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Fathers' Multiple-Partner Fertility and Children's Educational Outcomes

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Abstract

We find substantial and statistically significant detrimental effects of fathers' multiple-partner fertility (MPF) on children's educational outcomes. We focus on children in fathers' "second families" when the second families are nuclear families – households consisting of a man, a woman, their joint children, and no other children. We analyze outcomes for almost 75,000 Norwegian children, all of whom, until they were at least age 18, lived in nuclear families. Controlling for a rich set of socio-economic variables, we find that children who spent their entire childhoods in nuclear families but whose fathers had children from a previous relationship living elsewhere were 4 percentage points more likely to drop out of secondary school and 5 percentage points less likely to obtain a bachelor's degree than children in nuclear families without fathers' MPF. Resource competition due to economic and caregiving responsibilities for children living elsewhere does not explain the differences in educational outcomes. We do find that children in nuclear families whose fathers had previous childless marriages have educational outcomes that are similar to those of fathers with MPF. Our analysis suggests that the effects of fathers' MPF are primarily due to selection.

Key Words: Family structure, nuclear families, complex families, siblings, educational outcomes

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1. Introduction

Children who spend their entire childhoods in nuclear families—households consisting of a man, a woman, their joint children, and no other children—have better educational outcomes than children from other family structures.[1] However, not all nuclear families are the same—in some nuclear families one of the parents, usually the father, has children from a "first family" living elsewhere.

We investigate the association between fathers' multiple partner fertility (MPF) and the educational outcomes of the children in fathers' "second families." We restrict our attention to the case in which the second families are nuclear families -- households consisting of a man, a woman, their joint children, and no other children. More specifically, all of the children in our analysis spent their entire childhoods, at least until age 18, in nuclear families, the family structure numerous studies have found is associated with the best educational outcomes for children. We find that fathers' MPF is associated with substantial and statistically significant worse educational outcomes for the children in the father's second family.

Although family complexity, sibling structure, and MPF are receiving increasing attention from sociologists, demographers, and economists, attention has focused on mothers' rather than fathers' MPF. This reflects both the tradition of defining family structure as household structure and the paucity of US data on the family beyond the household. Because most US data sets are household-based and because children usually remain with their mothers when unions dissolve, US

[1] The U.S. Census Bureau defines a "traditional nuclear family" as a household consisting of a man, a woman, their joint children, and no one else; the census definition further specifies that the parents are a married couple. In our analysis, we define a nuclear family as a household consisting of a man, a woman, their joint children and no other children, but we include the small number of households in which other adults (e.g., grandparents) are present. We also depart from the census definiton by not requiring marriage.

data can tell us virtually nothing about the association between fathers' MPF and children's outcomes.

In an issue of *Annals of the American Academy of Political and Social Science* on "Family Complexity, Poverty, and Public Policy," Furstenberg (2014) concludes:

> The research on the consequences of more complex families for children is still inconclusive. There are many theoretical reasons why children may fare less well when their parents have obligations to children from other partners. We know that parents who have children with more than one partner are also different in many sociodemographic and psychological ways from those whose parenting is confined to a single union. Without effectively ruling out selection, it is very difficult to conclude that complexity per se undermines good parenting, couple collaboration, and successful child development. For the time being, it makes good sense not to rush to a judgment on the questions of whether or how family complexity compromises child well-being.

We agree with Furstenberg that we should avoid rushing to judgment about the causal effect of family complexity on children's outcomes. That said, our analysis sheds some light on the difficult question of causation and suggests the dominant role of selection.

To investigate the association between fathers' MPF and the long-term educational outcomes of the children in fathers' second families requires a large data set that links parents to all of their resident and nonresident children. To analyze long-term educational outcomes, we require a relatively long longitudinal data set that follows children into adulthood. No US data set satisfies these requirements. We use Norwegian register data, starting with 147,000 children born in Norway between 1986 and 1988. We analyze the educational outcomes of the more than 75,000 of these children who spent their entire childhoods in nuclear families.

Restricting our attention to children who spent their entire childhoods in nuclear families and controlling for child and parental characteristics, we find that fathers' MPF is associated with worse educational outcomes for the children in fathers' second families. For example, children who spent their entire childhoods in nuclear families but whose fathers had children from another relationship living elsewhere were 4 percentage points (ppt) less likely to complete secondary school and 5 ppt less likely to complete college/university compared with children whose fathers did not have children from another relationship living elsewhere.

By restricting our analysis to children who spent their entire childhoods in nuclear families, we are able to isolate the association between fathers' MPF and children's educational outcomes in a simple, transparent family environment without imposing untestable a priori restrictions. Because the children in our analysis never experienced a family structure transition, the restriction to children who spent their entire childhoods in nuclear families allows us to rule out family structure transitions and the accompanying stress as causes of the worse educational outcomes experienced by the children in fathers' second families.

Our data allow us to investigate three of the mechanisms that may explain the worse educational outcomes experienced by the children in fathers' second families. We find very little support for what we call the "resource competition hypothesis" -- that is, that the children in fathers' first families compete with the children in fathers' second families for resources. We also investigate the possibility that the children in the fathers' second families are "later born" children of the fathers and that this adversely affects their educational attainment. Finally, we have some direct evidence about selection: we find that the children in nuclear families whose fathers had previous childless marriages have educational outcomes that are very similar to those whose fathers have children from another relationship living elsewhere. This is strong evidence that selection rather than lack of household resources causes the children in fathers' second families to experience worse educational outcomes.

Our initial goal is to describe and analyze the association between fathers' MPF and children's educational outcomes. In section 2 we discuss the literatures on family structure, family complexity, and outcomes for children. Section 3 describes schooling and child support in Norway, our data, and our outcome and explanatory variables. In section 4 we investigate the association between fathers' MPF and children's educational outcomes, controlling for a rich set of socio-economic variables. In section 5 we discuss three mechanisms that may underlie the worse educational outcomes associated with fathers' MPF: resource competition, birth order, and selection. Sections 6, 7, and 8 investigate these three mechanisms; we conclude that the detrimental effect of fathers' MPF on children's educational outcomes is primarily due to selection. Section 9 concludes.

2. The Literatures on Family Structure and Family Complexity

Our work draws on the extensive literature on family structure and the burgeoning literature on family complexity. We first trace the evolution of the relevant family structure literature as it relates to educational outcomes for children and then turn to the literature on fathers' MPF.

2.1 Family Structure and Children's Educational Outcomes

The popular literature on outcomes for children emphasizes either the distinction between single-parent families and two-parent families or between married and unmarried mothers but seldom digs deeper. The scholarly literature in demography and sociology has successively refined family structure categories. McLanahan and Sandefur (1994) made an important early refinement. Using four US data sets, McLanahan and Sandefur found that, on average, children who grew up with both biological parents experienced substantially better educational and other outcomes than children from single-parent families and better outcomes than the nonjoint children (i.e., the stepchildren) in blended families.[2] Based on this finding, McLanahan and Sandefur mistakenly concluded that the crucial distinction was between children who grew up with both biological parents and those who did not.

The move beyond the single-parent/two-parent dichotomy was an important step forward, but the conclusion that the crucial dimension of family structure was growing up with both biological parents was a misstep. The misstep resulted from pooling the large number of children from nuclear families with the small number of children who spent their entire childhoods with both biological parents in "stable blended families." We refer to these children as the "joint children," as opposed to the nonjoint children (i.e., the stepchildren) in stable blended families. Contrary to McLanahan and Sandefur's conclusion, the joint children from stable blended families experienced substantially worse outcomes than the children from nuclear families. Using US data, Ginther and Pollak (2004), Gennetian (2005), and Halpern-Meekin and Tach (2008) show that the educational outcomes of the joint children from stable blended families were substantially worse than those of children from nuclear families even though the joint children from stable blended families spent their entire childhoods with both biological parents.[3]

Beyond the empirical difference between McLanahan and Sandefur, on the one hand, and Ginther and Pollak, Gennetian, and Halpern-Meekin and Tach on the other, is an important conceptual difference. McLanahan and Sandefur focus exclusively on the relationship between each child and his or her parents, while Ginther and Pollak, Gennetian, Halpern-Meekin and

[2] Blended families are households consisiting of a man, a woman, their joint children, and at least one "nonjoint" child (e.g., the woman's child from a previous relationship). McLanahan and Sandefur used the Panel Study of Income Dynamics (PSID), the National Longitudinal Survey of Young Men and Women (NLSY), the High School and Beyond Study (HSB), and the National Survey of Families and Households (NSFH).

[3] Ginther and Pollak, Gennetian, and Halpern-Meekin and Tach found virtually no difference between the educational outcomes of the joint children and the nonjoint children from stable blended families. In contrast, Case, Lin, and McLanahan (2001) and Evenhouse and Reilly (2004) using sibling difference models found that stepchildren had worse outcomes.

Tach, and Tillman (2008) also consider the relationship of each child to the other children in the household (i.e, sibling structure).[4] More generally, unlike the family structure literature, the family complexity literature considers household sibling structure, including the presence of half-siblings and step-siblings that results from repartnering and MPF.

2.2 Multiple Partner Fertility and Outcomes for Children

Recent research has estimated the prevalence of MPF in the United States. Monte (2019b, p. 111) finds that 16.1% of fathers age 40-44 have MPF. When the sample is limited to fathers with two or more children, 21.4% have MPF. Using the National Longitudinal Survey of Adolescent Health (Add Health) and the National Survey of Family Growth (NSFG), Guzzo (2014) finds that 13% of men and 19% of women in their forties have had children with more than one partner.[5] Using the National Survey of Family Growth (NSFG), Guzzo and Furstenberg (2007) and Manlove et al. (2008) document the prevalence of fathers' MPF and find that it is associated with economic disadvantage. Joyner et al. (2012) discusses the difficulty of measuring male fertility.

US Fragile Families data provide information about the association between fathers' MPF

[4] Equivalently, Ginther and Pollak and Gennetian consider not only each child's relationship to the parents but also the structure of the household (i.e., nuclear family versus blended family). Using Swedish and US data, Björklund, Ginther, and Sundström (2007) found that adverse educational outcomes are more closely associated with the number of resident half-siblings than with the number of full siblings. They also found that having lived with half-siblings was associated with adverse educational outcomes even after controlling for the total number of resident half and full siblings.

[5] For a collection of authoritative articles on MPF and other forms of family complexity, see *Annals of the American Academy of Political and Social Science* (2014) on "Family Complexity, Poverty, and Public Policy." Using data from the 2014 Survey of Income and Program Participation (SIPP), the first US data set to systematically collect data on men's fertility, Monte and Knop (2019a) find 8.7% of men age 15 or older have children with more than one partner; see also Monte (2017). Using data from Wisconsin, Cancian, Chung and Meyer (2016) found that mothers' likelihood of MPF increased if the father of a child was imprisoned. None of these studies investigate the association between MPF and outcomes for children. Several studies have documented the prevalence of fathers' MPF and studied the relationship between fathers' MPF and child support. Using administrative data from Wisconsin, Meyer, Cancian, and Cook (2005), Cancian and Meyer (2011), and Cancian, Meyer, and Cook (2011) find that MPF is very common and not fully incorporated into Wisconsin's child support policy. Cancian, Meyer, and Cook (2011) finds that 60% of first-born children of unmarried mothers have half-siblings by the age of 10. Taken together, these studies underscore the importance of fathers' MPF in formulating child-support policy, but they tell us nothing about outcomes for children.

and outcomes for young children in the father's first family, but no information about outcomes for the children in his second family.[6] For our purposes, the absence of information about outcomes for children in fathers' second families is the critical limitation of the Fragile Families data. Our research strategy focuses on the effects of fathers' MPF on educational outcomes for children who grew up in fathers' second families when these second families were nuclear families. The advantage of this strategy is that it allows us to study the effect of fathers' MPF in a context that avoids the need to control for the other factors that contribute to disadvantage for many of the children in the Fragile Families data set.

Other researchers have examined MPF in Norway and Sweden. Steele, Sigle-Rushton, and Kravdal (2009) finds that family disruption is adversely associated with children's educational outcomes in Norway, and Björklund. Ginther, and Sundström (2007) finds that the association between family complexity and children's outcomes is very similar in Sweden and the United States. Lappegård and Rønsen (2013) finds a U-shaped relationship between men's MPF and socioeconomic status in Norway; both low- and high-income Norwegian men are more likely than middle-income men to have children with multiple partners.[7]

Manning, Brown, and Stykes (2014) suggests that attention to MPF has generated renewed interest in blended families, household sibling structure, and measures of family complexity. That paper and Brown, Manning, and Stykes (2015) use the SIPP to combine

[6] For example, Carlson and Furstenberg (2007) finds that MPF measured by the father having a child with another woman is negatively associated with the quality of the mother's relationship with the children in his first family. Bronte-Tinkew, et al. (2009) finds that for children under the age of 36 months, a father having a child with another woman is positively associated with externalizing behavior and negatively associated with the physical health of children in his first family. Tach, Mincy, and Edin (2010) finds that father involvement with the children in his first family drops when the father has a child with another woman.

[7] Using Norwegian and Swedish data, Lappegård and Thomson (2018) document the intergenerational transmission of both male and female multipartner fertility. Mothers' MPF is associated with economic disadvantage and low educational outcomes in Australia, the United States, Norway, and Sweden (Thomson et al. 2014).

measures of family structure (defined as the relationship of parents to children within the household) and of household sibling structure into a measure of family complexity.[8] Manning, Brown, and Stykes (2014) examines the incidence of family complexity in the US, and finds that in 2009 40.8% of children experience either sibling complexity (5.2%), parent complexity (28.5%), or both (7.1%). However, Manning, Brown and Stykes (2014, p. 54) acknowledges that their estimates of sibling complexity "will not mirror those of parents because they exclude nonresident siblings or siblings who have formed their own, separate households."

3. Context, Family Types, and Covariates

This section begins by describing schooling and child support in Norway, then describes our data and the family types we analyze, and concludes by discussing our outcome and explanatory variables.

3.1 The Norwegian Context—Schooling and Child Support

All children in Norway attend compulsory school which they usually complete the year they reach 16. After completing compulsory school, all children are entitled to attend secondary school. Secondary schooling in Norway involves more tracking than in the United States: students who attend secondary school choose between a three-year academic track and a three- or four-year vocational track. University or college attendance usually requires completing the academic track with grades high enough to qualify for admission.

Graduation from secondary school has become increasingly important for successful participation in further education and work, and reducing the number of early school leavers is a

[8] Brown, Manning, and Stykes (2015) finds that sibling complexity (measured by household sibling composition) is associated with lower income and the receipt of public assistance.

policy objective in Norway and in most other OECD countries (Lamb and Markussen 2011). In Norway, more than 95% of those graduating from compulsory education in 2002–2004 (children born in 1986–1988) enrolled in secondary education, but only about 70% had completed secondary education five years later (Falch, Nyhus, and Ström 2014).

If parents are not married or cohabiting, the parent with physical custody receives child support from the other parent.[9] The child support formula depended on the noncustodial parent's ability to pay (income) and on the number of custodial and noncustodial children.[10] Required child support payments to the custodial parent depended on the total number of children of the noncustodial parent, the number of joint children living with the custodial parent, and the noncustodial parent's income. More specifically, the formula specifies a percentage of the noncustodial parent's income as a function of his or her gross income (11% for one child; 18% for two; 24% for three; and 28% for four or more children). For example, a father with two children, one child from his first family and one child in his second family, would pay his first wife 9% of his income in child support (1/2 x 18). A father with three children, two from his first family and one from his second family, would pay his first wife 16% of his income in child

[9] Norwegian law distinguishes between legal and physical custody. Legal custody involves the right to take part in decisions on matters of vital importance in children's every day life, such as place of residence, and where to go to school. If parents are married at childbirth both are automatically granted legal custody. If not married, fathers' legal custody depends on mothers' consent (as of 2006 unmarried fathers are automatically granted legal custody if they lived with the mother at childbirth). Physical custody is granted to the parent with whom the child lives most of the time. Equally shared physical custody is possible, but this was uncommon in the 1980s and 1990s when the children in our sample grew up. The typical norm then was to spend every second weekend, one afternoon per week and some days during holidays and vacations with the noncustodial parent. Skevik (2006) presents survey statistics from 2001-2002 on father-child contact after parental break-up.

[10] Rules for child support were altered in 2003. It is mainly the pre-2003 rules that are relevant for the children in our sample. The pre-2003 rules were established in 1989 but built on earlier legislation. Until 1989 contribution levels were set by local public authorities. Changes that took effect in October 2003 decreased the child support payments of fathers who spent more time with the children from their first families. These changes would have had little effect on the children in our analysis, the youngest of whom were aged 15–16 when these changes were implemented.

support (2/3 x 24). Noncustodial parents are legally obligated to provide financial support until their children turn 18 or until they complete secondary school, usually at age 19. Child support paid was deducted from the taxable income of the noncustodial parent and child support received was taxable income of the custodial parent. [11]

Parents who live with their children also receive a child benefit from the Norwegian social insurance system. For each child under 18, the child benefit has been fixed since 1993 at NoK 970 (about $110 US per month in 2015 dollars) and is exempt from taxes. If parents are married or cohabiting, the child benefit is usually transferred to the mother. If parents are not married or cohabiting, the custodial parent receives an extended child benefit, amounting to the child benefit for one child more than she or he lives with.[12]

3.2 Data and Family Type Definitions

Our analysis is based on individual-level data from official Norwegian registers for the period 1986–2014. The registers, which cover the entire Norwegian population, are merged using unique person-specific identification codes. These registers provide information about demographic background characteristics (gender, birth year/month, links to biological parents, and country of birth), socio-economic data (education, annual income, and earnings), annually updated information about household composition (as of 1996), and continuously updated employment and social insurance status. The link to parents enables us to identify both mothers' and fathers' MPF and, combining this information with data on household composition, we can identify the family structures in which each child lived until adulthood.[13]

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[11] Until 2002 the noncustodial parent also had to pay travel costs related to visits of nonresident children.

[12] During our sample time frame, surveys of divorced parents show that mothers received daily physical custody of children in almost 90% of cases, Jensen and Clausen (2000).

[13] We discuss misclassification later in this section.

By an "eligible child" we mean a child who spent his or her entire childhood in a nuclear family. To avoid repeating the cumbersome phrase "eligible child or children" we use "eligible child" as a shorthand, recognizing that in some families there is more than one eligible child. We include all eligible children in our analysis rather than selecting a "focal child" from each family.

For our empirical work, we define a *nuclear family* as a household in which the eligible child spent his or her entire childhood living with both biological parents and in which all the other children were also the joint children of these parents and, hence, full siblings.[14] By restricting our attention to nuclear families, we ensure that the eligible child experienced no family structure transitions. This restriction allows us to rule out family stress due to union dissolution as an explanation for the worse educational outcomes associated with fathers' MPF.[15] We use the following taxonomy of family types to analyze the effects of fathers' MPF:

- Simple Nuclear Family (**NFo**): the eligible child spent her entire childhood in a nuclear family. Neither the father nor the mother had children from another relationship.
- Complex Nuclear Family (**NF+**): the eligible child spent her entire childhood in a nuclear family. The father, but not the mother, had at least one child from another relationship living elsewhere.
- Nonnuclear Family (**NNF**): the child was ineligible because she did not spend her entire childhood in a nuclear family. That is, she spent at least one year in a household without both biological parents or in a household with at least one child

[14] Our definition of a nuclear family excludes families with adopted children.
[15] The family structure literature often attributes the outcomes of children in complex families to family structure transitions; for an early example, see Wu and Martinson (1993). But family structure transitions cannot explain our results: all of the children in the complex families we consider spent their entire childhoods in nuclear families, so none of them ever experienced a family structure transition.

who was not a joint child of her biological parents and, hence, not a full sibling. For example, in a single parent family, a blended family, or a nonparental family (e.g., with grandparents).

Our starting point is the population of 146,923 children born in Norway between January 1, 1986 and December 31, 1988 with Norwegian-born parents registered as living in Norway. Table 1 shows the distribution of eligible children by family type. Among all children, 54% grew up with both biological parents until age 18 and 46% grew up in nonnuclear families.[16] Among those who grew up with both biological parents until at least age 18, the vast majority (90.7%) grew up in simple nuclear families (NFo = 72,052) and somewhat more than 4% grew up in complex nuclear families (NF+=3,208).[17] Among our 75,260 eligible children, 7.75% have full siblings who were born in 1986–1988 and, hence, are also included in our analysis.

Misclassification of families as nuclear or nonnuclear poses a potential problem related to the living arrangements of children before age 10. The problem arises because the household membership rosters reported in the Norwegian registers are not available before 1996 when the children in our sample were about 10 years old. We treat a child who was reported living in a nuclear family at age 10 as if she had lived in a nuclear family at all younger ages. For a child whose father had children from a previous relationship, this need not be the case.[18] For example, if before age 10 a child from the father's first family had lived with a child from his second family, then we would classify her as living in a complex nuclear family when she actually lived in a nonnuclear family, specifically, in a blended family. Such misclassifications are likely to

[16] Just under half of children in nonnuclear families (48%) had half-siblings.
[17] The remaining 5.3% (N=4206) of the children who spent their entire childhoods with both biological parents grew up in what Ginther and Pollak (2004) call "stable blended families" – that is, they spent their entire childhoods with both biological parents and some portion of it with one or more half-siblings.
[18] Recall that we excluded from our analysis families in which the mother had previous children.

arise only when the age gap between the children in the father's first family and those in his second family is large. If the age gap is 12 years, when the child from the second family is 10, the child from the first family will be 22 and will probably have left home. If the age gap is 5 years, when the child from the second family is 10, the child from first family will be 15 and will probably still be living at home and, hence, will appear in the register. To test whether misclassification might be driving our results, we excluded from our sample all complex nuclear families in which the age gap between the youngest child in the father's first family and the oldest child in his second family was less than more than 11 years. After dropping these large-age-gap families, our estimates were very similar to those reported in Table 4, suggesting that misclassification is not the driving our results.

The misclassification problem does not arise for children of fathers with previous childless marriages. We find that the educational outcomes of the children in these simple nuclear families are much more similar to those of children in complex nuclear families (i.e., those in which the father has children from a previous relationship living elsewhere) than to those of children in simple nuclear families. From this we infer that the worse educational outcomes of children in complex nuclear families are not driven primarily by misclassification but by selection.

3.3 Outcome Variables and Explanatory Variables

We analyze four measures of educational outcomes. Two of our measures are based on the grades received at completion of compulsory school, usually the year a child turns 16. The children in our data receive grades ranging from 1 (lowest) to 6 (highest) in 11 subjects. Our first measure, *Grades*, is a normalized variable calculated by converting the sum of all grades to a distribution with mean 0 and variance 1. Our second measure is based on the grades obtained in the three core subjects (Mathematics, Norwegian, and English); we use these grades to construct *Low Grades,* an indicator variable which is equal to one if the child received a grade below 4 in all three core subjects, indicating weak qualifications for attending secondary school. Our third measure, *Drop Out*, is an indicator variable for not completing secondary school by age 22. Our fourth measure, *Bachelor's*, is an indicator variable for whether the child completed a bachelor's degree or higher by age 26. Table 2 and Figures 1 and 2 show the averages of each of our four educational outcomes by family type. The rank ordering by family type is the same for each outcome: the children from simple nuclear families do best, followed by complex nuclear families, and nonnuclear families.[19]

In our analyses we control for both family and child characteristics. For parents we include age, marital status, and indicator variables for educational level. These variables are all measured when the eligible child was born. For the years when the child is 0 to 18 years old, we also calculate the percentage of time that: i) the child lives in an urban location; ii) the mother is out of the labor force; iii) the father is out of the labor force; iv) the mother receives a disability pension; and v) the father receives a disability pension. For mothers' and fathers' annual earnings and for total household net financial wealth, we averaged variables measured over the years when the child was 7 to 18 years old. For children we include information on gender, month and year of birth, parity (i.e., birth order from the perspective of the mother), number of full siblings, and an indicator of whether the child moved to a different municipality during schooling age 6–18.

[19] Missing data on outcome variables is mainly due to exemption from being graded (Grades, Low Grades), and death or migration after the age of 18 (Drop Out, Bachelor's). Although we have 75,260 children registered as living with their parents until they are 18, we have the complete set of grades at age 16 for only 74,139.

Table 3 shows the descriptive statistics for the explanatory variables by the three family types. We see strong positive selection on these explanatory variables into simple nuclear families. As we move from simple nuclear families (NFo) to complex nuclear families (NF+) to nonnuclear families (NNF), the likelihood that parents were not married at the birth of the child increases. Mothers in nuclear families are much more likely than those in nonnuclear families to have at least some university education; 31% of mothers in simple nuclear families and 26% of those in complex nuclear families have at least some university education; in nonnuclear families, only 22% have any university education. As the education figures suggest, income and wealth are higher in simple nuclear families than in other family types.

4. Descriptive Regressions

We use the phrase "descriptive regressions" to characterize the patterns in the data. We begin by comparing educational outcomes of children from simple (NFo) and complex (NF+) nuclear families, controlling for household resources and observable parental and child characteristics. All of the children in our comparisons spent their entire childhoods in nuclear families. We use OLS and probit regressions to examine the association between fathers' MPF and our four indicators of children's educational outcomes: Grades, Low Grades, Drop Out, and Bachelor's. For child *i* consider the outcome equation

$$HC_i = \beta FS_i + \gamma W_i + \delta X_i + u_i$$

where HC_i measures a child's educational outcome, FS_i family and sibling structure, W_i observable parental characteristics, X_i individual child characteristics, and u_i is the error term.

Our first specification includes controls for gender, and birth year. Our second controls for gender, birth year, county of residence, and parents' education and age. Our third specification, which we call our "comprehensive specification," controls for gender, birth year, county of residence, parents' education and age, parity, labor force and disability status of the parents, household size, income, wealth, and mobility patterns. In the discussion that follows, we rely primarily on our comprehensive specification.

Table 4 reports estimates of the effect of fathers' MPF on children's educational outcomes. As we add control variables, the coefficients on fathers' MPF become smaller in magnitude, reflecting selection on observables. Fathers' MPF has substantial and significant detrimental effects on all four of our measures of children's educational outcomes. Estimates from the comprehensive specification indicate that fathers' MPF is associated with 10% of a standard deviation of lower grades (p<.001); a 3.2 ppt increase in the probability of having low grades (p<.001); a 3.9 ppt increase in the probability of dropping out of secondary school (p<.001); and a 5.2 ppt decrease in the probability of obtaining a bachelor's degree (p<.001).

Thus far we have referred to "children's educational outcomes" without distinguishing between boys and girls. Boys are less likely than girls to complete secondary school, less likely to go to college, and, for those who go to college, are less likely to graduate.[20] Our fourth specification augments our comprehensive specification by interacting the child's gender with fathers' MPF to investigate the effect of fathers' MPF on gender differences. When we augment our comprehensive specification by interacting gender (male=1) with NF+ families, we find (Table 4) that gender disparities in children's educational outcomes are not significantly affected by fathers' MPF.

5. Mechanisms of Disadvantage

[20] There is now an extensive literature on the gender gap in educational outcomes. See, for example, Autor and Wassermann (2013), Autor et al. (2019), Bailey and Dynarski (2011), Becker, Hubbard, and Murphy (2010), and DiPrete and Buchmann (2013). Falch, Nyhus, and Ström (2014) show that boys have worse educational outcomes than girls in Norway.

Economists, sociologists, and psychologists identify somewhat different mechanisms through which family structure might affect outcomes for children. Economists often treat family structure as a mechanism that facilitates parental investment – time and money – in children's human capital or as a proxy for such investments. For example, a father's financial responsibility for children in his first family might create resource competition between the children in his first family and those in his second family and thus reduce the resources available for investments in the human capital of the children in his second family.

Sociologists and psychologists have suggested that family structure could operate not only through resources but also through other mechanisms. For example, children from nuclear families might benefit from more consistent parenting, more supervision, more parental support, and more parental control than children from single-parent families (Cherlin and Furstenberg 1994; Hofferth and Anderson 2003) or blended families (Cherlin 1978), perhaps resulting in better educational and socio-economic outcomes.

Finally, the association between fathers' MPF and outcomes for children may reflect selection. For example, unobserved parental characteristics correlated with fathers' MPF may be associated with patterns of household resource allocation that favor parental consumption over investment in children's human capital, causing children to experience worse educational outcomes. Or, fathers' MPF may be associated with less competent or less devoted parenting or with more marital conflict.

In the following sections we discuss possible mechanisms underlying the substantial and statistically significant statistical association between fathers' MPF and children's educational outcomes. Because we limit our analysis to nuclear families, family stress due to union dissolution and family structure transitions cannot explain our results. We investigate three mechanisms:

"resource competition," "birth-order," and "selection." Although these mechanisms are not mutually exclusive, for expositional purposes we discuss them separately.

Resource competition posits that the children in the father's first family compete with the children in his second family for resources such as money, time, and attention. The underlying hypothesis is that the children in the first family drain away resources that would otherwise have gone to the children in the second family. Thus, the family beyond the household adversely affects the educational outcomes of the children in the father's second family. The resource competition hypothesis assumes that, on average, the NFo fathers and the NF+ fathers have the same preferences, beliefs, information, and parenting style, and attributes differences in children's educational outcomes to differences in the circumstances and opportunities facing these fathers, including their obligations to the children in their first families.[21]

Researchers have investigated the causal effects of birth order on children's outcomes (Black, Devereux, and Salvanes 2005, 2011, 2016; Hotz and Pantano 2015; Black, Grönqvist and Öckert 2017). The literature has established that first-born children in Norway have better educational outcomes than higher-order births (Black, Devereux, and Salvanes 2005). The literature focuses on birth order from the perspective of the mother (i.e., parity) and does not appear to have investigated birth order from the perspective of the father. In NF+ families, the oldest child in the nuclear family is the first-born child of the mother but, in the case of fathers' MPF, not the first-born child of the father. Our results may over-estimate the effect of father's MPF because we are comparing fathers' later-born children (those in NF+ families) with fathers' first-born children (those in NFo families).

[21] Economists model the allocation of household resources as determined by parents' preferences, beliefs, and information. Economists seldom discus parenting styles or practices. Notable exceptions are Cobb-Clark, Salamanca, and Zhu (2016), and Doepke and Zilbotti (2017, 2019).

The selection hypothesis posits that, on average, the NFo fathers and the NF+ fathers differ in unobserved characteristics, and that these differences explain the differences in children's educational outcomes. For example, the NF+ fathers may have different preferences, beliefs, information, or parenting styles than the NFo fathers. Perhaps the NF+ fathers are less willing to invest in their children or have less information about what constitutes effective parenting. According to the selection hypothesis, whether the father has a first family is only an indicator of his "type." In contrast, according to the resource competition hypothesis, the family beyond the household affects the educational outcomes of the children in the father's second family through its effect on resources.

6. Resource Competition

Norwegian child support law allows us to investigate whether resource competition between the children in fathers' first families and second families explains the association between fathers' MPF and children's educational outcomes. As discussed in section 3, Norwegian law requires noncustodial parents to pay child support for the children in their first families until those children reach the age of 18 or until they finish secondary school, usually at age 19.

Under the resource competition hypothesis, the connection between more children in the father's first family and educational outcomes for the children in his second family is straightforward: more children imply higher child support payments, and higher child support payments reduce the resources available to the children in the father's second family.[22] The connection with the age difference between the children from the father's first and second families involves an additional link. If the children in the two families are close in age, then the father must

[22] We thank Wendy Manning for suggesting these strategies for investigating the resource competition.

pay child support for a greater fraction of the years during which the children in his second family are growing up. A smaller age gap implies that resources will be stretched thinner than they would be if the age gap were larger. Hence, the resource competition hypothesis implies that when the age gap is smaller, educational outcomes for the children in the second family will be worse.

If there is one child in the father's first family and one child in his second family, we use the age difference (Δ) between them to construct an indicator of resource competition. Specifically, we use ($20 - \Delta$) to indicate the number of years the father is required to pay child support during which the child in the second family is 19 or younger.[23] This age-based indicator is associated with required child support payments but it may also be associated with unobserved voluntary transfers of money, time, and attention. If there are two or more children in the father's first family, we use the age differences (Δ_i) between each child in the father's first family and each eligible child in his second family; our indicator of resource competition with each eligible child is then the sum: $\Sigma (20 - \Delta_k)$. Finally, we investigate whether the father's income quartile, interacted with his MPF, is associated with the educational outcomes of children in his second family.[24] If the resource competition hypothesis is correct, we would expect fathers' MPF to be more harmful for the children of fathers in the lowest income quartile.[25] An alternative

[23] We only consider children in the father's first family who were younger than 20 when the first child in his second family was born.

[24] Some may argue that distance between the father's first and second families will affect child outcomes. Kalil, et al. (2011) found that proximity to a divorced father is associated with marginally worse educational outcomes for children from the father's first family. In our sample, we have information about the municipality in which the children live, but we do not observe the travel time or travel cost associated with visiting the children in the first family. Hence, it is difficult to identify how proximity to children in the first family affects outcomes for children in the second family. From the father's perspective, having a nonresident child living in a different economic region usually will imply that it is more costly and perhaps more time-consuming to maintain regular contact. This may adversely affect the resident child. On the other hand, fathers living far away from their nonresident children may increase the amount of time they spend with resident children and reduce the level of potential conflict with the previous partner. In estimates that are not reported, we found no effect of living in a different economic region than the nonresident half-siblings on educational outcomes for NF+ children.

[25] Løken, Mogstad, and Wiswall (2012) shows that income affects child outcomes near the bottom of the income distribution but not near the top.

hypothesis about the role of resources would focus on resource allocation within the household. If we had data on expenditure patterns or time use within the household, we could investigate whether total household resources were allocated differently in NFo families than in NF+ families. Norwegian registers, however, do not report expenditure patterns or time use.

6.1 Number of Children

The more children in the father's first family, the less time and money will be available for the children in his second family. If resource competition causes worse educational outcomes for the children in the father's second family, then more children in the father's first family should lead to worse outcomes. To test the number-of-children hypothesis, we add controls for one nonresident half-sibling or two or more nonresident half-siblings.[26] The average number of nonresident half-siblings in NF+ families is less than 2, with 70% of NF+ children having one nonresident half-sibling. We report the estimates from the simple and comprehensive specifications in Table 5. If resource competition explains our results, then the adverse effect of half-siblings should increase with the number of half-siblings. The results show that for all educational outcomes, the coefficient on two or more nonresident half-siblings is statistically significant and slightly larger than that for one nonresident half-sibling. However, we found that having two or more nonresident half-siblings was not significantly different than having only one nonresident half-sibling in NF+ families: both reduced educational outcomes compared with NFo children by a similar amount.

[26] Recall that if there is one joint child in the home, and the father has one child outside the home, he must pay 9% of his income in child support for his noncustodial child; if he has two children outside the home (3 children total), he must pay 16% of his income in child support for his noncustodial children.

6.2 Age Differences between Children

The closer in age the children in the father's first family are to those in his second family, the less time and money will be available for the children in the second family during their childhoods. If resource competition causes worse educational outcomes for the children in the father's second family, then more years of overlap with nonresident half-siblings under the age of 20 should lead to worse outcomes. However, if selection causes the worse outcomes of the children in fathers' second families, then these coefficients should not differ from one another. To test the age-difference hypothesis, we use the sum, Σ (20 - Δ_k), of age differences to half-siblings in the first family who were aged below 20 when the child in the second family was born. We included dummy variables for the total number of years of overlap (0–5, 6-–0, and 11+).[27] This provides a measure of the total amount of child support and the duration of that support during the childhood of the eligible child. If resource competition matters, we would expect the magnitude of the effect of half-siblings to increase with more years of overlap. In Table 6 we report the results for our comprehensive specification which includes a full set of controls. We tested whether the coefficients for 0–5, 6–10 and 11+ years differ significantly from one another. In nuclear families the probabilities of low grades, dropping out of secondary school, and having a bachelor's degree all increase in size the more financial responsibility a father has for nonresident half-siblings. The association between having nonresident half-siblings who are younger than 20 years old for 11+ years is largest and statistically significant for all four outcomes. However, the statistical tests fail to reject the null hypothesis that the effect of having half-siblings for 11+ years and 0–5 years is the same; the null hypothesis that 6–10 and 11+

[27] The dummy for 0–5 is one also if the father has a child from a previous relationship who is 20 or more years older than the eligible child.

years is the same; and the null hypothesis that having half-siblings for a total of 0–5 child years and 6–10 child years is the same.

6.3 Fathers' Income Quartile

We next investigate the effect of fathers' income quartile on children's educational outcomes. We include controls for income quartile and then interact it with fathers' MPF. The point estimates on fathers' MPF reported in Table 7 do not differ substantially from those reported in Table 4. None of the coefficients on fathers' income quartile interacted with fathers' MPF are statistically significant. Thus, fathers' income quartile provides no support for the resource competition hypothesis.

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Taken together, the results in this section do not support the hypothesis that resource competition explains the association between fathers' MPF and children's educational outcomes. Although there appears to be a larger adverse effect from having half-siblings who are closer in age, these results are not significantly different from having less resource competition from older half-siblings. Furthermore, fathers' income quartile has no effect on the MPF point estimates.

7. Birth Order

Next we consider whether birth order explains our results. Black, Devereux, and Salvanes (2005) have shown that first-born children in Norway have more education than later-born children. Black, Devereux, and Salvanes (2011) also show that first-born children have higher IQs, an outcome that is positively correlated with educational attainment. The oldest child in NF+ families is the first-born child of the mother but not the first-born child of the father. To see whether first-born effects are driving our MPF estimates, we divide the sample into the first-born children of the mother and the later-born children of both parents. The results are reported in Table 8. The first rows of Table 8 repeat our main results from Table 4 for ease of comparison. In the middle panel of Table 8 we limit the sample to first-born children. The coefficient estimates are remarkably similar in magnitude and statistical significance to the results for our full sample. NF+ children have worse educational outcomes than NFo children. In the bottom panel, we limit the sample to all later-born children. Comparing later-born children and our full sample estimates, we find that the coefficient estimates are quite similar for grades, low grades, and the probability of dropping out. That said we also find that the probability of obtaining a bachelor's degree is lower, perhaps reflecting the lower educational attainment of higher birth order NFo children.

8. Selection

Selection provides a third explanation of the worse educational outcomes experienced by children in complex nuclear families and thus an alternative to explanations based on resource competition and birth order. The simplest version of the selection hypothesis is that men who have children from previous relationships differ in unobserved characteristics from men who do not. A more complex version allows for the possibility that women who partner with men who have previous children differ in unobserved characteristics from women who partner with men who do not have previous children. We test the selection hypothesis in three ways. First, we focus on outcomes for children in simple nuclear families in which the fathers had previous childless marriages (section 8.1).[28] If the children in these men's second families experience

[28] We are grateful to David Ribar for suggesting this strategy.

worse educational outcomes than the children in other simple nuclear families, the explanation cannot be resources or birth order because none of these men had previous children. After controlling for observable differences in parents' characteristics, the observed differences in children's outcomes are attributable to selection (i.e., to unobserved differences in the men or in the women). Second, using an Oaxaca-Blinder decomposition, we investigate the extent to which the difference between children in simple and complex nuclear families reflects differences in the estimated coefficients rather than differences in the explanatory variables (section 8.2). Third, we use propensity score matching as an alternative method of controlling for selection on observables (section 8.3).

8.1 Fathers with Previous Childless Marriages

If selection is driving our MPF results, then fathers with previous childless marriages may have unobserved characteristics that cause their children in their second marriage – children who spent their entire childhoods in simple nuclear families – to experience worse educational outcomes. In our sample of 66,781 simple nuclear families we have 968 fathers with previous childless marriages.[29] For ease of comparison, in the top panel of Table 9 we repeat the estimates from our comprehensive specification (Table 4).

We report estimates of the effect of previously divorced fathers on their children's educational outcomes in the middle panel of Table 9. The estimates show that children with previously divorced fathers are 4.8 ppt more likely to have low grades ($p < .01$), 3.3 ppt more likely to drop out ($p < .05$), and 3.5 ppt less likely to obtain a bachelor's degree ($p < .05$). The

[29] We did not include in our analysis the 42 simple nuclear families in which both parents had previous childless marriages. In results not reported, we found that the added effect of having a second parent with a previous childless marriage was not significantly different from 0.

estimated effect of fathers' divorce on grades is one-third the size of the effect of fathers' MPF but is not statistically significant. Thus, children in simple nuclear families who fathers had previous childless marriages experience substantially and significantly worse educational outcomes that children whose fathers had no previous marriages. This is powerful evidence that selection on unobservables plays a crucial role.

We also investigate the children in simple nuclear families whose mothers had previous childless marriages (like all mothers in our nuclear families, these mothers had no previous children).[30] In our data 793 mothers had previous childless marriages. We report estimates of the effect of previously divorced mothers on their children's educational outcomes in the bottom panel of Table 9. Children of previously divorced mothers have grades that are 7.3 percent of a standard deviation lower ($p < .05$), indicating that mothers' previous divorce had an adverse effect on achievement. Children of previously divorced mothers are also 4.1 ppt ($p < .05$) less likely to obtain a bachelor's degree. The point estimates of the effect of mothers' previous divorces on the probability of low grades and dropout are positive but not statistically significant. We also tested whether the coefficients on previously divorced fathers and NF+ fathers were equal to one another and could only reject the null hypothesis for grades ($p<.104$). Although not direct evidence about why fathers' MPF is associated with worse educational outcomes for children, the results on mothers with previous childless marriages is further evidence of the importance of selection.

8.2 Oaxaca-Blinder Decomposition

[30] We are grateful to Richard Reeves for suggesting that we look at mothers with previous childless marriages.

We probed the selection explanation further by calculating a Oaxaca-Blinder decomposition to determine the extent to which differences in observable characteristics explain the worse educational outcomes of children in complex nuclear families. If the worse outcomes were explained by differences in observable characteristics, then this would argue against selection as the primary explanation. For each outcome, however, we find that differences in coefficients rather than differences in observable characteristics explain substantially larger fractions of the worse educational outcomes. Our estimates show that 81% of differences in test scores, 91% of differences in low grades, 74% of differences in not completing secondary school, and 56% of differences in completing a bachelor's degree are due to differences in estimated coefficients.

8.3 Matching Estimates

We estimate propensity score matching models to test whether we have failed to account fully for selection on observables. The matching estimator creates a sample of NFo children who are comparable on observed covariates to a sample NF+ children without imposing the functional form assumptions we used in our OLS and probit models. We implement propensity score matching in two stages. In the first stage we use a probit model to estimate the probability of being in an NF+ family conditional on observed characteristics. In the second stage we match children from NFo and NF+ families based on the similarity of the propensity score. Results are reported in Table 10. The first row repeats the marginal effect estimates from our comprehensive specification in Table 4 for ease of comparison. The second row uses propensity score methods and the full sample to estimate the effect of MPF of children's educational outcomes. All of the propensity score estimates have the same sign as the probit and OLS estimates and are statistically significant. The marginal effects and propensity score estimates in Table 10 are of the same magnitude for low grades and bachelor's degree. However, the propensity score estimates are almost twice the size of the marginal effects for grades and dropping out of high school.

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Taken together, the results in this section strengthen our conclusion that selection – that is, unobserved parental characteristics that affect both fathers' MPF and children's educational outcomes -- best explain why children in NF+ experience worse educational outcomes than children in NFo.

9. Conclusion

Until very recently, the family structure and family complexity literatures have been about household structure and household complexity. Because children generally remain with their mothers when their parents separate, most discussions have focused on mothers' MPF and ignored fathers'. Recent research on family complexity has investigated sibling structure but, in part because of data limitations, we know virtually nothing about the association between fathers' MPF and outcomes for children.

Using Norwegian register data, we investigated the association between fathers' MPF and the educational outcomes of the children in their second families when the second families were nuclear families -- households consisting of a man, a woman, their joint children, and no other children. Controlling for a rich set of socio-economic variables, we found that fathers' multiple-partner fertility is associated with substantially and significantly worse educational outcomes for children.

Why do children have worse educational outcomes when their fathers have children from another relationship living elsewhere? Family structure transitions and the stress than accompanies them are often invoked to explain outcomes for children in complex families, but this explanation is a nonstarter because we restricted our analysis to children who spent their entire childhoods in nuclear families. Competition for resources between the children in fathers' first and second families is a possible explanation, but we found only weak support for the resource competition hypothesis. Selection is a possible explanation: fathers who have children from another relationship living elsewhere may differ in unobserved characteristics from those who do not, and women who partner with these fathers may differ from those who do not. We found support for the selection hypothesis using the Oaxaca-Blinder decomposition and propensity score matching. We also examined the selection hypothesis by estimating whether children whose fathers had previous childless marriages experienced worse educational outcomes than children whose fathers did not have previous childless marriages and did not have children from another relationship living elsewhere. We found that children whose fathers had previous childless marriages experience worse educational outcomes and that their educational outcomes were very similar to those of children whose fathers had children from another relationship living elsewhere.

Taken together, we conclude that selection is the primary causal mechanism underlying the association between fathers' MPF and the worse educational outcomes experienced by children in complex nuclear families. Our results underscore the importance of unobserved parental characteristics as determinants of children's educational outcomes.

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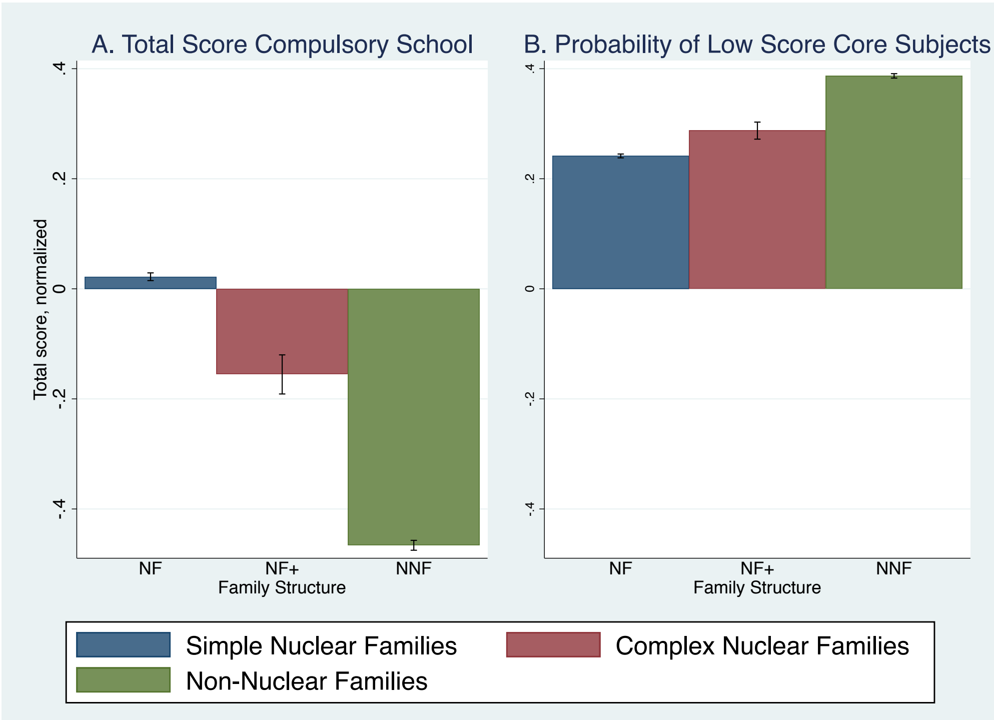

Fig. 1a
Normalized total exam scores by family structure.
Fig. 1b
Probability of low exam scores by family structure.

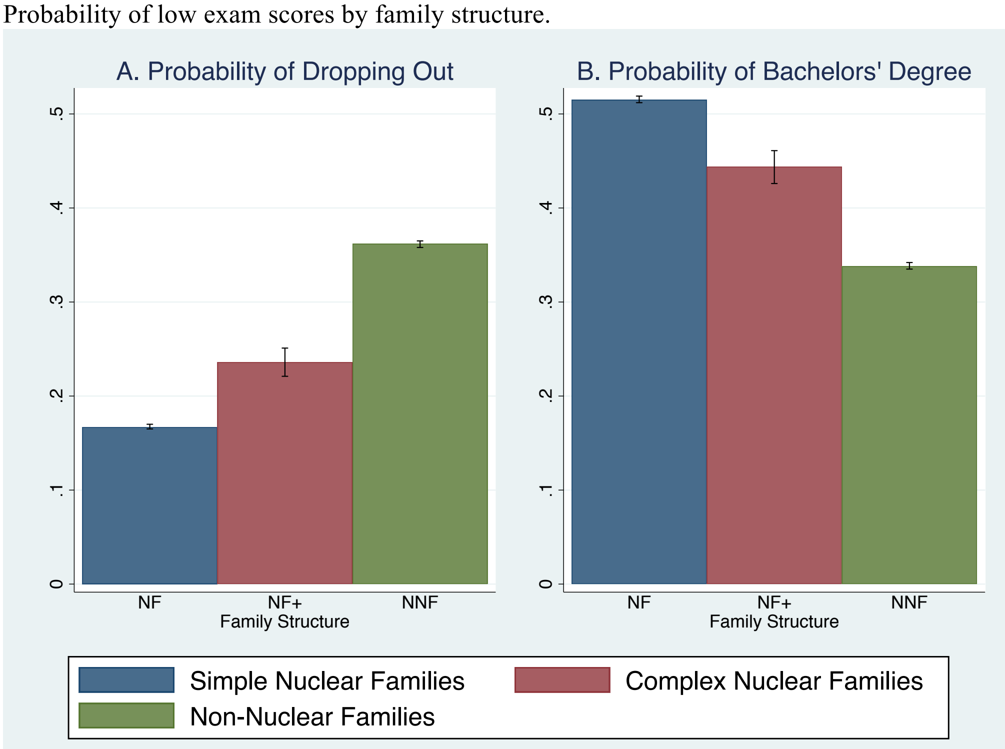

Fig. 2a
Probability of dropping out of secondary school by family structure.
Fig. 2b
Probability of obtaining a bachelor's degree by family structure.

Table 1: Family Type: Children, Full Siblings and Half-Siblings

# Children born in 1986–1988 by Norwegian born parents	146,923
# Children living with both biological parents until age 18	79,466
# Children in Simple Nuclear Families (NFo)	72,052
% no full siblings	2.7
% one full sibling	38.8
% two or more full siblings	58.5
# Children in Complex Nuclear Families (NF+)	3,208
% no full siblings	10.6
% one full sibling	46.6
% two or more full siblings	42.8
% one nonresident half-siblings	70.0
% two or more nonresident half-siblings	30.0
# Children in Nonnuclear families (NNF)	63,258
% no siblings	4.4
% no full siblings	26.0
% one full sibling	42.3
% two or more full siblings	31.7
% no half-sibling	51.7
% one half-sibling	18.4
% two or more half-siblings	29.9
% half-siblings both parents	17.0

Note: Complex defined as having at least one nonresident half-sibling.
4,199 children in nonnuclear families are dropped from our sample due to death before 18, lack of identity of the father and missing place of living (living abroad mostly). These are also exclusion criteria's used to select the nuclear children. We have also dropped 4,206 children who grew up with both parents in different kinds of blended families.

Table 2: Educational Outcomes by Family Type

Family type:	Outcome:	n	Mean	Std.Dev
Simple Nuclear	**Grades**	70,992	0.222	0.992
NFo	**Low Grades**	72,052	0.252	
	Dropout	71,910	0.172	
	Bachelor’s	71,930	0.513	
Complex Nuclear	**Grades**	3,147	-0.155	1.013
NF+	**Low Grades**	3,208	0.300	
	Dropout	3,201	0.240	
	Bachelor’s	3,202	0.442	
Nonnuclear	**Grades**	61,526	-0.466	1.120
NNF	**Low Grades**	63,258	0.403	
	Dropout	63,036	0.368	
	Bachelor’s	63,065	0.336	

Table 3: Descriptive Statistics for Covariates

	Nfo		NF+		NNF	
Variable	**Mean**	**Std.Dev.**	**Mean**	**Std.Dev.**	**Mean**	**Std.Dev.**
Parents cohabit at birth	0.134		0.296		0.451	
# Full Siblings	1.814	1.060	1.480	0.962	1.160	0.980
Age father	30.899	4.881	35.387	6.085	29.137	5.853
Age mother	28.414	4.522	29.248	4.599	26.104	5.038
Father's education:						
Primary school	0.178		0.255		31.18	
Some secondary	0.182		0.249		16.19	
Secondary school	0.329		0.270		31.46	
University/college	0.310		0.219		20.56	
Educ missing	0.002		0.006		0.61	
Mother's education:						
Primary school	0.264		0.296		37.19	
Some secondary	0.213		0.250		17.93	
Secondary school	0.215		0.190		21.58	
University/college	0.307		0.262		22.18	
Educ missing	0.001		0.003		0.4	
Earnings father	451.7	239.8	412.0	226.5	538.660	704.060
Earnings mother	210.1	119.9	226.5	127.6	363.130	344.003
Wealth household	1307.5	4945.9	1258.6	7060.6	1362.9	7437.6
Percent of Childhood:						
Urban area	75.116	42.361	74.921	42.182	78.529	38.621
Father no earnings	2.794	12.739	9.000	23.308	23.080	35,119
Mother no earnings	8.101	21.764	9.851	23.998	31.488	37.640
Mother disabled	2.624	12.768	8.061	22.186	2.299	10.465
Father disabled	3.780	15.569	5.445	18.566	2.013	11.001
Household size	4.683	0.968	4.352	0.875	na	
Family moved when child age 7-17	0.548		0.563		0.353	
Observations	72052		3208		63258	

Table 4: Estimates of Effect of Fathers' MPF on Children's Educational Outcomes

VARIABLES	Grades (1)	Grades (2)	Grades (3)	Grades (4)	Low Grades (1)	Low Grades (2)	Low Grades (3)	Low Grades (4)
Nuclear Family+	-0.182***	-0.141***	-0.099***	-0.115***	0.051***	0.045***	0.032***	0.045***
	[0.018]	[0.017]	[0.017]	[0.023]	[0.008]	[0.009]	[0.009]	[0.013]
Nuclear Family+ * Male				0.031				-0.021
				[0.032]				[0.015]
Constant	0.323***	-1.645***	-2.233***	-2.232***				
	[0.014]	[0.106]	[0.120]	[0.120]				
Observations	74,139	74,139	74,139	74,139	75,260	75,260	75,260	75,260
R-squared	0.079	0.257	0.278	0.278				

VARIABLES	Dropout (1)	Dropout (2)	Dropout (3)	Dropout (4)	Bachelor's (1)	Bachelor's (2)	Bachelor's (3)	Bachelor's (4)
Nuclear Family+	0.069***	0.062***	0.039***	0.035**	-0.077***	-0.071***	-0.052***	-0.064***
	[0.008]	[0.008]	[0.007]	[0.011]	[0.009]	[0.010]	[0.010]	[0.014]
Nuclear Family+ * Male				0.007				0.024
				[0.013]				[0.020]
Observations	75,111	75,111	75,111	75,111	75,132	75,132	75,132	75,132

Robust Standard errors in brackets. OLS estimates of Grades; Probit Estimates of Low Grades, Dropout and Bachelor's.
Probit coefficients are marginal effects. *** p<0.001, ** p<0.01, * p<0.05

Table 5: Estimates of Effect of Fathers' MPF on Educational Outcomes, Controlling for Number of Half-Siblings

VARIABLES	Grades (1)	Grades (3)	Low Grades (1)	Low Grades (3)	Dropout (1)	Dropout (3)	Bachelor's (1)	Bachelor's (3)
Nuclear Family	-0.183***	-0.095***	0.054***	0.032**	0.069***	0.039***	-0.077***	-0.046***
1 Half-sib	[0.021]	[0.019]	[0.010]	[0.010]	[0.009]	[0.009]	[0.011]	[0.012]
Nuclear Family	-0.179***	-0.112***	0.044**	0.032*	0.069***	0.041**	-0.075***	-0.068***
2+ Half-sibs	[0.033]	[0.031]	[0.015]	[0.015]	[0.014]	[0.014]	[0.016]	[0.018]
Constant	0.323***	-2.234***						
	[0.014]	[0.120]						
1 Half = 2+ Half		0.23		0.01		0.33		1.16
Sibs[a]		(0.632)		(0.974)		(0.865)		(0.305)
Observations	74,139	74,139	75,260	75,260	75,111	75,111	75,132	75,132
R-squared	0.079	0.278						

Probit Estimates of Low Grades, Dropout and Bachelor's. Probit coefficients are marginal effects.
OLS estimates of grades.
Robust Standard errors in brackets. *** $p<0.001$, ** $p<0.01$, * $p<0.05$
[a] Hypothesis test of difference in estimated coefficients with p-values in parentheses.

Table 6: Estimates of Effect of Fathers' MPF on Educational Outcomes, Controlling for Number and Years of Overlap with Nonresident Half-Siblings

VARIABLES	Grades (1)	Grades (3)	Low Grades (1)	Low Grades (3)	Dropout (1)	Dropout (3)	Bachelor's (1)	Bachelor's (3)
0–5 Years Overlap	-0.144***	-0.082*	0.025	0.013	0.051**	0.028	-0.044*	-0.039
With Half-sibs	[0.041]	[0.039]	[0.019]	[0.019]	[0.017]	[0.017]	[0.021]	[0.024]
6–10 Years Overlap	-0.151***	-0.081**	0.036*	0.023	0.050***	0.028*	-0.053**	-0.035*
With Half-sibs	[0.031]	[0.028]	[0.015]	[0.015]	[0.014]	[0.013]	[0.016]	[0.018]
11+ Years Overlap	-0.214***	-0.116***	0.069***	0.043***	0.087***	0.050***	-0.102***	-0.067***
With Half-sibs	[0.025]	[0.023]	[0.012]	[0.012]	[0.011]	[0.010]	[0.012]	[0.014]
Constant	0.323***	-2.231***						
	[0.014]	[0.120]						
0–5 Years = 6–10		0.00		0.18		0.00		0.02
Years Overlap [a]		(0.995)		(0.675)		(0.992)		(0.891)
6–10 Years = 11+		0.93		1.12		1.91		2.03
Years Overlap [a]		(0.335)		(0.290)		(0.167)		(0.154)
11+ years = 0–5		0.60		1.79		1.28		1.04
Years overlap [a]		(0.440)		(0.181)		(0.258)		(0.308)
Observations	74,139	74,139	75,260	75,260	75,111	75,111	75,132	75,132
R-squared	0.080	0.278						

Probit Estimates of Low Grades, Dropout and Bachelor's. Probit coefficients are marginal effects. OLS estimates of Grades.
Robust Standard errors in brackets. *** p<0.001, ** p<0.01, * p<0.05.
[a] Hypothesis test of difference in estimated coefficients with p-values in parentheses.

Table 7: Estimates of Effect of Fathers' MPF Interacted with Income Quartile

VARIABLES	**Grades (1)**	**Grades (3)**	**Low Grades (1)**	**Low Grades (3)**	**Dropout (1)**	**Dropout (3)**	**Bachelor's (1)**	**Bachelor's (3)**
Nuclear Family +	-0.123***	-0.085*	0.056**	0.047*	0.049**	0.039*	-0.060**	-0.056**
	[0.036]	[0.033]	[0.019]	[0.019]	[0.017]	[0.017]	[0.020]	[0.021]
Income Quartile 3	-0.211***	-0.002	0.078***	0.011*	0.044***	-0.007	-0.125***	-0.028***
	[0.010]	[0.009]	[0.005]	[0.005]	[0.005]	[0.004]	[0.005]	[0.006]
Income Quartile 2	-0.358***	-0.048***	0.124***	0.023***	0.085***	0.005	-0.196***	-0.054***
	[0.010]	[0.010]	[0.005]	[0.005]	[0.005]	[0.004]	[0.005]	[0.006]
Income Quartile 1	-0.513***	-0.103***	0.178***	0.044***	0.146***	0.029***	-0.278***	-0.097***
	[0.010]	[0.011]	[0.005]	[0.006]	[0.005]	[0.005]	[0.005]	[0.007]
Income Quartile 3	-0.031	-0.027	-0.012	-0.014	0.035	0.026	-0.006	0.001
*** Nuclear +**	[0.051]	[0.046]	[0.023]	[0.023]	[0.023]	[0.022]	[0.028]	[0.029]
Income Quartile 2	-0.071	-0.080	-0.022	-0.012	0.012	0.011	-0.004	-0.007
*** Nuclear +**	[0.050]	[0.046]	[0.022]	[0.022]	[0.020]	[0.020]	[0.027]	[0.029]
Income Quartile 1	-0.003	0.037	-0.020	-0.027	-0.003	-0.021	0.002	0.016
*** Nuclear +**	[0.047]	[0.043]	[0.021]	[0.020]	[0.018]	[0.016]	[0.026]	[0.027]
Constant	0.596***	-2.239***						
	[0.015]	[0.124]						
Observations	74,139	74,139	75,261	75,261	75,112	75,112	75,133	75,133

Robust Standard errors in brackets. OLS estimates of Grades. NS: Difference in estimated coefficients not statistically significant. Estimates of Low Grades, Dropout and Bachelor's. Probit coefficients are marginal effects.
*** p<0.001, ** p<0.01, * p<0.05

Table 8: Estimates of Effect of Fathers' MPF on Educational Outcomes, Sample Stratified by Birth Order

VARIABLES	Grades (1)	Grades (3)	Low Grades (1)	Low Grades (3)	Dropout (1)	Dropout (3)	Bachelor's (1)	Bachelor's (3)
Full Sample								
Nuclear Family+	-0.182***	-0.099***	0.051***	0.032***	0.069***	0.039***	-0.077***	-0.052***
	[0.018]	[0.017]	[0.008]	[0.009]	[0.008]	[0.009]	[0.009]	[0.010]
Constant	0.323***	-2.233***						
	[0.014]	[0.120]						
R-squared	0.079	0.278						
Observations	74,139	74,139	75,260	75,260	75,111	75,111	75,132	75,132
First-borns								
Nuclear Family+	-0.183***	-0.102***	0.050***	0.036**	0.065***	0.041***	-0.089***	-0.074***
	[0.025]	[0.024]	[0.012]	[0.012]	[0.011]	[0.011]	[0.013]	[0.016]
Constant	0.440***	-2.698***						
	[0.021]	[0.190]						
R-squared	27,627	27,627	28,040	28,040	27,984	27,979	27,993	27,993
Observations	0.082	0.275						
Later-borns								
Nuclear Family+	-0.214***	-0.099***	0.062***	0.028*	0.078***	0.037***	-0.076***	-0.031*
	[0.025]	[0.023]	[0.012]	[0.012]	[0.011]	[0.010]	[0.012]	[0.014]
Constant	0.251***	-2.174***						
	[0.018]	[0.195]						
R-squared	46,512	46,512	47,220	47,220	47,127	47,127	47,139	47,139
Observations	0.080	0.275						

Probit Estimates of Low Grades, Dropout and Bachelor's. Probit coefficients are marginal effects.
OLS estimates of grades. Propensity Score Matching using Probit first-stage.
Robust Standard errors in brackets. *** p<0.001, ** p<0.01, * p<0.05

Table 9: Estimates of Effect of Fathers' MPF on Educational Outcomes, Nuclear Families Compared with Results for Previously Divorced Fathers & Mothers

VARIABLES	Grades (1)	Grades (3)	Low Grades (1)	Low Grades (3)	Dropout (1)	Dropout (3)	Bachelor's (1)	Bachelor's (3)
Full Sample								
Nuclear Family+	-0.182***	-0.099***	0.051***	0.032***	0.069***	0.039***	-0.077***	-0.052***
	[0.018]	[0.017]	[0.008]	[0.009]	[0.008]	[0.009]	[0.009]	[0.010]
Constant	0.323***	-2.233***						
	[0.014]	[0.120]						
R-squared	0.079	0.278						
Observations	74,139	74,139	75,260	75,260	75,111	75,111	75,132	75,132
Previously Divorced Fathers								
Previously Divorced	0.055	-0.034	0.011	0.048**	0.013	0.033*	0.035*	-0.035*
Fathers	[0.032]	[0.029]	[0.014]	[0.016]	[0.013]	[0.013]	[0.016]	[0.018]
Constant	0.325***	-2.217***						
	[0.014]	[0.123]						
R-squared	0.079	0.279						
Observations	70,904	70,904	71,961	71,961	71,819	71,819	71,839	71,839
Previously Divorced Mothers								
Previously Divorced	0.080*	-0.073*	-0.024	0.029	-0.014	0.022	0.056**	-0.041*
Mothers	[0.034]	[0.031]	[0.015]	[0.018]	[0.013]	[0.015]	[0.018]	[0.020]
Constant	0.325***	-2.220***						
	[0.014]	[0.123]						
R-squared	0.079	0.279						
Observations	70,904	70,904	71,961	71,961	71,819	71,819	71,839	71,839

Probit Estimates of Low Grades, Dropout and Bachelor's. Probit coefficients are marginal effects.
OLS estimates of grades.
Robust Standard errors in brackets. *** p<0.001, ** p<0.01, * p<0.05. Regressions drop 84 families (91 children) where both parents have been previously divorced.

Table 10: Estimates of Effect of Fathers' MPF on Educational Outcomes, Propensity Score Estimates

VARIABLES	Grades	Low Grades	Dropout	Bachelor's
Full Sample				
Nuclear Family+	-0.099***	0.032***	0.039***	-0.052***
	[0.017]	[0.009]	[0.009]	[0.010]
Constant	-2.233***			
	[0.120]			
R-squared	0.278			
Propensity Score Full Sample				
Propensity Score	-0.192***	0.040**	0.064***	-0.049**
	[0.035]	[0.015]	[0.014]	[0.016]
Observations	74,139	75,260	75,111	75,132

Probit Estimates of Low Grades, Dropout and Bachelor's. Probit coefficients are marginal effects. OLS estimates of grades.
Propensity Score Matching using Probit first-stage.
Robust Standard errors in brackets. *** p<0.001, ** p<0.01, * p<0.05.