	–0.132	0.071	0.045	0.011	–0.065
freedom, age 30	(0.110)	(0.122)	(0.045)	(0.046)	(0.089)	(0.103)
Observations	466	513	466	513	341	367
VII. Children don't	–0.257**	0.029	0.081**	–0.001	–0.112	0.026
limit freedom, age 30	(0.109)	(0.130)	(0.039)	(0.050)	(0.093)	(0.110)
Observations	620	424	620	424	476	314

*Source: BCS70. Equation 2 estimated on specific subsamples of graduates as indicated in each block. The estimated coefficients on "FiF graduate" are reported in the table. All coefficients are estimated in separate models. Additional control variables: region of birth, parental background (SES), being a firstborn child, No. of siblings, ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Figure OA8: The FiF gap in partnerships



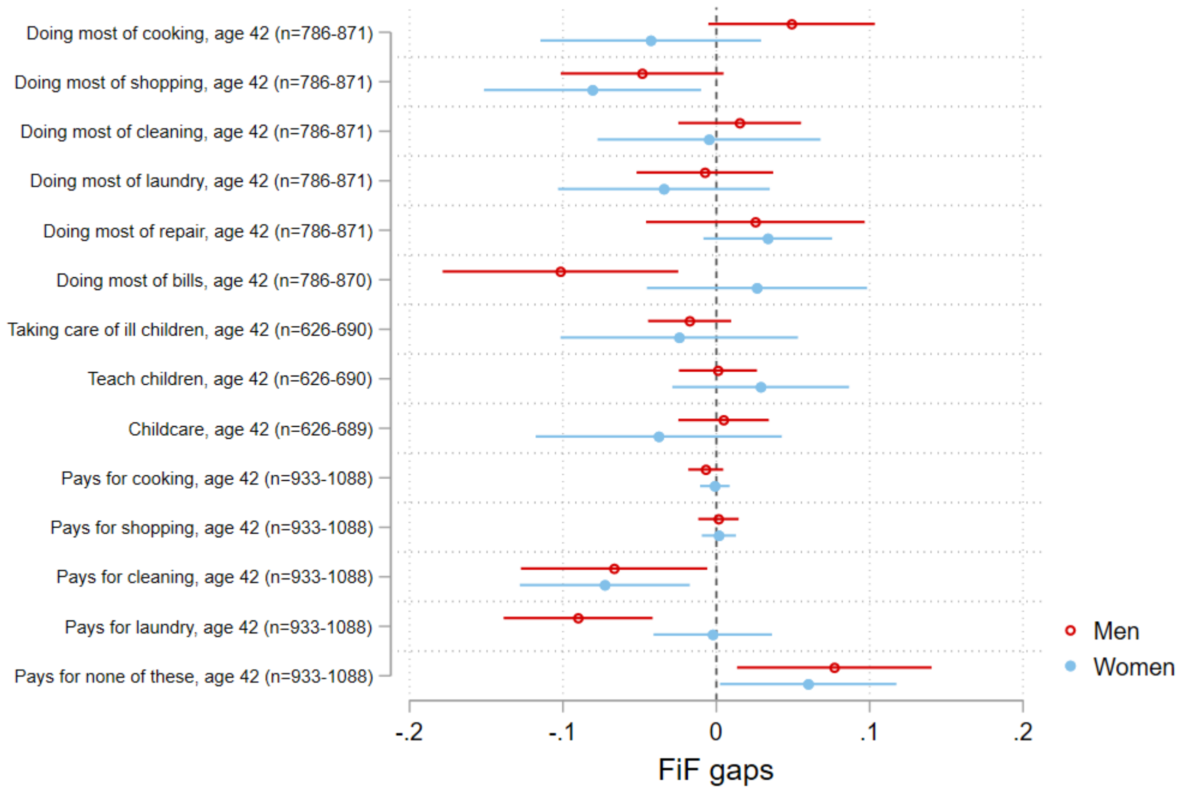
Source: BCS70. Sample of university graduates. Each data point captures the raw difference in these variables between FiF and non-FiF graduates, separately for men and women. All differences are plotted with their 95% confidence intervals. As all variables come from different waves of BCS70, the number of observations differ for each and indicated on the y-axis for men and women, respectively.

Table OA19: The role of partnerships in the FiF fertility gap

	(1) No. of children Women	(2) No. of children Men	(3) Childless-ness Women	(4) Childless-ness Men	(5) No. of children Mothers	(6) No. of children Fathers
I. Has partner,	–0.151*	0.052	0.076***	–0.007	0.014	0.040
age 30	(0.091)	(0.104)	(0.029)	(0.034)	(0.076)	(0.089)
Observations	740	603	740	603	628	518
II. No partner,	–0.271**	–0.228	0.094	0.101	–0.252*	–0.059
age 30	(0.133)	(0.143)	(0.061)	(0.065)	(0.131)	(0.149)
Observations	352	335	352	335	193	163
III. Low-SOC partner,	–0.159	0.092	0.092**	–0.058	0.048	–0.044
age 30	(0.114)	(0.145)	(0.038)	(0.050)	(0.096)	(0.115)
Observations	457	303	457	303	384	257
IV. High-SOC partner,	–0.172	0.023	0.079	0.030	–0.001	0.075
age 30	(0.154)	(0.205)	(0.049)	(0.074)	(0.126)	(0.151)
Observations	244	175	244	175	208	144
V. Graduate partner,	–0.157	0.113	0.074*	–0.049	0.020	0.002
age 30	(0.129)	(0.137)	(0.039)	(0.041)	(0.113)	(0.120)
Observations	335	309	335	309	285	273
VI. Non-graduate partner,	–0.112	0.067	0.070	0.031	0.068	0.159
age 30	(0.135)	(0.166)	(0.043)	(0.059)	(0.115)	(0.146)
Observations	405	294	405	294	343	245
VI. Does not pay for HH help,	–0.215**	–0.121	0.102***	0.023	–0.016	–0.104
age 42	(0.092)	(0.107)	(0.035)	(0.041)	(0.078)	(0.092)
Observations	797	677	797	677	583	475
VI. Pays for HH help	–0.133	0.046	0.034	0.039	–0.070	0.148
age 42	(0.146)	(0.158)	(0.053)	(0.054)	(0.116)	(0.134)
Observations	291	256	291	256	236	211

*Source: BCS70. Equation 2 estimated on specific subsamples of graduates as indicated in each block. The estimated coefficients on "FiF graduate" are reported in the table. All coefficients are estimated in separate models. Additional control variables: region of birth, parental background (SES), being a firstborn child, No. of siblings, ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Figure OA9: The FiF gap in household chores, age 42



Source: BCS70. Sample of university graduates. Each data point captures the raw difference in these variables between FiF and non-FiF graduates, separately for men and women. All differences are plotted with their 95% confidence intervals. As all variables come from different waves of BCS70, the number of observations differ for each and indicated on the y-axis for men and women, respectively.

Table OA20: The FiF gap among graduates in the number of children in the household (age 46)

VARIABLES	(1) No. of children in the HH women	(2) No. of children in the HH men	(3) Childless HH women	(4) Childless HH men	(5) No. of children in the HH mothers	(6) No. of children in the HH fathers
FiF graduate	-0.192**	-0.0267	0.0735**	0.0162	-0.0689	0.00184
	(0.0744)	(0.0848)	(0.0288)	(0.0323)	(0.0611)	(0.0752)
Constant	14.57	-16.38	-2.901	5.971	11.50	-6.528
	(13.37)	(15.96)	(5.644)	(6.561)	(10.55)	(14.31)
Observations	1,133	994	1,133	994	844	718
R-squared	0.032	0.036	0.021	0.031	0.057	0.044

*Source: BCS70. Additional control variables: region of birth, parental background (SES), being a first-born child, No. of siblings, ethnicity, cognitive skills, math grades from age 16. Robust standard errors in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$).*

Table OA21: Reasons of childlessness (age 42, women)

	FiF N	FiF Mean	NonFiF N	NonFiF Mean	Diff	p-value
Infertility problem (personal)	208	0.11	70	0.13	-0.02	0.60
Infertility problem (partner)	208	0.03	70	0.09	-0.05	0.07
Partner sterilised/had vasectomy/hysteret	208	0.04	70	0.01	0.02	0.32
Other health reason	208	0.08	70	0.09	-0.00	0.92
I have not wanted to have children	208	0.41	70	0.31	0.09	0.16
Wanted children but not got round to it	208	0.11	70	0.19	-0.08	0.11
My partner not wanted	208	0.11	70	0.14	-0.04	0.40
Partner already has	208	0.03	70	0.04	-0.01	0.57
Haven't met right person to have children	208	0.22	70	0.41	-0.20	0.00**
Financial situation wd make it difficult	208	0.06	70	0.06	0.01	0.87
Housing situation difficult	208	0.01	70	0.01	0.00	0.99
Don't want to compromise relationship	208	0.01	70	0.01	-0.00	0.74
I have been focused on my career	208	0.13	70	0.16	-0.03	0.50
In a homosexual relationship	208	0.00	70	0.01	-0.01	0.42
No particular reason	208	0.07	70	0.06	0.01	0.67
Other reason	208	0.04	70	0.01	0.02	0.32
Don't know	208	0.00	70	0.01	-0.01	0.08
Don't want to answer	208	0.01	70	0.06	-0.04	0.05*

*Source: BCS70. 'Diff' refers to the difference of means between FiF and non-FiF graduates. Two-sided t-test p-values are reported. (*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$).*

Table OA22: Reasons of childlessness (age 42, men)

	FiF N	FiF Mean	NonFiF N	NonFiF Mean	Diff	p-value
Infertility problem (personal)	177	0.03	71	0.03	0.00	1.00
Infertility problem (partner)	177	0.07	71	0.06	0.01	0.74
Partner sterilised/had vasectomy/hysteret	177	0.00	71	0.01	-0.01	0.11
Other health reason	177	0.02	71	0.04	-0.03	0.24
I have not wanted to have children	177	0.31	71	0.42	-0.11	0.09
Wanted children but not got round to it	177	0.06	71	0.07	-0.01	0.68
My partner not wanted	177	0.11	71	0.10	0.01	0.84
Partner already has	177	0.03	71	0.04	-0.01	0.75
Haven't met right person to have children	177	0.31	71	0.32	-0.02	0.77
Financial situation wd make it difficult	177	0.05	71	0.04	0.01	0.78
Housing situation difficult	177	0.01	71	0.01	-0.01	0.50
Don't want to compromise relationship	177	0.01	71	0.00	0.01	0.37
I have been focused on my career	177	0.07	71	0.10	-0.03	0.51
In a homosexual relationship	177	0.02	71	0.01	0.00	0.87
No particular reason	177	0.13	71	0.06	0.07	0.09
Other reason	177	0.03	71	0.03	0.00	1.00
Don't know	177	0.01	71	0.00	0.01	0.53
Don't want to answer	177	0.01	71	0.00	0.01	0.37

*Source: BCS70. 'Diff' refers to the difference of means between FiF and non-FiF graduates. Two-sided t-test p-values are reported. (*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$).*