Divorced fathers' proximity and children's long run outcomes:

Evidence from Norwegian registry data

Ariel Kalil[a], Magne Mogstad[b], Mari Rege[c] and Mark Votruba[d]

Abstract:

This study examines the link between divorced nonresident fathers' proximity and children's long-run outcomes using high-quality data from Norwegian population registers. We follow (from birth to young adulthood) 15,992 children born into married households in Norway in the years 1975-1979 whose parents divorce during his or her childhood. We observe the proximity of the child to his or her father in each year following the divorce and link proximity to children's educational and economic outcomes in young adulthood, controlling for a wide range of observable characteristics of the parents and the child. Our results show that closer proximity to the father following a divorce has, on average, a modest negative association with offspring's young-adult outcomes. The negative associations are stronger among children of highly-educated fathers. Complementary Norwegian survey data show that highly-educated fathers report more post-divorce conflict with their ex-wives as well as more contact with their children (measured in terms of the number of nights that the child spends at the fathers' house). Consequently, the father's relocation to a more distant location following the divorce may shelter the child from disruptions in the structure of the child's life as they split time between households and/or from post-divorce interparental conflict.

[a] Ariel Kalil, Harris School of Public Policy Studies, University of Chicago, a-kalil@uchicago.edu

[b] Magne Mogstad, Research Dept., Statistics Norway / ESOP, Dept. of Economics, University of Oslo, magne.mogstad@ssb.no

[c] Mari Rege, University of Stavanger, Dept. of Economics /Statistics Norway / University of Oslo, ESOP, Dept. of Economics, mari.rege@uis.no

[d] Mark Votruba, Weatherhead School of Management, Case Western Reserve University/Statistics Norway, mark.votruba@case.edu

1. Introduction

Rising rates of divorce and unwed childbearing in recent decades have increased political and public concern over nonresident fathers' involvement in children's lives. In the United States, for example, many new federal initiatives have been designed to motivate involvement among divorced or unwed fathers (Dion 2005) and these have been accompanied by publicly financed ad campaigns promoting the idea of fathers' integral role in children's development (Dominus 2005). In particular, there is an increased focus on father's rights to maintain contact with their children following a divorce. In 2004, the California Supreme Court held that several factors – including the distance of the move, the children's age, and the parents' relationship – must be considered before children of divorced couples can be moved out of town (McKee 2004). In doing so, the court clarified and effectively overturned a previous ruling that held that custodial parents had the "presumptive right" to relocate unless it would be detrimental to their children or if the move was in bad faith (McKee 2004).

A key underlying assumption of such legal and policy initiatives is that nonresident fathers not only have a right to maintain regular contact with their children but that doing so will improve those children's developmental outcomes. Advocates for this position point to evidence concerning risks to development among children with divorced parents as well as fathers' inputs as important components of children's development (Amato 2001; Argys, Peters, Brooks-Gunn, & Smith, 1998; Lamb, Pleck, Charnov, & Levine, 1987; McLanahan & Sandefur, 1994). However, evidence supporting the positive role of father-child contact following a divorce, per se, is mixed (Amato & Rezac, 1994; King 1994a; 1994b).

This study examines the link between divorced nonresident fathers' proximity and children's long-run outcomes in a large-scale national longitudinal sample based on high-

quality registry data from Norway. Unlike studies that have relied on small and non-representative samples, our data allow us to follow every child (from birth to young adulthood) born into married households in Norway whose parents divorce during his or her childhood. We observe multiple cohorts of such children, resulting in a large sample which produces precise estimates. Our data allow us to determine the proximity of the child to his or her father in each year following the divorce, and to assess whether proximity is associated with children's educational and economic outcomes in young adulthood, controlling for a wide range of observable characteristics of the parents and the child. No other study to our knowledge has adopted such a population perspective on the question of post-divorce father proximity and child outcomes. Our analysis assesses father-child proximity by examining fathers' moves away from the child to isolate the potential impacts of fathers' location that are not confounded by other potential impacts of the child's residential relocation.

To preview our findings, we find no evidence that proximity between divorced fathers and their children benefits children's educational achievement and human capital attainment in young adulthood. Indeed, our results show that closer proximity to the father following a divorce has, on average, a modest negative association with these outcomes. The negative associations are substantially larger for children of highly-educated fathers.

More specifically, our evidence suggests that a child with a college-educated father will increase his or her education by more than 0.6 years if the father relocates to a more distant location following the divorce. This represents more than a 20 percent increase relative to the standard deviation of years of education in our sample. Highly educated fathers' greater distance post-divorce is also associated with better outcomes for the child in the labor market. A child with college-educated father is 8.2 percentage points more likely to be working at age 27 if the father relocates to a more distant location following the divorce. Moreover, a child with college-educated father has earnings that are 16 percent higher if the

father relocates.

Our study investigates possible mechanisms driving these results using survey data of divorced Norwegian parents. Results from the survey data may help to explain why children benefit when highly-educated fathers relocate away from their children following a divorce. First, highly-educated fathers have a larger degree of post-divorce conflict with their ex-wives. Second, highly-educated fathers have more contact (measured in terms of the number of nights that the child spends at the fathers' house) with their children post-divorce, which supports US evidence that non-resident father involvement and shared custody arrangements are more common among families of higher socioeconomic status (Amato & Rezac, 1994; Cancian & Meyer, 1998; Donnelly & Finkelhor, 1993; Manning & Smock, 1999). Consequently, the father's relocation to a more distant location following the divorce may shelter the child from disruptions in the structure of the child's life as they split time between households and/or from post-divorce interparental conflict.

The remainder of this paper is organized as follows: Section 2 presents arguments for how and why father proximity following a divorce might matter for children's development. Here we also discuss the potential for heterogeneity in effects. Section 3 describes our data and sample selection, before Section 4 outlines our empirical strategy. Section 5 presents our results, and Section 6 concludes.

2. Background

There is substantial U.S. evidence that children of divorced parents have poorer academic, behavioral, and health outcomes than comparable children in intact families (Amato 2001; McLanahan & Sandefur, 1994; Seltzer 1994). In Norway as well, children of divorce demonstrate poorer outcomes to an extent comparable to U.S. samples despite the existence of a generous Scandinavian welfare state that buffers single mothers from serious economic hardship (Breivik & Olweus, 2006; Steele, Sigle-Rushton, & Kravdal, 2009;

Størksen, Roysamb, Holmen, & Tambs, 2006). For example, Steele and colleagues, using Norwegian registry data and paying careful attention to selection effects, conclude that parental divorce during early childhood is associated with significantly lower levels of educational attainment.

There is reason to hypothesize that fathers' proximity to the child following a divorce could have positive, negative or no effect on children's development, or that the effect could vary for different types of children (e.g. by gender or age at divorce). We will discuss each of these possibilities in turn.

Hypothesis 1: Fathers' proximity is beneficial because it promotes involvement/investment in children. Many studies argue that poor child development outcomes following a divorce result from the loss of fathers' investments that occurs when a marriage dissolves. In the economics literature, these inputs are characterized in general terms by fathers' inputs of time and money (Becker & Tomes, 1986). In the psychology literature, father involvement is conceptualized as a multifaceted construct with three distinct parts: father's accessibility to, engagement with, and responsibility for his child (Lamb et al., 1987). Accessibility reflects a father's contact with and availability to the child, irrespective of the quality of their interactions. Engagement is defined by fathers' interactions with children, including caregiving, play, and teaching activities, and includes both the quantity and quality of father-child interactions (Lamb et al., 1987). Responsibility is conceptualized generally as fathers' involvement in the management of the child's daily routines, health, and child care, and his role in making major decisions about the child.

Nonresident father-child contact (which is facilitated by living closer rather than farther apart) builds affection and provides opportunities for fathers to engage in active forms of parenting (Sobolewski & King, 2005). Proximity to the child following a divorce should

therefore be a positive predictor of fathers' active support and involvement in children's lives and could ameliorate some of the problems faced by children of divorce.

Some empirical evidence suggests that non-resident divorced fathers' contact with their children is correlated with good child outcomes, although much of this evidence comes from small and non-representative samples or cross-sectional data. Amato and Gilbreth (1999), in a widely-cited meta analysis, report that frequency of contact with non-resident fathers has small but statistically significant associations with child outcomes, including higher levels of academic success and lower levels of behavior problems such as depression and sadness. In contrast, King's (1994a; 1994b) analysis of large-scale U.S. data finds little evidence that father-child visitation has any positive impacts on child development. Seltzer (2000) finds that nonresident fathers who maintain closer contact with their children are more likely to pay child support, perhaps because they can observe more directly how that money is supporting the child's welfare, which could contribute to better outcomes since child support is a significant positive correlate of children's cognitive development (Argys et al., 1998). Moreover, nonresident fathers tend to bundle their involvement, such that those who see their children frequently also are more likely to be engaged with them, assume parenting responsibility, and provide in-kind support compared to those who see their children infrequently (Coley & Chase-Lansdale, 1999; Ryan, Kalil, & Ziol-Guest, 2008; Kalil, Ziol-Guest, & Coley, 2005; Rangarajan & Gleason, 1998; Sobolewski & King, 2005).

The few Norwegian studies that exist on this topic suggest a somewhat stronger positive role for father proximity following divorce than do the U.S. data. Notably, these studies do not use population-level data as we do here, nor do they follow the children of divorce into adulthood. Most of these studies focus on youth's psychological well-being. Størksen, Roysamb, Moum, & Tambs (2005) argue that father absence (i.e., not living with the biological father) accounts for poorer developmental trajectories during adolescence and

lower measure of psychological well-being for the children of divorce, especially for boys. Similarly, Breivik and Olweus (2005) argue that children of divorce have optimal psychological outcomes in joint physical custody arrangements (relative to the alternatives), which are undoubtedly highly correlated with divorced fathers' proximity.

Hypothesis 2: Fathers' proximity is detrimental because it sparks inter-parental conflict or undermines stability in children's lives.

A large literature documents the conflict that often characterizes the divorce process (Furstenberg & Cherlin, 1991). Indeed, much of the negative impact of divorce on children can be attributed to adverse pre-divorce conditions in families and children (Morrison & Cherlin, 1995). As such, some research suggests that greater increases in behavior problems are seen among children who remain in high-conflict marriages than among children whose parents separate or divorce (Morrison & Coiro, 1999). If conflict between the parents persists after the divorce, closer proximity of the fathers may create more opportunities for disagreement, to the detriment of the children. Amato and Rezac (1994), using a large national U.S. sample, found that nonresident father contact was detrimental in terms of boys' behavior problems when interparental conflict was high (but not when interparental conflict was low). In contrast, for girls, there was no association between nonresident father contact and behavior problems.

Fathers' proximity post-divorce could also be detrimental if it positively predicts the child's splitting time between two households, which could reduce stability in the child's life (Lamb, Sternberg, & Thompson, 1997) or increases the likelihood of interparental conflict. The most common living arrangement among divorced families in Norway lets the child visit the non-resident parent (usually the father) one afternoon weekly in addition to every second weekend (Størksen et al., 2006). Children who live in closer proximity to their non-resident fathers may have greater contact with those fathers, such as by spending more nights at

fathers' homes. It is possible that frequently moving between two parents' houses is stressful for children because it requires adjusting to different sets of parental rules and routines or because it disrupts children's daily activities.

Hypothesis 3: Fathers' proximity will not matter. There is also reason to think that divorced fathers' proximity to the child will not matter for children's development. Economic theories suggest that divorce occurs upon the discovery that a marriage "match" is poor quality (Becker, Landes, & Michael, 1977). For instance, divorce may result from negative surprises about the father's ability to invest productively in the family's welfare or the child's development (Charles & Stephens, 2004, Chiappori & Weiss, 2006; Rege, Telle, & Votruba, 2008, Kalil, Ziol-Guest, & Levin-Epstein, 2009). If so, divorce may have the effect of removing fathers from the household who are least skilled at parenting, making fathers' post-divorce proximity irrelevant for child development. As an example supporting this hypothesis, Sobolewski and Amato (2007) showed that when children experienced their parents' marital conflict and divorce growing up, the children had no higher levels of subjective well-being in young adulthood if they were emotionally close to both parents than to one parent only. In such "incongruent patterns" of parent-child closeness, the children are more likely to be close to their mothers only than their fathers only, suggesting that emotional closeness to fathers has little "value added" for young adults' subjective well-being in the aftermath of parental marital conflict and divorce, given an emotionally close relationship with mothers.

Indeed, many of the observed differences in developmental outcomes between the children who do and do not grow up with their father stem from the factors that selected families into divorce in the first place. At least two studies suggest that marriage confers little benefit to (and may even detract from) children's development when fathers lack the "skills" (i.e., education, emotional stability) necessary for promoting positive child outcomes

(Jaffee, Moffitt, Caspi, & Taylor, 2003; Ryan 2008). Of course, the divorce process (like the marriage market) is imperfect; fathers skilled at parenting can still end up divorced, and the involvement of these non-resident fathers may benefit children's development. It is also possible that fathers' proximity matters when mothers have limited human capital or parenting skills, or that strong bonds to nonresident fathers matter for children with weak ties to their mothers (King & Sobolewski, 2006; Ryan, Martin, & Brooks-Gunn, 2006).

Hypothesis 4: Fathers' post-divorce proximity will have heterogeneous effects depending on the child. Researchers have speculated that nonresident father contact and involvement might be more important for boys than for girls (Coley 1999), given the importance of a male role model for boys' identity development. Family size and birth order might also moderate the influence of nonresident fathers' proximity. In large families, for example, where each child's share of the mothers' resources is smaller than in families with fewer children, it may be especially important to garner the attention and inputs of the nonresident father. Similarly, later-born children, because they receive fewer resources than earlier-born children within families (Conley 2004), may be especially likely to benefit from nonresident fathers' inputs.

The age at which the divorce occurs might moderate the influence of nonresident father contact, although it is unclear what sign this interaction would take. The share of post-divorce years spent living in proximity to the non-resident father may matter more for children whose parents divorced at an early age simply because the benefits or detriments associated with fathers' post-divorce proximity accumulate over a larger number of childhood years. Alternatively, the limits on father-child interactions imposed by a lack of post-divorce proximity could represent a greater loss to those children who have spent a greater proportion of their childhood living with their fathers in a married household. In this case, the benefits of proximity may be larger when the divorce occurs later in the child's life.

9

3. Data

Our empirical analysis utilizes several registry databases provided by Statistics Norway. The data include a rich longitudinal dataset containing records for every Norwegian from 1975 to 2006. The variables captured in this dataset include individual demographic information (sex, age, marital status, number of children), and socio-economic data (years of education, earnings). Importantly, the dataset includes personal identifiers for one's parents, allowing us to link children to their parents and siblings. Moreover, the dataset includes geographic identifiers for economic region of residence allowing us to construct a measure for father's proximity.[e]

The Norwegian territory covers about 149,400 square miles, equivalent to an area equal to the US states of Delaware, District of Columbia, Pennsylvania, Maryland, South Carolina, Virginia and West Virginia combined. The country is dominated by mountainous or high terrain, as well as a rugged coastline stretching about 1,650 miles, broken by numerous fjords and thousands of island (making the coastline approximately 10 times longer if the length of the fjords were included). An "economic region" constitutes a regional level between a county (of which there are 19) and a municipality (of which there are 435), approximating regional labor markets. There are 46 economic regions in Norway with an average population (in 1975) of about 86,900 people. The main criteria used for defining the economic regions are labor market, trade and service patterns, as well as commuting and internal migration patterns.[f] In general, there are long driving distances between the populated areas of the economic regions, as they are mostly far apart or partitioned by mountains and/or the fjord-gashed shoreline. Figures A1 and A2 map, respectively, the economic regions of the southern and northern areas of Norway.

---

[e] Unfortunately, we do not know the exact geographical distance between the father and child.

[f] The classification of economic regions is analogous to the NUTS 4 – level in EU's regional classification, whereas county and municipality correspond to the NUTS – 3 and the NUTS – 5 level, respectively. See Bhuller (2006) for a detailed description of the classification of economic regions that we use.

As a measure of a father's proximity we construct a variable denoting the proportion of years that the child and father live in the same economic region between the divorce and the child's 18th birthday.[g] Figure 1 shows the distribution of this variable for our sample. As can be seen, most fathers either live away from the child most of the time or, conversely, live mostly in the same region as the child. This leads us to focus the empirical analysis on these extremes. Henceforth, we will refer to a *proximate father* as a father who lived in the same economic region for more than 90 percent of the years between the divorce and the child's 18th birthday. Conversely, a *distant father* is a father who lived in the same economic region for fewer than 10 percent of the years between the divorce and the child's 18th birthday.

Our empirical analysis focuses on the 1975-1979 cohorts in order to ensure availability of outcome measures when the child reaches the age of 27. Our analytic sample is restricted to children whose parents were married when the child was born and divorced before the child turned age 13,[h] and who reside in the same municipality as their mother until age 18. In order to ensure that our "treatment" variable is well defined, we also exclude a small number of children whose father dies before the child's 18th birthday. With these restrictions, we have a sample of almost 20800 children. Next, we exclude about 2700 children who moved to a different region before age 18, to ensure that our estimate of the effect of father's geographic proximity is not due to the child's or mother's relocation. Finally, as explained above, we restrict the sample to children whose father is categorized as either *proximate* or *distant*. Applying these restrictions provided us with a sample of 15992 children.

Our key outcome variable is the child's years of education at age 27. Figure 2 illustrates the distribution of this variable for our analytical sample. We also construct two dummy variables denoting whether the child obtained at least 12 years of education and if the child

---

[g] We focus on proportion of years instead of number of years because the latter is highly correlated with age of divorce.
[h] We restrict the sample to children whose parents were divorced before the child turned 13 in order to ensure a minimum amount of time between divorce and adulthood.

obtained at least 15 years of education. Further, we utilize several outcome variables capturing socio-economic status at age 27. In addition to earnings, these include dummies indicating whether the child is working, unemployed, receiving welfare, or married at age 27. Finally, we examine whether the youth had a child of his or her own prior to age 21.

Our rich dataset allows us to construct several variables capturing important child, father and mother characteristics to include in our regression analyses. Notably, characteristics that are possibly endogenous to the relocation event (such as earnings) are captured prior to the relocation. The set of control variables includes dummy variables for the economic region of residence of the family at the child's birth; the child's sex, year of birth, first- or second generation immigrant status, number of siblings, birth order, and the child's age at parental divorce; the fathers' age at the birth of the child (six dummy variables for ages <20,20-25,25-30,30-35,35-40, ≥ 40); fathers' age at the birth of his oldest child (six dummy variables for ages <20,20-25,25-30,30-35,35-40, ≥ 40); father's years of education (four dummy variables for ≤9, 10-12, 13-15, ≥ 16); and father's average earnings in the two years prior to divorce (entered in linear and quadratic form). A set of mother characteristics is also controlled for and is coded in an identical fashion to the father variables. These include her age at birth of the child, her age at birth of her oldest child, the number of children she has prior to the child's birth with men other than the father of the child, and her education and pre-divorce earnings.

In some regressions we will also add controls for mother and father post-divorce circumstances. Specifically, we construct a dummy indicating whether the father remarried prior to the child's 16th birthday and a dummy indicating whether the father had a new child prior to the child's 16th birthday. Similar dummies were constructed for the mother.

4. Empirical Strategy

In our empirical analysis we compare child outcomes of children with proximate fathers to children of distant fathers (as noted above, our sample is restricted to children whose fathers

are either proximate or distant). Equation 1 defines the linear regression model that serves as our primary empirical specification throughout the analysis:

$$(2) \qquad E_i = \alpha + \eta\, D_i + \beta\, A_i + \gamma X_i + \mu\, C_i + \sigma\, M_i + u_i$$

where

E_i	~	Measure of child i's educational outcome at age 27
D_i	~	Indicator that the father is a distant father
A_i	~	Vector of dummies for child's age at divorce
X_i	~	Vector of child, father and mother characteristics (Described in Section 3)
C_i	~	Vector of cohort dummies
M_i	~	Vector of economic region dummies
u_i	~	error term with mean zero

The parameter of interest is the estimated distant father coefficient, η , which captures the incremental increase in education from having a distant father relative to children whose father is proximate. Estimation of Equation (2) will produce unbiased estimates of η provided that there are no omitted determinants of children's outcomes that are correlated with father's relocation.[i].

The identifying assumption may be difficult to defend for several reasons. For example, more productive fathers may have greater access to employment opportunities outside of their economic region. If children of more productive fathers tend to achieve more education, our estimate of η will be biased upwards. Alternatively, our estimate could be biased downwards if fathers predisposed to invest less time in their children are also more likely to move away. In our empirical analysis we address these potential sources of bias by investigating the robustness

---

[i] Some of the outcomes of interest are limited dependent variables. In these cases, our linear probability model will be the best least-squares approximation of the true conditional expectation function. As noted by Angrist (2001), if there are no covariates or they are mostly discrete, as in our case, linear models are no less appropriate for limited dependent variables than for other types of dependent variables. In any case, we have checked that our results are robust to alternative approximations of the conditional expectation function, estimating Logit and Probit models. The marginal effects from these models are very similar to the estimates from the linear probability model.

of our estimate to inclusion and exclusion of our large set of covariates capturing important parental characteristics. Admittedly, in the absence of experimental data the threat of selection bias cannot be fully resolved. In particular, a reverse causality story is possible: fathers' decisions to relocate may be affected by their expectations for the child's development.

5. Empirical Results

5.1 Summary Statistics

Our sample consists of 15992 children, of whom 14.5 percent have a distant father and 85.5 have a proximate father. In Table 1 we separately report the mean and standard deviations for the sample of children with distant fathers and the sample of children with proximate fathers. We note that child educational outcomes are slightly higher for children with a distant father.

Table 1 also shows that child and parent's pre-divorce characteristics are fairly similar across the two groups. This is important, as large differences in the observable characteristics of children with proximate and distant fathers may suggest unobservable differences, calling our empirical strategy into question. Across the two samples, there is, however some differences in post-divorce circumstances. In particular, mothers are less likely to remarry if the father is distant, and distant fathers are more likely to have a new child.

A concern in applying linear regressions under the assumption of selection on observables is lack of overlap in the covariate distribution. As emphasized by Imbens and Wooldridge (2008), this can be assessed by the (scale-invariant) normalized difference measure. For each covariate, the normalized difference is defined as the difference in averages by treatment status, scaled by the square root of the sum of variances. Imbens and Wooldridge suggest as a rule of thumb that linear regression methods tend to be sensitive to the functional form assumption if the normalized difference exceeds one quarter. The last

column of Table 1 displays normalized differences for child and parental covariates, indicating that lack of overlap should be of little concern for our estimation results.

5.2 Main results

As described in Section 4, our empirical analysis compares educational outcomes of children with a proximate father to children with a distant father. The estimated coefficient captures the incremental increase in education from having a distant father relative to children whose father is proximate. Table 2 presents our main results. We run each model specification for three different educational outcome variables: Years of education, High-school graduate and College graduate. Standard errors in Table 2 (and subsequent tables) allow for dependence of residuals across siblings with the same mother.

Controlling only for cohort fixed effects, Model 1 finds that the educational attainment of children with a distant father is significantly higher compared to children with a proximate father. Model 2 and 3 show that this result is robust to the inclusion of controls for the child's age at divorce, region fixed effects and child characteristics.

As discussed in Section 4, an estimate of the impact of a distant father on a child's education is likely biased by omitted variables. In particular, a positive effect estimate may be due to fathers' being more likely to relocate if the mother is resourceful and can manage most of the parenting herself. Alternatively, more resourceful fathers may be more likely to relocate due to better job opportunities. Consistent with an omitted variable bias story, we see that our estimate declines somewhat when controlling for mother or father characteristics in Model 4 and 5. However, the estimates in the different models are not significantly different. Moreover, we can see in Models 4 and 5 that controlling for either parent's characteristics has similar effects on the estimate, whereas Model 6 shows that further adding of the other parent's characteristics does not greatly affect the estimates. Even though we

cannot rule out omitted variable bias, the robustness to inclusion of father and mother characteristics is reassuring in this regard.

Post-divorce circumstances give rise to another source of omitted variable bias. For example, as our summary statistics suggest, a father may relocate because he is starting a new family. If this is the case, our estimate may be capturing the effect of a father's remarriage and new childbearing, rather than the effect of his relocation. In Model 7 and 8 we investigate such a possibility by including controls for mothers' and fathers' post-divorce characteristics. Post-divorce characteristics are dummies capturing the individual's new family situations and are described in Section 3. Admittedly, the analyses in Model 7 and 8 suffer from an endogeneity problem since a father's relocation can also affect the likelihood of remarriage and new childbearing. Nevertheless, the fact that our point estimates barely move when including fathers' and mothers' post-divorce characteristics suggests that the estimate of having a distant father is not seriously biased by the effect of the parents' new family situations.[j]

Due to the endogeneity problems in Models 7 and 8 we view Model 6 as our preferred specification. In Panel 1 we can see that this model suggests that children with a distant father on average have 0.13 years more education compared to children with proximate fathers. This represents a 5 percent increase relative to the standard deviation of years of education in our sample. Alternatively, in Panel 2 we see that a distant father increases the likelihood of graduating from high school by 2 percentage points. About 66 percent of our sample graduate from high school. Though statistically significant, one can arguably question the economic significance of these estimates. For example, an increase of 0.13 years of education corresponds to a mere 0.065 percent increase in annual earnings.[k]

_____

[j] It should also be noted that the post-divorce covariates add little explanatory power to the model, so the robustness of our effect estimates to their inclusion is not surprising.
[k] Hægeland et al. (1999) estimate the average return on earning per completed year of education to be about five percent.

Nevertheless, the empirical analysis in Table 2 suggests that non-resident fathers' proximity to their children does not have a beneficial impact on those children's educational achievement. In fact, the evidence suggests that closer proximity to the father following a divorce has a modest negative association with these outcomes.

Panels 2 and 3 report estimates using high-school graduate and college graduate as dependent variables. These results are consistent with a linear effect of having a distant father on years of education. Hereafter, we therefore focus on years of education as our outcome variable.

5.3 Heterogeneous effects

Section 2 discussed several reasons for why the effect of fathers' relocation could be different for different sub-groups of children (e.g. by gender or age at divorce). This raises the possibility that the modest estimates in Table 2 mask meaningful effects within certain sub-groups of children. Table 3 investigates this possibility. Model 1 replicates our preferred Model 6 from Table 2. In Models 2-5 we add terms interacting *distant* with child characteristics. While these interaction effects are somewhat imprecisely estimated, we find no significant differences between the different groups of children.

In Section 2 we also hypothesized that children with a high-skilled father may benefit more from paternal input than a child with a low-skilled father. If so, we should expect that children of fathers with higher education benefit more from proximity than other children. In Table 4 we investigate whether the effect of having a distant father depends on fathers' and mothers' education and pre-divorce earnings. Model 1 replicates our preferred Model 6 from Table 2. Model 2 adds an interaction term between *distant* and whether the father attended college. Interestingly, from the interaction term we see that the positive effect of having a distant father is substantially *larger* if the father has some college education, while the point

17

estimate for children of fathers with no college education is small and no longer statistically significant.

In Model 3 we add an additional interaction term between *distant* and a high (pre-divorce) earnings dummy for the father, defined as having earnings above the median among fathers in our sample. We see that the point estimate for having a distant father with high education barely changes, and that fathers' earnings appear to be irrelevant for the effect of *distant*. Model 4 adds similar interaction terms for mothers' earnings and education. The point estimate on having a distant father with high education is also robust to these additional covariates. Moreover, mothers' education and earnings are not found to be statistically significant mediators of the *distant* effect. Model 5 and 6 assures that the model is robust to the inclusion of fathers' and mothers' post-divorce characteristics interacted with distant father, suggesting that the effect estimate of having a distant college-educated father is not biased by the effect of the parents' new family situations.

The evidence in Table 4 thus suggests positive effects of having a distant father post-divorce if the father is highly-educated, with small (and perhaps no) effect if the father has low education.[1] Specifically, the results from Model 5 suggest that a child with a college-educated father will increase his or her education by more than 0.6 years if the father relocates to a more distant location following the divorce. This represents more than a 20 percent increase relative to the standard deviation of years of education in our sample.

5.3 Additional outcomes

Table 5 investigates the effect of having a distant father relative to children whose father is proximate on other socio-economic outcomes (defined in Section 4). All models include the control variables of Model 6 in Table 2. In line with the results on education, the results in the first panel suggest that having a distant father does not, on average, seem to

---

[1] Appendix Table A1 presents regression results to investigate the robustness of this finding to alternative covariates, as we performed for the "main effect" in Table 2. The estimates are found to be quite robust to alternative specifications.

matter for the child's socio-economic status at age 27. From our investigation of heterogeneous effects in Table 4, however, we learned that children of fathers with college educations benefit from fathers' relocation in terms of higher educational attainment. The second panel includes interaction terms to investigate similar heterogeneity along these outcomes.

The analyses in Table 5 provide additional evidence of the adverse impacts of fathers' proximity post-divorce if the father has a college education. In particular, we see that if the father is college-educated, then his distance post-divorce strengthens the labor force attachment, increases earnings, and reduces welfare dependency of the child at age 27. For example, the first column in the second panel suggests that a child with college-educated father is 8.2 percentage points more likely to be working at age 27 if the father relocates to a more distant location following the divorce. This represents more than a 12 percent increase relative to the work force participation rate in our sample. Similarly, the second column suggests that a child with college-educated father will increase his or her earnings by more than 16 percent if the father relocates.

5.4. Investigation of mechanisms using survey data

The results in Tables 4 and 5 contradict the hypothesis that children of highly-skilled fathers benefit more from fathers' proximity post-divorce than children of low-skilled fathers. Instead, highly-educated fathers' proximity seems to be negatively associated with children's educational attainment and future economic success. A possible explanation for this could be that highly-educated fathers are more involved in their children's lives following the divorce, including a greater likelihood of having the child stay with the father for overnight visits and weekends and possibly a greater likelihood of shared custody arrangements (Amato & Rezac, 1994; Cancian & Meyer, 1998; Donnelly & Finkelhor, 1993; Manning & Smock, 1999). As discussed in section 2, fathers' involvement of this sort may not be beneficial to the child if it

contributes to post-divorce interparental conflict, or if splitting time between two households disrupts needed stability in the child's life (Lamb et al., 1997). Consequently, it may be beneficial to the child if a highly-educated father relocates because it shelters the child from interparental post-divorce conflict and/or creates a more stable home environment.

This hypothesis would be supported by evidence that divorced college-educated fathers have more contact with their non-resident children and a greater degree of conflict with their ex-spouses. Our register data does not allow us to test this because we cannot observe post-divorce interparental conflict and father-child contact. However, we can utilize responses to a mail survey performed by Statistics Norway in 2002 to investigate this issue. The survey asked divorced parents about non-resident father-child contact and interparental conflict. The responses were matched to register data, providing a rich set of variables capturing the respondents' socio-economic status. The survey had a response rate of about 60 percent. In total, the survey interviewed 2, 309 parents, including 749 couples in which both the mother and the father of a child responded (i.e. 1498 responses).

In the analysis of these survey data we strive to parallel the sample in our investigation of the register data. Consequently, we utilize data on all fathers who were living with the mother at the birth of their (first) child and divorced before the (first) child turned age 13, where the mother has custody of the child(ren). We also construct control variables capturing child, mother and father characteristics similar to those described in Section 4. We have two main variables of interest: 1) a dummy variable measuring whether the father reports a high level of post-divorce conflict between himself and the child's mother[m]; and 2) a dummy variable indicating that the child spends more than 1 out of 5 nights at the father's home.

---

[m] This measure was originally scaled with values of 1,2,3 and 4, where 4 denotes "high conflict" and 1 denotes "no conflict."

Table 6 investigates whether a high level of post-divorce conflict is more prevalent among fathers with a college education. Consistent with the mechanism outlined in hypothesis 2, Model 1 finds that college-educated fathers report a higher level of post-divorce conflict compared to fathers with no college education. Models 2 and 3 show that this correlation is robust to the inclusion of post-divorce characteristics and father and child characteristics. In line with other studies, these data also show a correlation between fathers' remarrying/cohabiting and post-divorce conflict (Cherlin & Furstenberg, 1994). Over the sample for which we have responses from both the mother and father, models 4 and 5 replicate models 2 and 3 (respectively), while Model 6 controls for characteristics of the mother. Estimates are modestly larger for this sample but remain robust to inclusion of mother's characteristics.[n]

Table 7 investigates whether highly-educated fathers spend more time with their children. Consistent with the mechanism outlined in hypothesis 2, Models 1-3 show that children of college-educated fathers spend more time with their father post-divorce, compared to other children. This correlation is robust to inclusion of post-divorce characteristics, in addition to father and child characteristics. Again, the correlation appears modestly stronger when estimated over the sample for which we have responses from both parents (Models 4 and 5) and is robust to inclusion of mother's characteristics (Model 6).

In summary, the evidence presented in Tables 6 and 7 suggests that highly-educated fathers report a higher degree of post-divorce conflict with their ex-wives and are more involved in their children's lives, at least as measured by the number of nights the child spends at the father's house. Consistent with hypothesis 2, this suggests an explanation for why children may benefit when highly-educated fathers relocate: the father's relocation may

---

[n] The finding of higher conflict reported by college-educated fathers is much less pronounced when we analyze the level of conflict as reported by the *mother*. Using mothers' report of conflict, the probability of high post-divorce conflict is only modestly (and insignificantly) higher for college educated fathers. However, these results are estimated on a smaller sample (the analysis requires a subsample where both the mother and father respond as fathers report their own education) and are very imprecise.

shelter the child from post-divorce conflict and/or from persistent disruptions in the structure of the child's life as they split time between households.

6. Conclusion

In the U.S. and elsewhere, several recent legal and policy initiatives have been undertaken to motivate involvement of divorced fathers in their children's lives (Dion 2005), including laws restricting the relocation of families following divorce (McKee 2004). These initiatives are generally motivated by the notion that involvement of nonresident fathers is beneficial for their children, a hypothesis supported by evidence from many fields highlighting fathers' inputs as important components of children's development (Argys et al., 1998; Lamb et al., 1987; McLanahan & Sandefur, 1994). Nonetheless, there is a scarcity of compelling evidence supporting the positive role of father-child contact following a divorce (King 1994a; 1994b).

Utilizing high-quality longitudinal population data on children of divorce who have reached young adulthood in Norway, we find no support for the assumption that nonresident fathers' proximity to their children has a beneficial impact for those children. Instead, our evidence indicates that fathers' post-divorce proximity is negatively associated with children's educational achievement and human capital attainment in young adulthood. Importantly, these associations are only statistically significant (and are substantial) for highly-educated fathers. These findings should not be interpreted as suggesting that the quality of fathers' relationships with children following a divorce does not matter to child development, nor that fathers are unimportant in children's lives. The findings do suggest, however, that living in close proximity to a nonresident father following a divorce does not, in and of itself, promote good child outcomes.

A number of plausible hypotheses could explain why living in closer proximity to a divorced father fails to promote better child outcomes. For instance, it is possible that fathers'

proximity is not strongly correlated with fathers' engagement in their children's lives. If so, this hypothesis runs counter to numerous studies that show a positive correlation between father-child contact and other dimensions of fathers' parenting involvement (Coley & Chase-Lansdale, 1999; Ryan et al., 2008; Kalil et al., 2005; Sobolewski & King, 2005).

A second hypothesis is that fathers who end up divorced are commonly those who have not been successful in the roles of husband and father. It is well-established that men's risk factors for divorce include poor relationship skills, antisocial behavior, and low human capital (Jaffee et al., 2003; of course, many of these are also risk factors for divorce among women). To the extent that divorced fathers are characterized by poor parenting skills or serve as poor role models, proximity to such fathers may fail to benefit their children and may even be detrimental to their children's development (Ryan 2008). Our finding that fathers' proximity is uncorrelated with children's outcomes for fathers with less than college education is broadly consistent with this hypothesis, though it fails to explain the negative associations for college-educated fathers.

A third possibility is that any benefit of increased fathers' engagement, facilitated by close proximity, is offset or even undermined by the challenges in accommodating that engagement (Amato & Rezac, 1994). In particular, fathers' active engagement could come at the cost of increasing post-divorce conflict among the ex-spouses or disrupting stability in children's day-to-day lives, each of which could adversely affect children's development. This hypothesis could explain why fathers' proximity generally fails to improve children's outcomes and the substantial negative associations for college-educated fathers. Prior analyses have found that highly-educated divorced fathers are more likely to be involved in their children's lives and to request joint custody (Amato & Rezac, 1994; Cancian & Meyer, 1998; Donnelly & Finkelhor, 1993; Manning & Smock, 1999). Our analysis of Norwegian survey data finds that college-educated divorced fathers spend more nights with their children and also report higher

degrees of post-divorce conflict with their ex-spouses. Together, these results suggest that fathers' relocation to a more distant location following the divorce may benefit children by sheltering them from interparental conflict and/or from persistent disruptions in the structure of the child's life as they split time between households. Although these findings pertain to the effects of fathers' relocation following a divorce, they are also important given recent legal and policy initiatives to limit custodial mothers' relocation choices following a divorce, as these policies are motivated by concerns about father-child post-divorce proximity.

As noted above, we wish to avoid implying that nonresident fathers' relationships do not matter for children's development following a divorce. Our data contain no measures of the quality of relationships or the extent of responsive parenting between nonresident fathers and their children. These are the two dimensions of nonresident fathers' behavior that have been most often linked to good child outcomes (Amato & Gilbreth, 1999; King & Sobolewski, 2006). The limited number of studies that have examined the role of father-child contact, per se, have found inconsistent associations with children's developmental outcomes (Amato & Gilbreth, 1999; Amato & Rezac, 1994; King 1994a, 1994b). Our findings are thus generally consistent with these prior studies, although none examined long-run outcomes as we do here, and many are inconclusive on the issue of causality given a reliance on cross-sectional data (e.g., King & Sobolewski, 2006). It is also possible that data limitations and analytic flaws characteristic of many of these prior studies reduced their ability to identify the negative associations between father-child proximity and children's attainment that our study has demonstrated.

There is undoubtedly heterogeneity in our sample that we are unable to identify given data limitations. For example, if the average small negative effect of father proximity on children's attainment is largely a result of conflict that persists between the mother and the nonresident father, this would suggest that proximity matters differently for families who are able to

effectively resolve the conflicts of the divorce or who are better able to maintain clear and compatible rules and routines across households, perhaps especially in the case of shared-custody arrangements (see, e.g., Amato & Rezac, 1994). Indeed, our findings could be interpreted as support for policy initiatives to better equip divorced parents to minimize the conflicts and disruptions that arise when caregiving responsibilities are shared. It might also be the case that emotional ties to fathers, whose formation is facilitated by proximity, are more beneficial when children have weak emotional ties to their mothers (King & Sobolewski, 2006; Ryan et al., 2006).

Nevertheless, a conclusion that is strongly supported by our data is that policies that attempt to regulate father-child proximity following a divorce are unfounded if the motivation for such policies is the positive development of the child.

References

Amato, P.R. (2001). Children of divorce in the 1990's: An update of the Amato and Keith (1991) meta-analysis. *Journal of Family Psychology, 15*: 355-370.

Amato, P.R. & Gilbreth, J.G. (1999). Nonresident fathers and children's well-being: A meta–analysis, *Journal of Marriage and the Family, 61*: 557–573.

Amato, P.R. & Rezac, S.J. (1994). Contact with nonresident parents, interparental conflict, and children's behavior. *Journal of Family Isssues, 15 (2)*: 191-207.

Angrist, J. (2001). Estimation of limited dependent variable models with dummy endogenous regressors: Simple strategies for empirical practice. *Journal of Business and Economic Statistics, 19 (1)*: 2-16.

Argys, L., Peters, H.E., Brooks-Gunn, J., and Smith, J. (1998). The impact of child support on cognitive outcomes of young children. *Demography*, 35(2): 159-173.

Becker, Gary, Elisabeth Landes and Robert Michael. 1977. "An economic analysis of marital instability." *Journal of Political Economy* 85(6): 1141-1187.

Becker, G. & Tomes, N. (1986). Human capital and the rise and fall of families. *Journal of Labor Economics,* 4(3): S1-S39.

Bhuller, M. (2009). Classification of economic regions in Norway. Notater, 24, Statistics Norway [In Norwegian].

Braver, S., Ellman, I., & Fabrocius, W. (2003). Relocation of children after divorce and children's best interests: New evidence and legal considerations. *Journal of Family Psychology, 17*, 206-219.

Breivik, K. & Olweus, D. (2005). Adolescents' adjustment in four post-divorce family structures. *Journal of Divorce and Remarriage, 44*, 99-124.

Breivik, K. & Olweus, D. (2006). Children of divorce in a Scandinavian welfare state: Are they less affected than US children? *Scandinavian Journal of Psychology, 47*, 61-74.

Cancian, M. & Meyer, D. (1998). Who gets custody? *Demography, 35*, 147-157.

Charles, K., & Stephens, M. (2004). Job displacement, disability, and divorce. *Journal of Labor Economics, 22,* 489-522.

Cherlin, A. & Furstenberg, FF (1994). Step-families in the United States: A reconsideration. *Annual Review of Sociology, 20*, 359-381.

Chiappori, P. & Weiss, Y. (2006). Divorce, remarriage, and welfare: a general equilibrium approach. *Journal of the European Economic Association,* 4 (2-3), 415-426.

Coley, R. L., & Chase-Lansdale, P. L. (1999). Stability and change in paternal involvement among urban African American fathers. *Journal of Family Psychology, 13*, 416-435.

Conley, D. (2004). *The Pecking Order: Which Siblings Succeed and Why*. New York: Pantheon.

Dion, M. R. (2005). Healthy marriage programs: Learning what works. *Future of Children, 15,* 139-156.

Dominus, S. (2005, May 8). *The fathers' crusade*. Available on-line at http://www.nytimes.com/2005/05/08/magazine/08FATHERS.html

Donnelly, D. & Finkelhor, D. (1993). Who has joint custody? Class differences in the determination of custody arrangements. *Family Relations, 42,* 57-60.

Furstenberg, F.F. & Cherlin, A. (1991). *Divided families: What happens to children when parents part*. Cambridge, MA: Harvard University Press.

Hægeland, T., Klette, T.J., & Salvanes, K.G. (1999). Declining returns to education in Norway? Comparing estimates across cohorts, sectors, and over time. *Scandinavian Journal of Economics 101 (4)*: 555-576.

Imbens, G. W., & Wooldridge J. W. (2008). Recent development in the econometrics of program evaluation, IZA Discussion Paper No. 3640.

Jaffee, S., Moffitt, T., Caspi, A., & Taylor, A. (2003). Life with (or without) father: The benefits of living with two biological parents depends on the father's antisocial behavior. *Child Development, 74*, 109-126.

Kalil, A., Ziol-Guest, K. M., & Coley, R. L. (2005). Perceptions of father involvement patterns in teenage-mother families: Predictors and links to mothers' psychological adjustment. *Family Relations, 54*, 197-211.

Kalil, A., Ziol-Guest, K., & Levin-Epstein, J. (2009, April). *Non-standard work and marital stability: Evidence from the National Longitudinal Survey of Youth*. Paper presented at the Population Association of America (PAA) Annual Meeting: Detroit, MI.

King, V. (1994a). Variation in the consequences of nonresident father involvement for children's well-being. *Journal of Marriage and Family, 56*, 963-972.

King, V. (1994b). Nonresidential father involvement and child well-being: Can dads make a difference? *Journal of Family Issues, 15 (1),* 78-96.

King, V., & Sobolewski, J. M. (2006). Nonresident fathers' contributions to adolescent well-being. *Journal of Marriage and the Family, 68,* 537-557

Lamb, M., Pleck, J., Charnov, E., & Levin, J. (1987). A biosocial perspective on paternal behavior and involvement. In J. Lancaster, J. Altman, A. Rossi, & L. Sherrod (Eds.), *Parenting across the lifespan: Biosocial perspectives* (pp. 11-42). New York: Aldine-De Gruyter.

Lamb, M., Sternberg., K., & Thompson, R. (1997). The effects of divorce and custody arrangements on children's behavior, development, and adjustment. *Family and Conciliation Courts Review, 35*, 393-404.

Manning, W. & Smock, P. (1999). New families and nonresident father-child visitation. Social Forces, 78, 87-116.

McKee, M. (2004, May 3). *Divorced parents must consider ex if moving away*. Available on-line at http://www.law.com/jsp/article.jsp?id=1083328797176

McLanahan, S. & Sandefur, G. (1994). *Growing up with a single parent: What hurts, what helps*. Cambridge, MA: Harvard University Press.

Morrison, D. & Coiro, M. (1999). Parental conflict and marital disruption: Do children benefit when high-conflict marriages are dissolved? *Journal of Marriage and the Family, 61*, 626-637.

Morrison, D. & Cherlin, A. (1995). The divorce process and young children's well-being: A prospective analysis. *Journal of Marriage and the Family, 57*, 800-812.

Rangarajan, A., & Gleason, P. (1998). Young unwed fathers of AFDC children: Do they provide support? *Demography, 35,* 175–186.

Rege, M., Telle, K., & Votruba, M. (2009). The effect of plant downsizing on disability pension utilization. *Journal of the European Economic Association*, forthcoming.

Ryan, R. M. (2008, April). *Family structure and early child outcomes: The moderating influence of paternal education.* Paper presented at the Population Association of America (PAA) Annual Meeting: New Orleans, LA.

Ryan, R., Kalil, A., & Ziol-Guest, K. (2008). Longitudinal patterns of non-resident fathers' involvement: The role of resources and relations. *Journal of Marriage and Family, 70,* 962-977.

Ryan, R. M, Martin, A., & Brooks-Gunn, J. (2006). Is one good parent good enough? Mothering, fathering and child cognitive outcomes in the Early Head Start Research and Evaluation Project. *Parenting: Science and Practice*, 6, 211-228.

Seltzer, J.A. (1994). Consequences of marital dissolution for children. *Annual Review of Sociology 20*: 235–266.

Seltzer, J.A. (2000). Child support and child access: Experiences of divorced and nonmarital families. In *Child Support: The Next Frontier*, ed. J. Thomas Oldham and Marygold S. Melli. Ann Arbor, MI: University of Michigan Press.

Statistics Norway (2008). Population statistics: Divorces and separations, 2006. Retrieved March 20, 2009 at http://www.ssb.no/english/yearbook/tab/tab-102.html

Steele, F., Sigle-Rushton, W. & Kravdal, O. (2009). Consequences of family disruption on children's educational outcomes in Norway. *Demography, 46(3)*: 553-574.

Sobolewski, J.M. & Amato, P.R. (2007). Parents' discord and divorce, parent-child relationships and subjective well-being in early adulthood: Is feeling close to two parents always better than feeling close to one? *Social Forces, 85*, 1105-1124.

Sobolewski, J.M. & King, V. (2005). The importance of the coparental relationship for nonresident fathers' ties to children. *Journal of Marriage and Family, 67*, 1196-1212.

Størksen, I., Roysamb, E., Moum, T., & Tambs, K. (2005). Adolescents with a childhood experience of parental divorce: A longitudinal study of mental health and adjustment. *Journal of Adolescence, 28,* 725-739.

Størksen, I., Roysamb, E., Holmen, T., & Tambs, K. (2006). Adolescent adjustment and well-being: Effects of parental divorce and distress. *Scandinavian Journal of Psychology, 47*, 75-84.

Table 1. Descriptive statistics of children with distant and proximate father

	Distant father		Proximate father		Normalized Difference
	Mean	St. dev.	Mean	St. dev.	
Outcomes					
Years of education	11.80	2.66	11.62	2.62	
High-school graduate (at least 12 years of educ.)	.68	.47	.65	.48	
College graduate (at least 15 years of educ.)	.19	.39	.16	.37	
Working	.66	.47	.68	.47	
Earnings (NOK fixed-2007)	223,100	179,200	230,500	167,500	
On welfare	.21	.41	.21	.41	
Unemployed	.04	.19	.04	.19	
Married (by age 27)	.12	.33	.11	.32	
Young Parent (by age 21)	.06	.24	.06	.23	
Child's characteristics					
Female	.52	.50	.49	.50	0,042
Number of siblings	1.08	.91	1.10	.87	-0,016
Birth order	1.85	.89	1.79	.87	0,048
Age at time of divorce	7.47	3.05	6.90	3.00	0,133
Immigrant	0.07	0.25	0.08	0.27	-0,027
Mother's pre-divorce characteristics					
Earnings (NOK fixed-1979)	27,800	28,400	32,800	29,500	-0,122
Years of education	10.45	1.88	10.42	1.86	0,011
Age at birth	25.50	4.63	25.19	4.53	0,048
Age at first birth	22.54	3.61	22.32	3.64	0,043
Father's pre-divorce characteristics					
Earnings (NOK fixed-1979)	83,100	42,300	87,500	42,700	-0,073
Years of education	10.96	2.37	10.89	2.74	0,019
Age at birth	28.10	5.17	27.94	5.05	0,022
Age at first birth	24.92	3.99	25.06	4.15	-0,024
Mother's post-divorce circumstances					
Re-married	.19	.40	.25	.44	-0,101
New child	.22	.42	.19	.39	0,052
Father's post-divorce circumstances					
Re-married	.28	.45	.29	.45	-0,016
New child	.30	.46	.21	.41	0,146

Notes: The sample consists of 15992 children, of which 14.5 percent have a distant father and 85.5 percent have a proximate father. The outcomes working, earnings, on welfare, unemployed, and educational attainment are measured at age 27. Working is a binary indicator equal to 1 if the child earns at least 2 basic amounts (defined according to the standards of the social security system and equal to NOK 131,000, fixed–2007), and 0 otherwise. On welfare is a binary indicator equal to 1 if the child receives at least 1 basic amount (equal to NOK 65,500, fixed-2007) of cash benefits, and 0 otherwise. Unemployed is a binary indicator equal to 1 if the child receives at least 1 basic amount of unemployment benefits, and 0 otherwise. The normalized difference is defined as the differences in mean values of a given covariate for children with distant and proximate father, normalized by the square root of the sum of within-group variances.

Source: Administrative registers from Statistics Norway.

Table 2. Effect of distant father on child's educational attainment

Dependent variable:	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Years of education								
Point estimate	.185***	.203***	.217***	.142***	.160***	.130**	.133**	.138***
(Standard error)	(.061)	(.061)	(.059)	(.057)	(.057)	(.057)	(.057)	(.056)
[Adjusted R-squared]	[.001]	[.002]	[.079]	[.136]	[.128]	[.151]	[.151]	[.151]
High-school graduate								
Point estimate	.024**	.027**	.030***	.020*	.023**	.019*	.019*	.019*
(Standard error)	(.011)	(.011)	(.011)	(.011)	(.010)	(.010)	(.011)	(.010)
[Adjusted R-squared]	[.000]	[.002]	[.039]	[.079]	[.071]	[.090]	[.090]	[.090]
College graduate								
Point estimate	.023**	.025***	.025***	.015*	.017*	.013	.013	.014*
(Standard error)	(.009)	(.009)	(.009)	(.009)	(.009)	(.009)	(.009)	(.009)
[Adjusted R-squared]	[.000]	[.002]	[.032]	[.077]	[.077]	[.091]	[.091]	[.091]
Control variables:								
Age of child at divorce	NO	YES	YES	YES	YES	YES	YES	YES
Region-specific fixed effects	NO	NO	YES	YES	YES	YES	YES	YES
Child characteristics	NO	NO	YES	YES	YES	YES	YES	YES
Mother's pre-divorce characteristics	NO	NO	NO	YES	NO	YES	YES	YES
Father's pre-divorce characteristics	NO	NO	NO	NO	YES	YES	YES	YES
Mother's post-divorce characteristics	NO	NO	NO	NO	NO	NO	YES	YES
Father's post-divorce characteristics	NO	NO	NO	NO	NO	NO	NO	YES

Notes: The sample consists of 15992 children, of which 14.5 percent have a distant father and 85.5 percent have a proximate father. Each column of each panel is a separate regression. The dichotomous outcomes (High-school graduate and College graduate) are estimated by a linear probability model. Standard errors allow for dependence of residuals across siblings with the same mother. 1 percent significance level is denoted ***, 5 percent significance level is denoted **, and 10 percent significance level is denoted *.

All models regresses child's years of education on a dummy variable for absent father.

Model 1 includes no control variables.

Model 2 includes dummy variables for age of child at divorce.

Model 3 adds control variables for child characteristics, including dummy variables for cohort, birth order, sex, number of siblings, immigrant status, as well as fixed effects for region of birth.

Model 4 adds control variables for mother's pre-divorce characteristics, including mother's pre-divorce earnings (linearly and squared) as well as dummy variables for categories of mother's age at child's birth, mother's age at first birth, and mother's education.

Model 5 excludes control variables for mother's pre-divorce characteristics but adds control variables for father's pre-divorce characteristics, including father's pre-divorce earnings (linearly and squared) as well as dummy variables for categories of father's age at child's birth, father's age at first birth, and father's education.

Model 6 includes control variables for mother's and father's pre-divorce characteristics.

Model 7 adds control variables for mother's post-divorce circumstances, including dummy variables for mother remarried, mother has a new child, and mother remarried interacted with mother has a new child.

Model 8 adds control variables for father's post-divorce circumstances, including dummy variables for father remarried, father has a new child, and father remarried interacted with mother has a new child.

Source: Administrative registers from Statistics Norway

Table 3. Effect of distant father on child's education by child's characteristics

Dependent variable: Years of education	Model 1	Model 2	Model 3	Model 4	Model 5
Distant father	.130** (.057)	.168** (.075)	.149* (.082)	.224*** (.086)	.150** (.065)
Distant father interacted with:	.				
Female		-0.074 (.109)			
Divorce age > 6			-.035 (.110)		
Not first born				-.160 (.111)	
Only-child					-.076 (.128)
Adjusted R-squared	.151	.151	.151	.151	.151

Notes: The sample consists of 15992 children, of which 14.5 percent have a distant father and 85.5 percent have a proximate father. Each column is a separate regression. Standard errors in parentheses allow for dependence of residuals across siblings with the same mother. 1 percent significance level is denoted ***, 5 percent significance level is denoted **, and 10 percent significance level is denoted *.
All models include the control variables of Model 6 in Table 2.

Source: Administrative registers from Statistics Norway

Table 4. Effect of distant father on child's education by parent's pre-divorce characteristics

Dependent variable: Years of education	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Distant father	.130** (.056)	.048 (.060)	.060 (.076)	.128 (.079)	.138 (.087)	.123 (.111)
Distant father interacted with:						
Father attended college		.407*** (.155)	.415*** (.158)	.494*** (.175)	.495*** (.175)	.489*** (.175)
Father high earnings			-.035 (.113)	-.034 (.113)	-.034 (.114)	-.032 (.116)
Mother attended college				-.124 (.157)	-.122 (.181)	-.125 (.180)
Mother high earnings				-.137 (.115)	-.143 (.114)	-.137 (.115)
Post-divorce control variables						
(a) Father remarried	NO	NO	NO	NO	YES	YES
(b) Father has new child	NO	NO	NO	NO	YES	YES
(c) Father remarried and has new child	NO	NO	NO	NO	YES	YES
(d) Mother remarried	NO	NO	NO	NO	YES	YES
(e) Mother has new child	NO	NO	NO	NO	YES	YES
(f) Mother remarried and has new child	NO	NO	NO	NO	YES	YES
Distant father interacted with (a), (b), (c), (d), (e), (f)						YES
Adjusted R-squared	.151	.151	.151	.151	.151	

Notes: The sample consists of 15992 children, of which 14.5 percent have a distant father and 85.5 percent have a proximate father. Each column is a separate regression. Standard errors in parentheses allow for dependence of residuals across siblings with the same mother. 1 percent significance level is denoted ***, 5 percent significance level is denoted **, and 10 percent significance level is denoted *.
All models include the control variables of Model 6 in Table 2.
Model 3 also includes a dummy variable for father having high pre-divorce earnings.
Models 4-5 add a control variable for mother having high pre-divorce earnings.
Model 5 includes the control variables of Model 8 in Table 2 for parent's post-divorce circumstances.
Model 6 adds control variables for distant father interacted with parent's post-divorce circumstances.

Source: Administrative registers from Statistics Norway

Table 5. Effects of distant father on child's socio-economic outcomes

Dependent variable:	Working	Earnings	Unemployed	On Welfare	Married	Young Parent
Distant father	-.011	2260	.001	.000	.013*	.003
	(.011)	(3780)	(.004)	(.009)	(.007)	(.005)
Sample Size	15988	15988	15988	15988	15988	15988
Adjusted R-squared	.044	.084	.011	.051	.029	.042
Distant father	-.028**	-9880**	.002	.007	.011	.006
	(.012)	(4210)	(.005)	(.010)	(.008)	(.006)
Distant father interacted with	.082***	37650***	-.005	-.033	.008	-.017
father attended college	(.026)	(9105)	(.010)	(.022)	(.018)	(.013)
Sample Size	15988	15988	15988	15988	15988	15988
Adjusted R-squared	.045	.071	.011	.051	.029	.042

Notes: The sample consists of 15992 children, of which 14.5 percent have a distant father and 85.5 percent have a proximate father. Every column for each of the two panels is a separate regression. Standard errors in parentheses. 1 percent significance level is denoted ***, 5 percent significance level is denoted **, and 10 percent significance level is denoted *. All models include the control variables of Model 5 in Table 2.
Source: Administrative registers from Statistics Norway.

Table 6. Effect of father's education on the probability of high post-divorce conflict

Dependent variable: High post-divorce conflict among parents	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Father attended college	.138***	.132**	.120**	.210***	.187***	.200***
	(.051)	(.051)	(.053)	(.060)	(.063)	(.067)
Control variables:						
Father remarried/cohabiting	No	Yes	Yes	Yes	Yes	Yes
Father has new child	No	Yes	Yes	Yes	Yes	Yes
Father remarried/cohabiting and has new child	No	Yes	Yes	Yes	Yes	Yes
Child characteristics	No	No	Yes	No	Yes	Yes
Father's characteristics	No	No	Yes	No	Yes	Yes
Mother's characteristics	No	No	No	No	No	Yes
Sample size	622	622	622	393	393	393
Adjusted R-squared	.010	.020	.036	.031	.079	.085
Dependent mean	.418	.418	.418	.405	.405	.405

Notes: The sample consists of fathers who were living with the mother at the birth of their (first) child and divorced before the (first) child turns age 13, where the mother has custody of the child(ren).
Each column is a separate regression. Standard errors in parentheses. 1 percent significance level is denoted ***, 5 percent significance level is denoted **, and 10 percent significance level is denoted *.
Models 1-3 are estimated on the full sample, whereas Models 4-7 are estimated on the sub-sample with available data on mother's characteristics.
Child characteristics include dummy variables for child birth year and age of the (first) child at the time of divorce.
Father's characteristics include dummy variables for number of children with the mother, birth year, and immigrant status.
Mother's characteristics include dummy variables for birth year, immigrant status, attended college, remarried/cohabiting, new child, as well as remarried/cohabiting and a new child.

Source: 2002 survey data (on divorced parents) from Statistics Norway

Table 7. Effect of father's education on father-child contact

Dependent variable: Stays 1 of 5 nights with the father	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Father attended college	.130**	.134***	.144***	.145**	.177***	.179***
	(.052)	(.052)	(.054)	(.060)	(.064)	(.068)
Control variables:						
Father remarried/cohabiting	No	Yes	Yes	Yes	Yes	Yes
Father has new child	No	Yes	Yes	Yes	Yes	Yes
Father remarried/cohabiting and has new child	No	Yes	Yes	Yes	Yes	Yes
Child characteristics	No	No	Yes	No	Yes	Yes
Father's characteristics	No	No	Yes	No	Yes	Yes
Mother's characteristics	No	No	No	No	No	Yes
Sample size	610	610	610	390	390	390
Adjusted R-squared	.009	.012	.043	.029	.062	.067
Dependent mean	.416	.416	.416	.415	.415	.415

Notes: The sample consists of fathers who were living with the mother at the birth of their (first) child and divorced before the (first) child turns age 13, where the mother has custody of the child(ren).
Each column is a separate regression. Standard errors in parentheses. 1 percent significance level is denoted ***, 5 percent significance level is denoted **, and 10 percent significance level is denoted *.
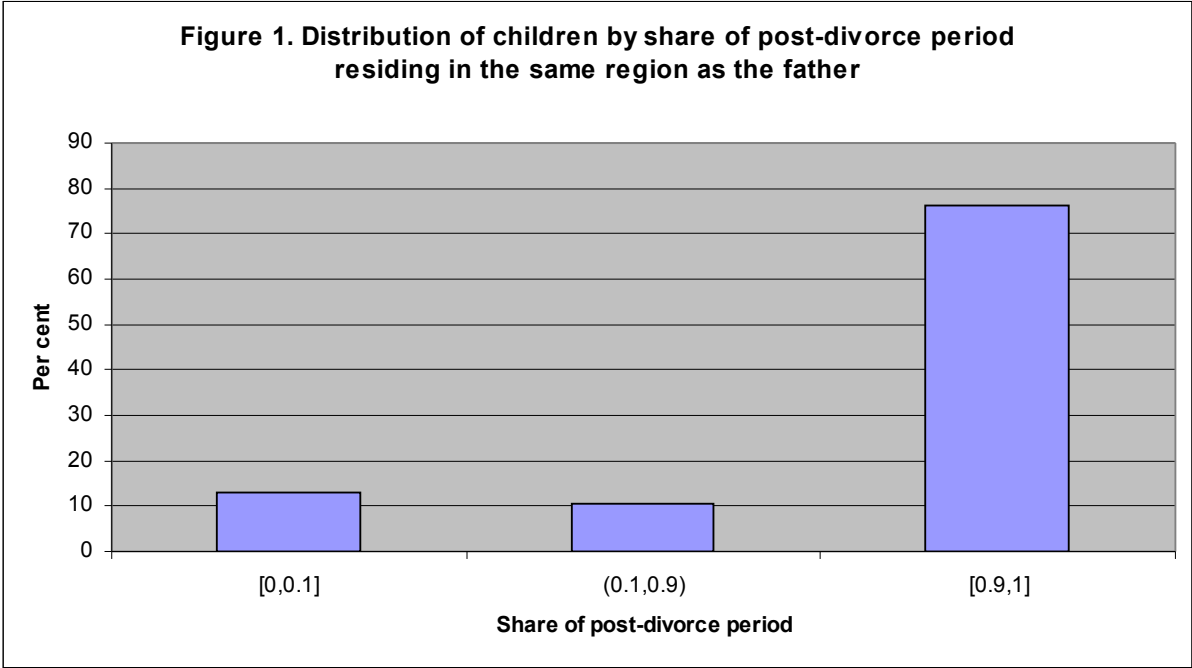Models 1-3 are estimated on the full sample, whereas Models 4-7 are estimated on the sub-sample with available data on mother's characteristics.
Child characteristics include dummy variables for child birth year and age of the (first) child at the time of divorce.
Father's characteristics include dummy variables for number of children with the mother, birth year, and immigrant status.
Mother's characteristics include dummy variables for birth year, immigrant status, attended college, remarried/cohabiting, new child, as well as remarried/cohabiting and a new child.

Source: 2002 survey data (on divorced parents) from Statistics Norway

Figure 1. Distribution of children by share of post-divorce period residing in the same region as the father

Notes: The sample consists of 18082 children.
Source: Administrative registers from Statistics Norway.
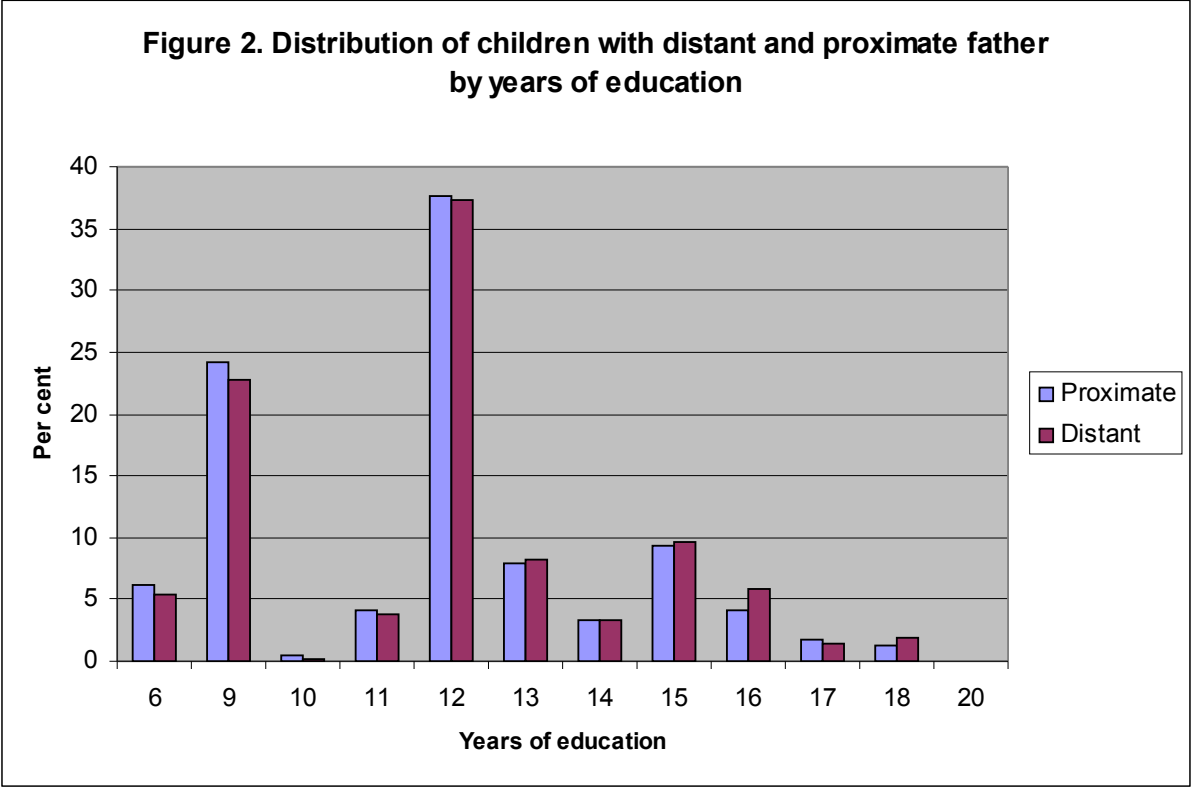
Figure 2. Distribution of children with distant and proximate father by years of education

Notes: The sample consists of 15992 children, of which 14.5 percent have a distant father and 85.5 percent have a proximate father. Years of education is measured at age 27.
Source: Administrative registers from Statistics Norway.

APPENDIX:

Table A1. Effect of distant father on child's education by father's education

Dependent variable: Years of education	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Distant father	.082 (.064)	.091 (.064)	.088 (.063)	.040 (.062)	.090 (.063)	.048 (.060)
Distant father interacted with:						
Father attended college	.404*** (.142)	.404*** (.142)	.332** (.138)	.414*** (.136)	.347** (.137)	.407*** (.155)
Father's education	YES	YES	YES	YES	YES	YES
Age of child at divorce	NO	YES	YES	YES	YES	YES
Region-specific fixed effects	NO	NO	YES	YES	YES	YES
Child characteristics	NO	NO	YES	YES	YES	YES
Mother's pre-divorce characteristics	NO	NO	NO	YES	NO	YES
Father's pre-divorce characteristics	NO	NO	NO	NO	YES	YES
Age of child at divorce	NO	YES	YES	YES	YES	YES
Adjusted R-squared	.062	.063	.126	.150	.130	.151

Notes: The sample consists of 15992 children, of which 14.5 percent have a distant father and 85.5 percent have a proximate father. Each column of each panel is a separate regression. The dichotomous outcomes (High-school graduate and College graduate) are estimated by a linear probability model. Standard errors allow for dependence of residuals across siblings with the same mother. 1 percent significance level is denoted ***, 5 percent significance level is denoted **, and 10 percent significance level is denoted *.
All models regresses child's years of education on a dummy variable for absent father., including dummy variables for categories of father's education.
Model 1 includes no other control variables.
Model 2 adds dummy variables for age of child at divorce.
Model 3 adds control variables for child characteristics, including dummy variables for cohort, birth order, sex, number of siblings, immigrant status, as well as fixed effects for region of birth.
Model 4 adds control variables for mother's pre-divorce characteristics, including mother's pre-divorce earnings (linearly and squared) as well as dummy variables for categories of mother's age at child's birth, mother's age at first birth, and mother's education.
Model 5 excludes control variables for mother's pre-divorce characteristics but adds control variables for father's pre-divorce characteristics, including father's pre-divorce earnings (linearly and squared) as well as dummy variables for categories of father's age at child's birth, and father's age at first birth.
Model 6 includes control variables for mother's and father's pre-divorce characteristics.

Source: Administrative registers from Statistics Norway

**Figure A1. Map of economic regions in the south of Norway**

Notes: The map shows economic regions in the 16 southern counties of Norway (Vest-Agder, Aust-Agder, Telemark, Rogaland, Vestfold, Østfold Akershus, Oslo, Buskerud, Oppland, Hedmark, Hordaland, Sogn og Fjordane. Møre og Romsdal, Sør-Trøndelag, Nord-Trøndelag). The fat lines represent the borders of the counties, whereas the thin lines represent the borders of the economic regions. Economic region may cross county borders.

Source: Bhuller (2009)

Figure A2. Map of economic regions in the north of Norway
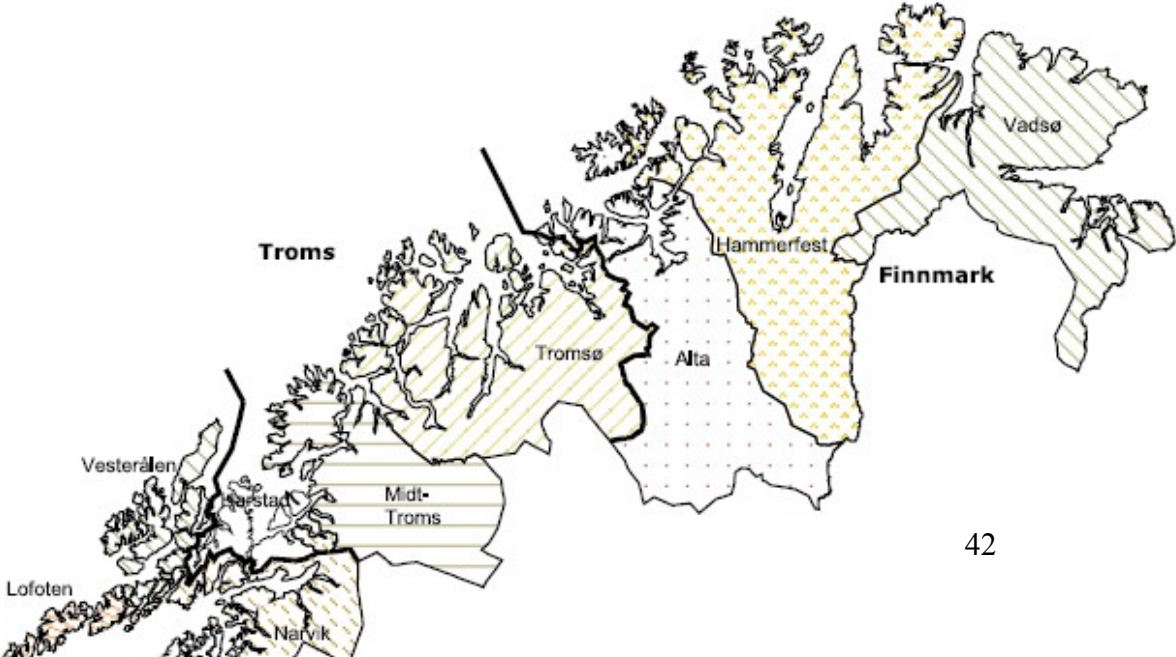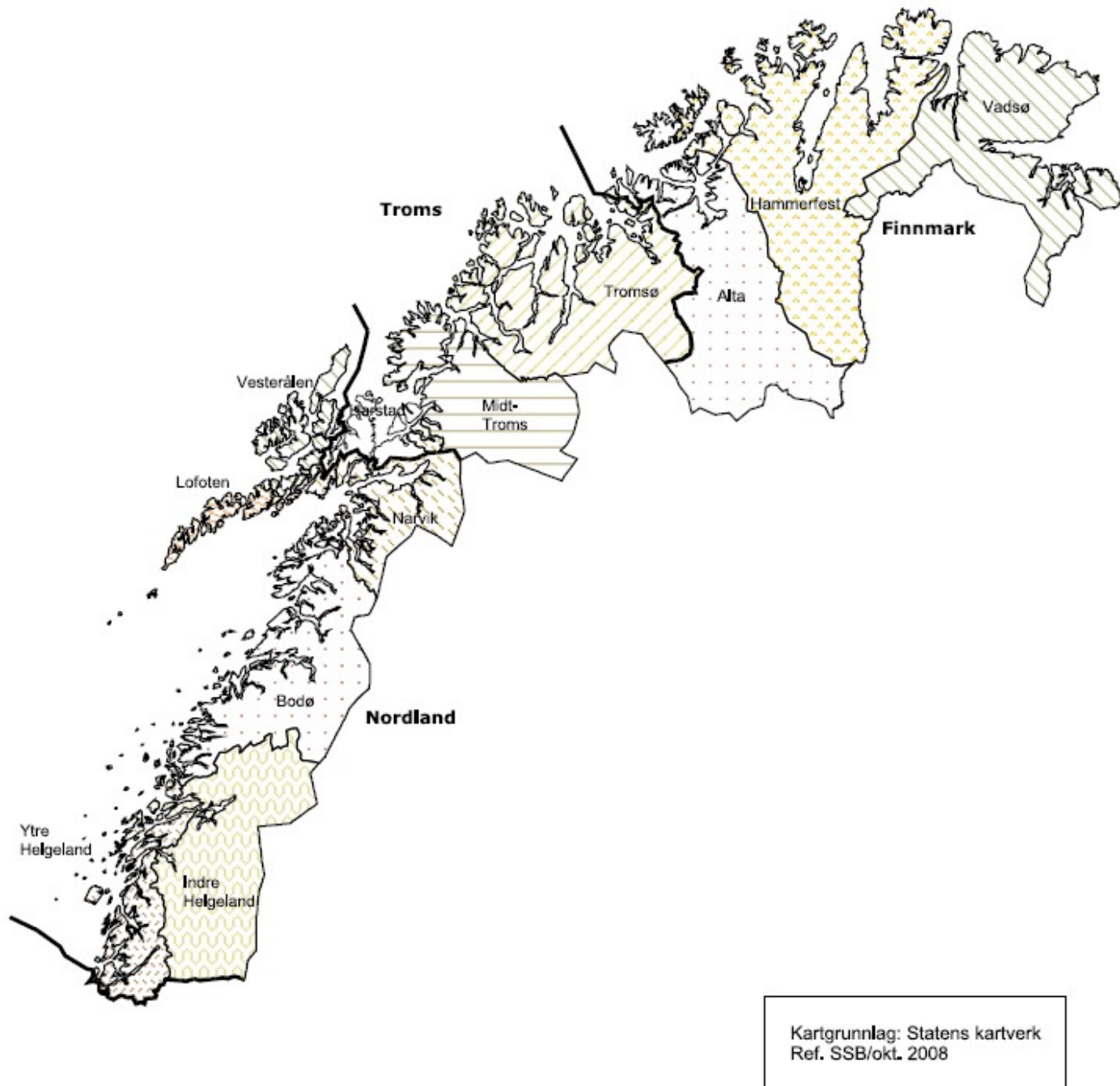
Notes: The map shows economic regions in the three northern counties of Norway (Nordland, Troms and Finmark). The fat lines represent the borders of the counties, whereas the thin lines represent the borders of the economic regions. Economic region may cross county borders.

Source: Bhuller (2009)