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ABSTRACT

Fathers' multiple-partner fertility (MPF) is associated with substantially worse educational outcomes for children. 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. Children with MPF fathers are more likely than other children from nuclear families to drop out of secondary school (24% vs 17%) and less likely to obtain bachelor's degrees (44% vs 51%). These gaps remain substantial after controlling for child and parental characteristics such as income and wealth, education and age: 4 percentage points (ppt) for dropping out of secondary school and 5 ppt for obtaining a bachelor's degree. Resource competition with the children in the father's first family does not explain the differences in educational outcomes. We find that the association of having a father who had a previous childless marriage is similar to the association of fathers' MPF and argue that this suggests that selection plays the primary role in explaining the association between fathers' MPF and children's 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 alike: in some nuclear families one of the parents, usually the father, has children from a previous relationship living elsewhere.

We investigate the association between fathers' multiple partner fertility (MPF) and the educational outcomes of the children in fathers' "second families."[2] In order to isolate the effect of MPF in absence of family structure transitions we restrict our attention to second families that are nuclear families. All of the children we consider 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 substantially worse educational outcomes for the children in the fathers' second families.

Although MPF is 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. Outcomes for children in blended families – households consisting of the parents, their joint children, and at least one nonjoint child – have been extensively studied; see, for example, Ginther and Pollak (2004), Gennetian (2005), and Halpern-Meekin and Tach

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[1] The US 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.

[2] We refer to the nuclear family as a "second family," although 6% of the MPF fathers have children with more than two women.

(2008). But because children usually remain with their mothers when unions dissolve, blended families typically include the mother's children from previous relationships but not the father's. Because most US data sets are household-based, they often do not report whether the father has children from other relationships unless those children live in the household under study.

We investigate both short-term and long-term educational outcomes associated with fathers' MPF. Several studies have examined the association between family structure and children's educational outcomes (see for example, Ginther and Pollak 2004, Gennetian 2005, Björklund et al. 2007, McLanahan and Sandefur 1994, Steele et al. 2009). A meta-analysis finds that fathers' involvement contributes significantly to children's educational outcomes (Jeynes 2015). Ours is the first study to examine whether fathers' MPF has a significant association with children's adult outcomes. To investigate the association between fathers' MPF and the 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 requires a data set that follows children far enough into adulthood to investigate both high school and college graduation. No US data follows children into early adulthood in sufficient numbers to support this kind of analysis. For example, the PSID does not include enough MPF fathers to provide the data needed to investigate the association of fathers' MPF with college graduation or even high-school graduation of children in fathers' second families.[3]

We use Norwegian register data which provides information about all of the 147,000 children born in Norway in 1986, 1987, and 1988. The large sample size provided by population registers allows us to explore several potential explanations for the association between fathers'

[3] In the PSID we identified 1402 children in fathers' second families where the father had been married for twenty or more years. To investigate college graduation, we would need to observe these children to their mid-20s, but only 133 of these children are observed in their mid-20s. To investigate high school graduation, we could relax the age restriction to age 21, but this would add only 31 more children.

MPF and children’s educational outcomes. We analyze the educational outcomes of those children who spent their entire childhoods in nuclear families – more than 75,000 children. We observe all of the children in our study until they reach the age of 26.

Several researchers have used Norwegian register data to gain a better understanding of the association between birth order and various outcomes (Black et al. 2005, 2011, 2016, 2018; Lillehagen and Isungset 2020), the impact of proximity of divorced fathers to their children (Kalil et al. 2011), and the effect of family disruptions on child outcomes (Steele et al. 2009). Given that father’s MPF can be linked to each child’s educational outcome for an entire cohort of children we can estimate the impact of MPF net of other types of family complexity. By restricting our analysis to children who spent their entire childhoods in nuclear families, we isolate the association between fathers’ MPF and children’s educational outcomes in a simple, transparent family environment without imposing untestable a priori restrictions. By limiting the sample to children who spent their entire childhoods in nuclear families, we rule out family structure transitions as the cause of the worse educational outcomes experienced by the children in fathers’ second families. This is only possible with a very large data set such as that found in the Norwegian registers.

We call nuclear families in which fathers have children from another relationship “complex nuclear families” and denote them by NF+; we call families in which fathers do not have such children “simple nuclear families” and denote them by NFo. We find that children from complex nuclear families experienced substantially worse educational outcomes. We decompose the difference between the educational outcomes of children in complex and simple nuclear families into the effect of fathers' MPF and the effect of differences in covariates such as income and wealth, education and age. For each of the four educational outcomes we consider, we find that the effect of fathers' MPF accounts for most of the difference in outcomes between complex and simple nuclear families.

Our data allow us to investigate two mechanisms that may explain the worse educational outcomes experienced by the children in fathers’ second families. The “resource competition hypothesis” postulates that the children in fathers' first families compete with the children in their second families for resources. We find little support for this explanation. We also investigate the “later birth hypothesis” and find very little support for this explanation.

Although Furstenberg (2014) argues that we should avoid rushing to judgment about the “causal effect” of family complexity on children’s outcomes, for the type of family complexity we investigate our analysis points to the dominant role of selection (i.e., unobserved characteristics that affect both fathers’ MPF and child outcomes). We find that the association between educational outcomes of having a father with a previous childless marriage is similar to the association of having a father with MPF. This is strong evidence that the unobserved characteristics of the father rather than competition for resources or later birth causes the children in the second families of the MPF fathers 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 prevalence of fathers’ MPF and what is known about the association between fathers’ MPF and outcomes for children. We also discuss two mechanisms through which fathers’ MPF might affect child outcomes as well as the possible role of selection. Section 3 describes schooling and child support in Norway, our data, our outcome variables, and our explanatory variables. In section 4 we describe the association between fathers’ MPF and children's educational outcomes, controlling for a rich set of socio-economic covariates. Sections 5 investigates resource competition and section 6 birth order as possible mechanisms by which fathers' MPF might affect child outcomes. Section 7 investigates the selection hypothesis, finding evidence that the association between fathers' MPF and children's educational outcomes is primarily due to selection. Section 8 concludes.

2. The Literature on Fathers' Multiple Partner Fertility

It is easier to measure the prevalence of MPF than its effects. Using the National Survey of Family Growth, Guzzo (2014) finds that in the United States 13% of men and 19% of women aged 40-44 have had children with more than one partner.[4] But not all men are fathers and not all fathers have two or more children, so alternative measures of MPF also convey important information. For example, Guzzo reports that 17% of fathers and 22.5% of fathers with two or more children have had MPF.[5]

For Norway, Lappegård and Rønsen (2013) analyze socioeconomic differences in fathers' MPF for men born between 1955 and 1984 using individual-level register data for the period 1971-2006. On average, 8% of fathers in their sample have a multipartner second birth. Since a large fraction of the cohorts in their study were still relatively young, the numbers are not directly comparable to those calculated by Guzzo for the US. We use Norwegian register data and focus on MPF by age 45 for men and women born in 1968-1970. We find that 11% of men and 14.5% of women have had children with more than one partner. Restricting our attention to

[4] 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 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 in the US it is associated with economic disadvantage. Many of the results from the previous literature on father's MPF in the US rely on the Fragile Families data based on children born in cities with populations over 200,000 whereas our data are based on the 1986, 1987, and 1988 birth cohorts of Norwegian children. Lappegård and Rønsen (2013) found that low-income and high-income men in Norway were more likely to have MPF.

[5] Guzzo and Dorius (2016) provide a table summarizing studies of the prevalence of MPF in the United States. Joyner et al. (2012) discusses the difficulty of measuring male fertility; Amorim and Tach (2019) provide additional evidence.

fathers, we find that MPF prevalence rises to 14%. The corresponding number for mothers is 16.5%. The prevalence of MPF among the fathers of the children in our study is considerably lower, approximately 4.3%. This is not surprising, as these are fathers of children who spent their entire childhoods in nuclear families.

2.1 Fathers' Multiple Partner Fertility and Outcomes for Children

Fomby et al. (2016) and Fomby and Osborne (2017) use US Fragile Families data to analyze children's aggressive behavior when they enter school but the Fragile Families children are not yet old enough to allow us to analyze outcomes such as college or even high school graduation. Carlson and Furstenberg (2007) also use Fragile Families data to analyze mother's and father's MPF in the first three years of a child's life. They find that father's MPF has a negative effect on his investment of time and money in his current parenting relationship. Carlson and Furstenberg (2007) find fewer negative effects associated with mother's MPF. Other researchers have examined the effects of family disruption and complexity in Norway and Sweden. Steele et al. (2009) finds that family disruption is adversely associated with children's educational outcomes in Norway, and Björklund et al. (2007) finds that the association between family complexity and children's education and income outcomes is very similar in Sweden and the United States.

2.2 Mechanisms of Disadvantage

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

We investigate two mechanisms, “resource competition” and “later birth,” that may underlie the substantial and statistically significant association between fathers’ MPF and children’s worse educational outcomes. The resource competition hypothesis 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. That is, the children in the first family drain away resources that would otherwise have gone to the children in the second family. Thus, the resource competition hypothesis implies the family beyond the household adversely affects the educational outcomes of the children in the father's second family. An underlying assumption is that, on average, NFo fathers and NF+ fathers have the same preferences, beliefs, information, personalities, and parenting styles. Thus, the resource competition hypothesis attributes differences in children's educational outcomes not to differences in the fathers themselves but to differences in the circumstances facing MPF fathers, for example, their child support obligations to the children in their first families.[6] Using the Fragile Families data, Carlson and Furstenberg (2007) found evidence of resource competition leading to disadvantage in fathers' second families.

The later birth hypothesis implies that estimates are likely to misattribute to fathers' MPF the effect of birth order because they compare the later-born children of some fathers (those in NF+ families) with the first-born children of other fathers (those in NFo families). That is, in NF+ families, the oldest child in the father's second family is the first-born child of the mother but not the first-born child of the father. Researchers have investigated the causal effects of birth order on children's outcomes (Black et al. 2005, 2011, 2016, 2018; Hotz and Pantano 2015; Bertoni and Brunello 2016). The literature has established that first-born children in Norway have better educational outcomes than higher birth order children (Black et al. 2005). This older literature focuses on parity (i.e., birth order from the perspective of the mother) and does not appear to have investigated birth order from the perspective of the father. Using Norwegian data, Lillehagen and Isungset (2020) investigate birth order from the perspective of the father. They find that children born to MPF fathers have better educational outcomes compared to their older half-siblings. They conclude that maternal resources may be contributing to negative birth order effects.

2.3 The Selection Hypothesis

Investigating the association between family instability and child outcomes, Fomby and Cherlin (2007) write, "The association between multiple transitions and negative child outcomes

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[6] Economists model the allocation of household resources as determined by parents' preferences, beliefs, and information. Economists seldom discus personality or parenting style. Exceptions include Lundberg (2012) which finds that extraversion and openness to experience are associated with an increased probability of divorce, and Cobb-Clark et al. (2019) and Doepke and Zilbotti (2017, 2019) which analyze parenting style.

does not necessarily imply that the former causes the latter. In fact, multiple transitions and negative child outcomes may be associated with each other through common causal factors reflected in the parents' antecedent behaviors and attributes. We call this the *selection hypothesis*." (Italics in the original.) McLanahan et al. (2013, p. 422), concluding their analysis of the "causal effects of father absence," write: "Despite the robust evidence that father absence affects social-emotional outcomes throughout the life course, these studies also clearly show a role for selection in the relationship between family structure and child outcomes." Furstenberg (2014) also emphasizes the importance of selection in addressing family complexity: "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.

In the context of fathers' MPF, the selection hypothesis posits that, on average, the NFo fathers and the NF+ fathers differ in both observed and unobserved characteristics, and that these differences account for the observed differences in children's educational outcomes. Net of controlling for observables, the selection hypothesis suggests that 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. These unobserved characteristics may include preferences, beliefs, information, personalities, or parenting styles. Perhaps the NF+ fathers are less inclined to invest in their children or have different beliefs about what constitutes effective parenting. Or perhaps fathers' MPF is associated with less competent or less devoted parenting, less investment in personal relationships with mothers and children or with more marital conflict. According to the selection hypothesis, whether the father has a first family is an indicator of these or other unobserved underlying characteristics – in the jargon of economics, of the father's "type." These underlying characteristics such as preferences, beliefs, or information may operate through mechanisms involving household expenditure patterns or the allocation of goods and time within the household. If we had data on household expenditure patterns or, better yet, detailed data on the allocation of goods and time within the household, we could investigate whether there were differences in resource allocation in NFo families compared with NF+ families. By doing so, we might learn more about why the children in NF+ families experience worse educational outcomes than those in NFo families. Administrative data however, such as the Norwegian registers, report neither household expenditure patterns nor the allocation of goods and time within households.

3. The Norwegian Context, Family Types, and Covariates

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 policy objective in Norway and in most other OECD countries (Lamb and Markussen 2011). In

Norway, between 97% and 98% of children graduating from compulsory school in 2002–2004 (children born in 1986–1988) enrolled in secondary education, but only about 70% of each cohort had completed secondary education five years later (Falch et al. 2014). Although the returns to schooling are lower in Norway than in the US (Dolton et al. 2009), completed formal education is increasingly important for earnings prospects given the effect of international trade and technological change in lowering the demand for low-skilled workers.

Parents with children from a previous relationship either pay or receive child support for the children from the previous relationship depending on whether they have physical custody or not. The Norwegian registers do not provide information about custody arrangements, but they do report household composition, including the presence of half-siblings; because we restrict our attention to nuclear families, no half-siblings are reported as being present in the households we consider. Hence, we infer that the children from fathers' previous relationships live in another household. In addition, MPF fathers were legally obligated to pay child support (Tjøtta and Vaage 2008).[7] If a noncustodial parent refuses to pay child support it will be collected by the government via payroll deduction. The child support formula depended on the noncustodial parent's ability to pay (income) and on the number of custodial and noncustodial children.[8] 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,

[7] Daily physical custody is granted to the parent with whom the child lives most of the time. Equally shared physical custody, in the sense that the children live approximately 50% of the time with each parent, is possible, but was uncommon in the 1980s and 1990s when the children in our sample grew up. The 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 showing that among nonresident fathers about 60% have a written or oral agreement about contact with the child and 57% of the nonresident fathers report having met with the children within the last week. Tjøtta and Vaage (2008) provide a comprehensive description of the Norwegian child support system.

[8] 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 youngest of whom were aged 15-16 when these changes were implemented.

and the noncustodial parent's income. More specifically, the formula specifies a percentage of the noncustodial parent's gross income as a function of his or her total number of children (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 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.[9] The child support formula implies that noncustodial parents make substantial financial transfers to the children in their first families.

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.[10]

3.1 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

[9] College tuition is not a major expense in Norway: most Norwegian colleges and universities charge modest fees and do not charge tuition. Child support paid was deducted from the taxable income of the noncustodial parent and child support received was taxable income of the custodial parent. Until 2002 the noncustodial parent also had to pay travel costs related to visits of nonresident children.

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

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, 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 in each year from birth until age 18.[11]

By an "eligible child" we mean a child who spent his or her entire childhood in a nuclear family.[12] We include all eligible children in our analysis rather than selecting one "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.[13] The nuclear second family can be a married or cohabiting union. Data on marriage is available for all years, but data on cohabitation is only available starting in 1986. 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. By restricting our attention to nuclear families, we ensure that the eligible child experienced no family structure

[11] In Ginther et al. (2019), a previous version of this paper, we erroneously wrote that for children under the age of 10, the Norwegian register data do not enable us to distinguish between those who lived in nuclear families and those who lived in blended families before age 10. Contrary to what we wrote in Ginther et al. (2019), the Norwegian register data do enable us to distinguish between children in nuclear families and those in blended families at every age from birth until age 18. We used this information in the estimates reported in Ginther et al. (2019) and in this paper.

[12] To avoid repeating the cumbersome phrase "eligible child or children" we use "eligible child" as a shorthand, recognizing that about 8% of families in our sample have more than one eligible child.

[13] Our definition of a nuclear family excludes families with adopted children.

transitions. This allows us to rule out family structure transitions as an explanation for the worse educational outcomes associated with fathers' MPF. We use the following taxonomy 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.[14]
- 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 who was not a joint child of her biological parents and, hence, not her full sibling. For example, in a single parent family, a blended family, or a nonparental family (e.g., with grandparents).[15]

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. We begin with the 1986 birth cohort because it is the earliest cohort for which we have complete information about household composition. We end with the 1988 birth cohort because we want

[14] Strictly speaking, "living elsewhere" is redundant. If a child from another relationship were living in the household, it would not be a nuclear family

[15] While it is possible to examine father's MPF in NNF we do not include these children in our study because the additional family complexity makes it difficult to investigate potential causal mechanisms.

to follow all of the children into young adulthood to obtain information on completed higher education and 2015 is the latest year for which we have observations.

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% did not.[16] Of the 54% who grew up with both biological parents, 95% grew up in nuclear families and 5% grew up in blended families. 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, in 66,781 families) and somewhat more than 4% grew up in complex nuclear families (NF+=3,208, in 2,983 families).[17] Of the 2,983 fathers with MPF, 70% (2,082) have only one child from a previous relationship and of those 929 (45%) were previously married. There are 901 fathers with more than one child from a previous relationship and 810 (90%) of them were previously married. Only 176 of those with two or more children (6% of fathers with MPF) had them with more than two women.

3.2 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 receive grades ranging from 1 (lowest) to 6 (highest) in 11 subjects. Our first measure, *Grades*, is a normalized variable calculated by standardizing 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

[16] Just under half of children in nonnuclear families (48%) had half-siblings.
[17] The remaining 5.3% (N=4,206) 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.

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, *Dropout*, is an indicator variable for not completing secondary school by age 22.[18] 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 Figure 1 shows the averages of each of our four educational outcomes by family type. For each educational outcome: the children from simple nuclear families do best, followed by those from complex nuclear families, who are followed by those from nonnuclear families.[19]

We use previous studies to guide our choice of covariates in the regressions (Ginther and Pollak 2004, Björklund et al. 2007). Our goal is to control for observable inputs associated with children's educational outcomes including parental educational attainment, earnings, and other relevant factors. Variables such as parents' marital status, age, and education are 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 income (sum of earnings, capital income and transfers) and for 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

[18] Thus, "Dropout" includes both children who entered secondary school and failed to graduate by age 22 and the small number (less than 3%) who did not enter secondary school.

[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 (Dropout, 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.

the mother), number of full siblings, and an indicator of whether the child moved to a different municipality during schooling age.

Table 3 shows the descriptive statistics for the explanatory variables as we go from simple nuclear families to complex nuclear families to nonnuclear families. We see systematic differences in these explanatory variables: 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 be college or university graduates; 31% of mothers in simple nuclear families and 26% of those in complex nuclear families were college or university graduates; in nonnuclear families, only 22% were college or university graduates. As the education figures suggest, income and wealth are higher in simple nuclear families than in other family structures.[20]

4. Descriptive Regressions

In this section we use "descriptive regressions" to summarize the patterns in the data; in the two following sections we discuss causal mechanisms. We start by comparing educational outcomes of children from simple (NFo) and complex (NF+) nuclear families, controlling for observable household, parent, 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 measures of children's educational outcomes: Grades, Low Grades, Dropout, and Bachelor's. For child *i* consider the outcome equation

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

[20] The NNF measures of income and wealth are not directly comparable to NF and NF+ families because they are the sum of income and wealth of two parents who do not live together. NNF families have the highest values of income and wealth, but the standard deviations are also larger. This is likely the result of divorced women working more and earning more income.

where HC_i measures a child's educational outcome (HC = human capital), 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, percentage of time a child lives in an urban location, 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. We use this comprehensive specification to control for observable characteristics that may be associated with MPF. In our discussion, we rely primarily on the comprehensive specification.

Children in NF+ experience worse educational outcomes than children in NFo. Table 4 reports estimates of the association between of fathers' MPF on our four educational outcomes. As we add control variables, our estimates of the effects of fathers' MPF become smaller in magnitude, but even with our comprehensive specification (specification 3) fathers' MPF still accounts for a substantial part of the differences in all four of our measures of children's educational outcomes.[21]

We focus on the two long-term outcomes, Dropout and Bachelor's.[22] The descriptive statistics in Table 2 show that Dropout for NF+ is 24%, while for NFo it is 17%, and Bachelor's for NF+ is 44%, while for NFo it is 51%. These differences reflect both the effect of fathers' MPF and differences in covariates. The covariates exacerbate the adverse effects of fathers' MPF: NF+

[21] We also estimated propensity score matching models to determine whether our results were robust to this alternative estimation method for selection on observables. In unreported results, we found that the effects of NF+ have the same sign and significance using matching models as with the descriptive regressions.

[22] Estimates from the comprehensive specification indicate that fathers' MPF is associated with 10% of a standard deviation lower grades (p<.001) where the rate for NFo is 0.022 and with a 3.2 ppt increase in the probability of having low grades (p<.001) where the rate for NFo is 0.258. Using Add Health data, Lei and Lundberg (2020) find that grades are not good predictors of long-term educational outcomes for boys.

families have less education and less income than NFo families. For example, in NF+ 26% of the mothers were college graduates, while in NFo 31% were college graduates; for fathers, the gap in college graduation rates was even greater. Controlling for the full set of covariates in specification 3 of Table 4, fathers' MPF is associated with a 3.9 ppt ($p < .001$) increase in Dropout and a 5.2 ppt ($p < .001$) decrease in Bachelor's.

We can use our estimates to calculate a counterfactual prediction of what Dropout and Bachelor's would have been for children from families with the same covariates as NF+ but in which the fathers did not have children from another relationship (see Appendix Table A1). Our estimates imply that Dropout for NFo families evaluated using the covariates of NF+ families would be 20%, which is 3 ppt greater than Dropout for children in NFo. The counterfactual prediction for Bachelor's is 48%, which is 2 ppt less than for children in NFo. These counterfactual predications show that although the worse educational outcomes of the children in NF+ families are attributable to both fathers' MPF and to differences in the covariates, the primary factor is fathers' MPF.

We have thus far referred to "children's educational outcomes" without distinguishing between boys and girls, although 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 et al. (2010), and DiPrete and Buchmann (2013). Falch et al. (2014) show that boys have worse educational outcomes than girls in Norway: boys are less likely than girls to complete secondary school, less likely to go to college and, for those who go to college, less likely to graduate. To investigate the association between fathers' MPF and gender differences, our fourth specification augments the comprehensive specification by interacting the child's gender with fathers' MPF. When we interact 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. Resource Competition

5.1 Number of Children

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 imply less resources available to the father's second family.[23] The connection between the age overlap of 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 pay child support for a greater fraction of the years during which the children in his second family are growing up. A larger age overlap implies that resources will be stretched thinner than they would be if the age overlap were smaller. Hence, the resource competition hypothesis implies that when the age overlap is larger, educational outcomes for the children in the second family will be worse.

To test the number-of-children hypothesis, we add controls for one nonresident half-sibling or two or more nonresident half-siblings.[24] 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 estimated adverse effect of half-siblings should increase with the number of half-siblings. The results show that for all educational

[23] We are grateful to Wendy Manning for suggesting these strategies for investigating the resource competition.
[24] 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.

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: one half-sibling and two-half siblings reduced educational outcomes compared with NFo children by similar amounts.

5.2 Age Overlap between Children

Norwegian child support law allows us to quantify these differences in child support and 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.

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 - Δ) 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.[25] This age-based indicator is associated with legally 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: Σ (20 - Δ_k). Finally, we investigate whether the father's income quartile, interacted with his MPF, is associated with the educational outcomes of children

[25] 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.

in his second family.[26] 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.[27]

To test the age-overlap hypothesis, we use the sum of age differences between half-siblings in the first family who were aged below 20 when the child in the second family was born, Σ (20 - Δ_k). We included dummy variables for the total number of years of overlap (0–5, 6––0, and 11+).[28] 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 estimated 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 having half-siblings for 11+ years and 0–5 years is the same; the null hypothesis

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[26] 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.

[27] Løken et al. (2012) shows that income affects child outcomes near the bottom of the income distribution but not near the top.

[28] The dummy for 0–5 is also 1 if the father has a child from a previous relationship who is 20 or more years older than the eligible child.

that 6–10 and 11+ 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.

5.3 Fathers' Income Quartile

We next investigate the association between fathers' income quartile and children's educational outcomes. We include controls for income quartile and then interact it with fathers' MPF. These regressions estimate the association between income and children's educational outcomes. The highest income quartile is the omitted category. As income decreases relative to the highest levels, the lower income quartiles are associated with worse educational outcomes. Furthermore, 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 larger adverse effects 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, while higher income is associated with improved educational outcomes, fathers' income quartile interacted with MPF has no effect on the MPF point estimates.

6. Birth Order

Next we consider whether birth order explains our results. Black et al. (2005) have shown that first-born children in Norway have more education than later-born children. Black et al. (2011) also show that first-born children have higher IQs, an outcome that is positively correlated with educational attainment. Lillehagen and Isungset (2020) consider birth order from fathers' perspective. 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. 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, the coefficient estimate for obtaining a bachelor's degree is lower, perhaps reflecting the lower educational attainment of higher birth order NFo children.

7. Selection

The selection hypothesis provides an alternative to the resource competition and birth order hypotheses as an explanation of the worse educational outcomes experienced by NF+ children. 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 may differ in unobserved characteristics from women who do not. Because our data do not allow us to distinguish among these two versions of the selection hypothesis, we treat them as a single hypothesis.

We test the selection hypothesis in two ways. First, we investigate outcomes of children in simple nuclear families in which the fathers had previous childless marriages (section 7.1).[29] If the children in these men's families experience worse educational outcomes than the children in other simple nuclear families, the explanation cannot be resource competition or birth order because none of these men had previous children. Nor can the explanation be alimony and spousal support because these are sufficiently rare in Norway that these men are very unlikely to have financial obligations to their ex-wives.[30] After controlling for differences in observed parental characteristics, the remaining differences in children's outcomes are attributable to selection (i.e., to unobserved characteristics that affect child outcomes). Second, using a Oaxaca-Blinder decomposition, we investigate the extent to which the difference between children in NF+ and NFo reflect differences in the estimated coefficients rather than differences in observed parental characteristics (section 7.2).

7.1 Fathers with Previous Childless Marriages

If selection is driving our MPF results, then fathers with previous childless marriages (FPCM) or the women who partner with them may have unobserved characteristics that adversely affect children's educational outcomes. For this version of the selection hypothesis to

[29] We are grateful to David Ribar for suggesting this strategy.
[30] According to Thomson Reuters Practical Law, "In Norway it is unusual for a spouse to be granted spousal maintenance after a divorce." https://uk.practicallaw.thomsonreuters.com/w-012-2153?transitionType=Default&contextData=(sc.Default)

hold, the characteristics that made a man less successful in his first marriage are also associated with worse educational outcomes for the children in the nuclear family. As before, we restrict our attention to children who spent their entire childhoods in nuclear families. In our sample of 66,781 simple nuclear families we have 1,010 fathers with previous childless marriages.[31] For ease of comparison, in the top panel of Table 9 we repeat the estimates from our comprehensive specification (Table 4).

In the lower panel we include additional controls for previous childless marriages of the father and mother. The estimates of NF+ do not change substantially once we include covariates for previously married parents, and remain worse than for NFo families. The estimated effects of FPCM are adverse and roughly similar to the estimates of NF+. We tested whether the coefficients for FPCM and NF+ were significantly different from one another and rejected this hypothesis only for grades ($p<.04$). Thus, for the other three outcomes (low grades, dropout, and bachelor's) the estimate of FPCM is similar in magnitude to that of NF+, indicating that the children of FPCM have worse educational outcomes than children from traditional nuclear families. The average educational outcomes of children in FPCM families, however, are much better than those in NF+ families because covariates, such as income and wealth, education and age, offset or more than offset these adverse effects. For the children of FPCM, some educational outcomes are a bit worse than those of children in NFo families, while others are substantially better.

[31] We excluded from our analysis the 84 simple nuclear families with 91 children 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.

We focus on the two long-term outcomes, Dropout and Bachelor's.[32] For Dropout, the mean outcomes are similar for the FPCM children and NFo children: 18% for the FPCM children and 17% for the NFo children, while for the NF+ children Dropout is 24% (See Table A2). We use our estimates to calculate a counterfactual prediction of Dropout for children from families with the same covariates as the families of FPCM but in which the fathers did not have previous childless marriages (see Appendix Table A2). The covariates for families with previous childless marriages are more favorable than those for the NFo families (see Appendix Table A3). For these FPCM families, predicted Dropout would be 16%, which is 3 ppt lower than experienced by children in NFo. For Bachelor's, the average outcome is also better for the FPCM children than for those in NFo: 55% for the FPCM children and 51% for the NFo children. Our counterfactual estimate of what Bachelor's would be for NFo children from families with the same covariates as the FPCM families but without the FPCM is 59%. We also tested whether the coefficients for FPCM and the coefficients for NF+ fathers were equal and could only reject the null hypothesis for grades ($p<.104$). This constitutes powerful evidence in favor of the selection hypothesis.

The association between mothers' previous childless marriages (MPCM) and children's educational outcomes provides additional evidence of the importance of selection, although not evidence of why fathers' MPF is associated with worse educational outcomes for children.[33] We investigated outcomes for children in the 832 simple nuclear families with MPCM.[34] In our comprehensive specification, MPCM significantly reduces grades and the likelihood of obtaining

[32] Children of FPCM are 4.9 ppt more likely to have low grades ($p < .01$). The estimated effect on grades is 3.8% of a standard deviation lower, one-third the size of the effect of fathers' MPF, and it is not statistically significant.

[33] We are grateful to Richard Reeves for suggesting that we investigate mothers with previous childless marriages.

[34] Our definition of nuclear families specifies that the mother had no previous children.

a bachelor's degree. These estimates of MPCM are adverse and roughly similar to the estimates of NF+.[35] The educational outcomes of the MPCM children are substantially better than those of children in NF+. For both Dropout and Bachelor's, the mean outcomes are also better for the MPCM children than for the children in NFo. For MPCM the mean outcome for Dropout is 16%, for NFo it is 17%, while for NF+ it is 24% (see Appendix Table A2). The counterfactual calculation implies that without MPCM, Dropout would have been 14% for NFo families. For MPCM, the mean outcome for Bachelor's is 57%, for NFo it is 51%, while for NF+ it is 44%. The counterfactual prediction of Bachelor's for NFo families is 60% for children who grew up in families with the covariates of the MPCM family but in which the mother did not have a previous childless marriage.

The counterfactual predictions illustrate the importance of covariates such as income and wealth, education and age as determinants of children's educational outcomes. For both FPCM and MPCM the covariates offset or more than offset the adverse effects of previous childless marriages; in contrast, for NF+ the covariates amplify the adverse effects of fathers' MPF.

7.2 Oaxaca-Blinder Decomposition

We probed the selection hypothesis further by calculating a Oaxaca-Blinder decomposition to determine the extent to which differences in covariates explain the worse educational outcomes of children in complex nuclear families. If the worse outcomes were explained by differences in observed 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 observed characteristics explain substantially larger fractions of the

[35] The point estimates of the effect of MPCM on the probability of low grades is 3.1 ppt and on dropout is 2.2 ppt, but neither of these is statistically significant.

worse educational outcomes. Our estimates show that 81% of differences in test scores, 91% of differences in low grades, 74% of differences in dropping out of secondary school, and 56% of differences in completing a bachelor's degree are due to differences in estimated coefficients.

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Taken together, the results in this and the two previous sections are strong evidence that selection – for example, unobserved characteristics that affect both fathers' MPF and children's educational outcomes – is the primary explanation for the association between fathers' MPF and children's worse educational outcomes.

8. Discussion and Conclusion

Until very recently, the family structure and family complexity literatures have emphasized household structure and household complexity. Because of data limitations and because children generally remain in households with their mothers when their parents separate, research has emphasized mothers' MPF while virtually ignoring fathers'. Ours is the first study to investigate the relationship between fathers' MPF and children's adult educational outcomes. Using Norwegian register data, we investigated the association between fathers' MPF and the educational outcomes of the children in fathers' 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 covariates, we found that fathers' MPF is associated with substantially and significantly worse educational outcomes for children: children of MPF fathers are four percentage points more likely to drop out of secondary school and five percentage points less likely to obtain a bachelor's degree.

Why do children in complex nuclear families have worse educational outcomes than children in simple nuclear families? Competition for resources between the children in fathers' first and second families is a possible explanation, but the data provide little support for the resource competition hypothesis. Birth order is another possible explanation, but the data provide little support for the birth order hypothesis. Family structure transitions and the stress that accompanies them are often invoked to explain adverse outcomes for children in complex families. For the children we studied, however, the family structure transition explanation is a nonstarter because we restricted our analysis to children who never experienced a family structure transition: all of the children we studied spent their entire childhoods, from birth until age 18, in nuclear families.

Discussing outcomes for children in complex families, Furstenberg (2014) reminds us of the need to consider selection. According to the selection hypothesis, fathers who have children from another relationship may differ in unobserved characteristics (e.g., preferences, beliefs , information) from fathers who do not, and the women who partner with these men may differ from the women who do not. To evaluate the selection hypothesis, we estimated whether children in simple nuclear families whose fathers had previous childless marriages experienced worse educational outcomes than children in simple nuclear families whose fathers did not have previous childless marriages. Controlling for covariates such as income and wealth, education and age, we found that the association between having a father with a previous childless marriage and children's educational outcomes was similar to the association between having a MPF father and children's educational outcomes. This finding, together with our finding that the data do not support the resource competition hypothesis or the birth order hypothesis, suggests that selection is the primary explanation for the association we observe between fathers' MPF and the worse educational outcomes of children in fathers' second families.

Norwegian register data, comprehensive as they are, do not enable us to identify the mechanisms behind the association between fathers' MPF and children's educational outcomes. If we had survey data on household expenditure patterns or, better yet, on the allocation of goods and time within households, we might learn more about why the children in complex nuclear families experience worse educational outcomes than those in simple nuclear families. But administrative data such as the Norwegian registers report neither household expenditure patterns nor the allocation of goods and time within households.

Previous studies have found striking similarities between the estimated effects of family complexity on children's outcomes in Nordic countries the United States.[36] That said, Norway and the United States differ dramatically in dimensions only hinted at by our brief descriptions of education and child support in Norway. Still, we expect that in the US, as in Norway, educational outcomes for children in the second families of MPF fathers and in the families of fathers with previous childless marriages will be worse than for children in nuclear families in which fathers have neither previous children nor previous childless marriages. We think that the "father effects" we observe in Norway probably reflect the allocation of goods and time within the household. Because the social safety net is substantially weaker in the US than in Norway, because income inequality is substantially greater in the US than in Norway, and because higher education is

[36] Björklund et al. (2007) found that the effect of family complexity on children's educational outcomes was very similar in the US and Sweden. Heckman & Landersø (2021) and Landersø & Heckman (2017) draw the same conclusion for the US and Denmark. Breivik & Olweus (2006) found that the negative effect of parental divorce on children's educational outcomes was very similar in US and Norway, despite the generous social safety net in Norway. Reisel (2011) found "more similarities than differences in the relationship between family background and college degree attainment" in the US and Norway. Grätz et al. (2018) argue that family background characteristics have a universal effect on educational outcomes in Nordic countries, Germany, the United Kingdom, and the United States.

expensive in the US and essentially free in Norway, we think that the allocation of money and parental time is likely to be more important for children's educational outcomes in the United States than it is in Norway. We infer from this that the adverse effects of fathers' MPF are likely to be greater in the US than in Norway, and are likely to be greater in families with lower levels of resources.

We think selection is likely to play a substantial role in all types of complex families -- step families, blended families, and single parent families as well as families in which fathers have MPF. The complication that makes it difficult to assess the importance of selection is the need to assess simultaneously the importance of selection, family structure transitions, and covariates such as parental income and education that represent parental resources. In step families, blended families, and in most single parent families children experience at least one family structure transition and these transitions are widely believed to adversely affect children's outcomes (McLanahan et al. 2013). We decline to speculate on the basis of our analysis of the effects of fathers' MPF in Norway about the relative importance of selection compared with family structure transitions in step families, blended families, and single parent families in Norway and or about their relative importance in such families in the United States. We do, however, suggest that researchers interested in outcomes for children in complex families need to take selection seriously.

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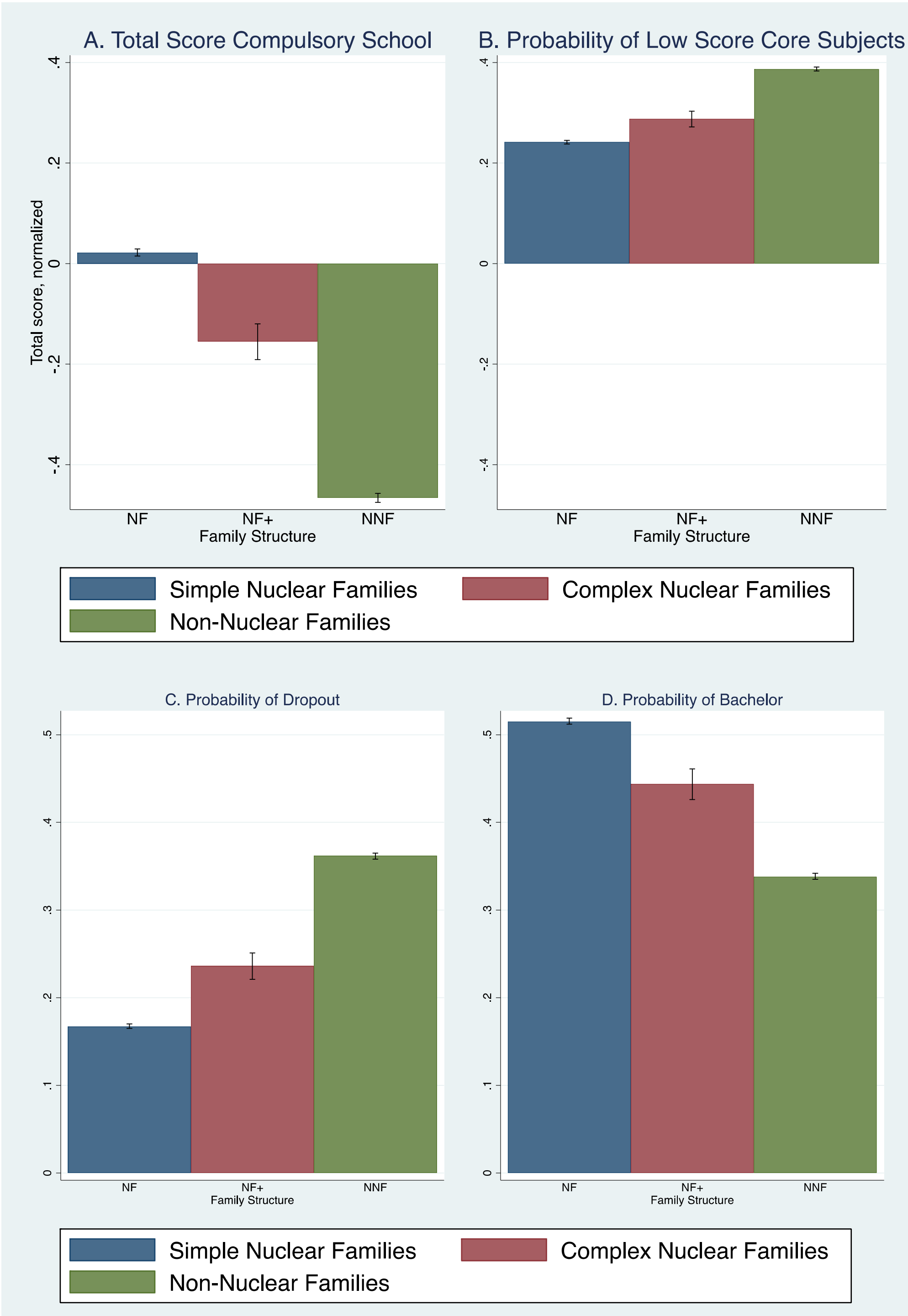

Fig. 1a
Normalized total exam scores by family structure.
Fig. 1b
Probability of low exam scores by family structure.
Fig. 1c
Probability of dropping out of secondary school by family structure.
Fig. 1d
Probability of obtaining a bachelor’s degree by family structure.

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 are dropped from this classification due to lack of identity of the father, missing place of living (living abroad mostly), or death before age 18. Among those who grew up with both biological parents are also 4,206 children who grew up with both parents in different kinds of blended families. Number of siblings and half-siblings is counted at age 18. Among our 75,260 eligible children in NFo and NF+ families 7.75% have full siblings who were born in 1986-1988 and, hence, are also included in our analysis.

Table 2: Children's 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	

Grades: Sum of grades at completion of compulsory school, normalized.
Low Grades: Indicator for no grade or grade below 4 in three core subjects (Math, Norwegian, English).
Dropout: Indicator for not completed secondary school by age 22.
Bachelor: Indicator for having completed a bachelor's degree by age 26.

Table 3: Descriptive Statistics for Covariates by Family Type

Variable	Nfo Mean	Std.Dev.	NF+ Mean	Std.Dev.	NNF Mean	Std.Dev.
Parents cohabit at birth	0.134		0.296		0.451	
# Full Siblings	1.8	1.1	1.5	1.0	1.1	1.0
Age father	30.9	4.9	35.4	6.1	29.1	5.9
Age mother	28.4	4.5	29.2	4.6	26.1	5.04
Father's education:						
Primary school	0.178		0.255		0.312	
Some secondary	0.182		0.249		0.162	
Secondary school	0.329		0.270		0.315	
University/college	0.310		0.219		0.206	
Educ missing	0.002		0.006		0.006	
Mother's education:						
Primary school	0.264		0.296		0.372	
Some secondary	0.213		0.250		0.179	
Secondary school	0.215		0.190		0.216	
University/college	0.307		0.262		0.222	
Educ missing	0.001		0.003		0.004	
Income father	451.7	239.8	412.0	226.5	538.6	704.1
Income mother	210.1	119.9	226.5	127.6	363.1	344.0
Wealth household	1307.5	4945.9	1258.6	7060.6	1362.9	7437.6
Percent of Childhood 0-18:						
Urban area	75.1	42.4	74.9	42.2	78.5	38.6
Father no earnings	2.8	12.7	9.0	23.3	23.1	35,1
Mother no earnings	8.1	21.8	9.9	24.0	31.5	37.6
Mother on disability pension	2.6	12.8	8.1	22.2	2.3	10.5
Father on disability pension	3.8	15.6	5.5	18.6	2.0	11.0
Household size	4.7	1.0	4.4	0.9	na	
Family moved when child age 7-17	0.548		0.563		0.353	
Observations	72052		3208		63258	

Parents' marital status, age and education are measured when eligible child is born.
Parents' income includes annual earnings, capital income and transfers, averaged over the years when the child is 7-18 years old, measured in 1000 NoK 2015..
Wealth household is sum of parents' net financial wealth, averaged over the years when the child is 7-18 years old, 1000 NoK 2015. For NNF children this variable does not reflect actual wealth of the household as parents do not live together throughout the child's entire childhood.
Additional covariates in regressions are gender, birth year and month, parity (from the perspective of the mother), number of full siblings and county of residence at age 10.

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+ *				0.031				-0.021
Male				[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+ *				0.007				0.024
Male				[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
(1): Additional covariates include dummies for male, birth year and birth month.
(2): Covariates include (1) plus parents age, birth order from the perspective of the mother and dummies for parents education.
(3): Comprehensive specification with full set of covariates. include (2) plus dummies for fathers' income quartile, log of mothers' income, household wealth and size, percent of childhood characteristics and county of residence at age 10 and dummies for family having moved during schooling age and parents' cohabiting at birth (not legally married).
(4): Comprehensive specification plus interaction between male and dummy for Complex Nuclear Family (NF+).

Table 5: Estimates of Effect of Fathers' MPF on Children's 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.
(1): Additional covariates include dummies for male, birth year and birth month.
(3): Comprehensive specification with full set of covariates.

Table 6: Estimates of Effect of Fathers' MPF on Children's Educational Outcomes, Controlling for Number and Years of Overlap with 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.
(1): Additional covariates include dummies for male, birth year and birth month.
(3): Comprehensive specification with full set of covariates.

Table 7: Estimates of Effect of Fathers' MPF on Children's Educational Outcomes 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
(1): Additional covariates include dummies for male, birth year and birth month.
(3): Comprehensive specification with full set of covariates.

Table 8: Estimates of Effect of Fathers' MPF on Children's 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)
<u>Full Sample</u>								
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	0.080	0.275						
Observations	46,512	46,512	47,220	47,220	47,127	47,127	47,139	47,139

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
(1): Additional covariates include dummies for male, birth year and birth month.
(3): Comprehensive specification with full set of covariates.

Table 9: Estimates of Effect of Fathers' MPF on Children's 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 Parents								
Nuclear Family+	-0.180***	-0.102***	0.051***	0.034***	0.069***	0.041***	-0.075***	-0.054***
	[0.018]	[0.017]	[0.008]	[0.009]	[0.008]	[0.008]	[0.009]	[0.010]
Previously Divorced Fathers	0.056	-0.038	0.011	0.049**	0.013	0.034**	0.036*	-0.035*
(FPCM)	[0.032]	[0.029]	[0.014]	[0.016]	[0.013]	[0.013]	[0.016]	[0.018]
Previously Divorced Mothers	0.081*	-0.075*	-0.024	0.031	-0.013	0.022	0.056**	-0.040*
(MPCM)	[0.034]	[0.031]	[0.015]	[0.018]	[0.013]	[0.015]	[0.018]	[0.020]
Constant	0.322***	-2.264***						
	[0.014]	[0.120]						
R-squared	0.080	0.278						
Observations	74,051	74,051	75,169	75,169	75,020	75,020	75,041	75,041

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.

(1): Additional covariates include dummies for male, birth year and birth month.

(3): Comprehensive specification with full set of covariates.

Appendix Tables

Table A1: Predicted Outcome Evaluated at Mean of Covariates for NF+

		Predicted mean
Grades	Nfo	-0.056
		[0.006]
	NF+	-0.155
		[0.0157]
Low Grades	Nfo	0.271
		[0.003]
	NF+	0.300
		[0.008]
Dropout	Nfo	0.199
		[0.003]
	NF+	0.240
		[0.007]
Bachelors	Nfo	0.485
		[0.003]
	NF+	0.442
		[0.008]

Notes: All predictions use Specification 3 and the covariates from NF+ families (see Table 3). Standard Errors in brackets. Grades: Total score at completion of compulsory school (age 16). Low Grades: Score 3 or below in all three core subjects (Math, Norwegian, English) at completion of compulsory school. Dropout: Not having completed secondary school (High school) by age 22. Bachelor: Having completed a bachelor's degree or higher by age 26. NFo: Traditional nuclear, NF+:Father had child(ren) from previous relationship.

Table A2: Predicted Outcome Calculated at Mean of Previously Childless Marriages

Outcome	Family type	Mean Outcome	Predicted Mean FPCM Covariates	Predicted Mean MPCM Covariates
Dropout	NFo	0.172	0.128	0.138
			[0.002]	[0.002]
	NF+	0.240	0.165	0.181
			[0.007]	[0.008]
	FPCM	0.183	0.159	0.170
			[0.012]	[0.012]
	MPCM	0.157	0.148	0.157
			[0.013]	[0.013]
Bachelors	NFo	0.512	0.594	.0602
			[0.003]	[0.003]
	NF+	0.442	0.540	0.557
			[0.010]	[0.008]
	FPCM	0.552	0.559	0.574
			[0.017]	[0.014]
	MPCM	0.569	0.554	0.569
			[0.020]	[0.017]

Notes: Means are the averages of the outcomes by family type. All predictions use Specification 3 and the covariates from FPCM/MPCM families. . Standard errors of predictions in brackets.
Grades: Total score at completion of compulsory school (age 16). Low Grades: Score 3 or below in all three core subjects (Math, Norwegian, English) at completion of compulsory school. Dropout: Not having completed secondary school (High school) by age 22. Bachelor: Having completed a bachelor's degree or higher by age 26. NFo: Traditional nuclear, NF+:Father har child(ren) from previous relationship, FPMC/MPCM: father/mother with previous childless marriage.

Table A3: Background Characteristics of Traditional Nuclear Families in which the Father or Mother has a Previous Childless Marriage (PCM)

Variable	Father PCM Mean	Father PCM Std.dev.	Mother PCM Mean	Mother PCM Std.dev.
Parents not married at birth [a)]	0.215		0.242	
# full siblings [b)]	1.530	0.870	1.42	0.830
Fathers age	35.2	4.6	32.9	5.1
Mothers age	30.0	4.3	31.7	3.9
Fathers' education				
Compulsory	0.156		0.119	
Compulsory and some secondary	0.198		0.17	
Completed secondary	0.237		0.273	
Higher education	0.406		0.437	
Education missing	0.003		0.001	
Mothers' education				
Compulsory	0.203		0.205	
Compulsory and some secondary	0.208		0.221	
Completed secondary	0.178		0.176	
Higher education	0.410		0.392	
Education missing	0.002		0.005	
Fathers' mean earnings [c)]	470	216	511	319
Mothers' mean earnings	239	135	245	145
Household mean wealth	1408	2497	1643	4591
% of childhood when				
father has no earnings	4.4	14.5	3.0	11.4
mother has no earnings	16.9	25.8	18.7	27.1
living in urban area	86.3	33.1	85.7	33.8
mother is disabled	1.3	7.9	1.2	7.6
father is disabled	1.0	7.5	0.4	3.7
% moving during age 7 - 17 [d)]	10.9		9.5	
# children	963		765	

a) Proportion. Either cohabiting or not registered as living in the same household.
b) Number of full siblings from the perspective of the child.
c) Income (all sources) and wealth is in NOK 1000, 2015, based on annual measures and averaged over the years when child is aged 7-19.
d) % of children moving to a different municipality during age 7 to 17.