Intergenerational Earnings Mobility and Divorce*

Espen Bratberg
Department of Economics
University of Bergen
espen.bratberg@econ.uib.no

Karsten Marshall Elseth Rieck
Department of Economics
University of Bergen
karsten.rieck@econ.uib.no

Kjell Vaage
Department of Economics
University of Bergen
kjell.vaage@econ.uib.no

June, 2011

Abstract

This paper examines the potential effect of marital disruption on intergenerational earnings mobility. We observe the earnings of children born in 1960 and 1970 along with their biological fathers and mothers. The earnings mobility between sons and daughters relative to the earnings of their mothers and fathers is estimated. Our results suggest that divorce is associated with increased mobility, except between mothers' and daughters' earnings. Transition matrices reveal that the direction of the mobility is negative; children of divorced parents tend to move downward in the earnings distribution compared to children from intact families. Finally, we utilize information on the earnings mobility of siblings in dissolved families who grew up when the family was intact. The difference between pre- and post-divorce siblings is in turn compared with sibling differences in intact families.

Keywords: Intergenerational earnings mobility; divorce; gender differences.

JEL codes: J62; J12; C23.

* Acknowledgement: The authors would like to thank the participants at EEA 2009 in Barcelona and SOLE 2011 in Vancouver for their comments and suggestions.
All errors and opinions are the authors' sole responsibility.

1. Introduction

The body of research on intergenerational correlations of social and economic status has been growing during recent decades.[1] One finding from this research is that the Scandinavian countries are characterized by high intergenerational earnings mobility relative to the US and the UK (Björklund and Jäntti, 1997; Bratberg *et al.*, 2005, 2007; Bratsberg *et al.*, 2007). It has been suggested that high mobility in the Scandinavian societies is the result of policies aimed at reducing inequality. The Norwegian welfare state is characterised by a high degree of redistribution, low wage dispersion, and an educational system focused on providing equal opportunities.

Norway is also included among the countries in Europe with the highest numbers of marital dissolutions. In 1960, the probability that a marriage would be dissolved within a period of twenty years was 7.7%, increasing to 20.5% in 1980 and fluctuating between 35% and 40% from 1990 (Statistics Norway, 2011a). These changes have been followed by transitions from intact two-parent families to alternative family structures like single parenthood and step-parent families. In 2010, only 75 % of children between 0 and 17 years of age lived with both biological parents, as compared to 82 % in 1989 (Statistics Norway, 2011b). A large body of literature—within economics and other fields—deals with the impact of parental divorce on children, see e.g. Amato and Keith (1991), McLanahan and Sandefur (1994), and Gruber (2004). The main picture is that the children of divorced parents have less favourable outcomes regarding educational attainment, high school drop-out ratio, early motherhood, youth unemployment, etc.

In the standard approach to modelling intergenerational earnings transmission, represented by Becker and Tomes (1979, 1986), parents' earnings are linked to their children's by families investing a part of their income in the younger generation's education.

[1] See Solon (1999) for a review.

The higher this correlation is, the less is intergenerational mobility. Divorce may reduce the households' economic resources, and thus, the potential for investing in the children's human capital. If the custodial parent must increase his or her labour supply to offset the loss of a second income, it may have adverse effects on the cognitive and non-cognitive environment of the children (less time to assist the children in homework, after-school activities, etc.). This form of investment extends the Becker-Tomes type, but has gained increasing attention in recent studies of human capital accumulation, see e.g. Carneiro and Heckman (2003) and Heckman and Masterov (2007). In divorced families, it may be crucial to separate father-child from mother-child earnings correlations. The typical outcome is that the mother is the custodial parent, and according to the human capital investment approach, this should increase the mother-child correlation but decrease the father-child correlation.[23] Time-use studies, e.g. Lundberg (2005), indicate that fathers in intact families spend more time with their sons than their daughters. If the marital break-up leads to less father-child contact with less opportunity to influence the child, it also points to smaller father-child correlations. On the other hand, if there is a strong biological component ('nature') in intergenerational mobility, father-child correlations should be less affected by a non-resident father.

There is a relatively small body of literature addressing divorce and intergenerational mobility. Peters (1992), using data from the US, finds no effect of a disrupted family on the mobility of sons or daughters. In another American study, Couch and Lillard (1997) find that sons of divorced couples are *less* mobile than others and attributes this result to a clustering of divorcing families, parents and children, in the lower part of the income distribution, i.e., there is less upward mobility. Björklund and Chadwick (2003) use Swedish data to address several constellations of biological and non-biological father-child pairs. They find that the

[2] This is not an unambiguous prediction, however, as the new family structure may affect preferences for investing in children's human capital.

[3] In Norway, the parent with child custody receives most of the public transfers plus child support from the noncustodial parent, the latter being enforced by law. This probably makes the custodial parent better off than in most other countries. See Tjøtta and Vaage (2008) for details.

association between the incomes of sons and biological fathers are weaker the less they lived together, and also that the correlation is weaker for non-biological than for biological fathers. Fertig (2007) uses PSID data and finds that with each additional year in a family involving a single or a step-parent, children's earnings move further from their biological fathers', but closer to their mothers'.

The main objective of the present paper is to add to this rather scarce literature using Norwegian administrative register data, which provides us with very long earnings series for the working-age population. We focus on the cohorts born in 1960 and 1970, comparing intergenerational earnings elasticities in divorced and intact families. In the literature on earnings transmission, a high degree of intergenerational mobility is closely related to equality of opportunity and is often considered a cornerstone of a well-functioning welfare state. The above discussion and literature review call for some reservations: if children of divorced parents typically move in a downward direction in the earnings distribution compared to their parents, it does not represent a welfare gain. Intergenerational elasticities from parent-child regressions only show the degree of mobility, not the direction. We therefore make a point of considering transition matrices, which also indicate the direction of mobility.

A crucial question in empirical research on the impact of parental divorce on children's outcome is how to isolate the causal effects of divorce and separate them from other innate family characteristics. Families that break up might have characteristics (high conflict levels etc.) that would have had adverse effects on the children even in the counter-factual case of no divorce. If divorcing families are selected on properties that affect child outcomes negatively, a negative effect of divorce on the estimated parent-child elasticity may be biased away from zero. We approach this issue by comparing the earnings of siblings in dissolved families who grew up before and after the divorce, respectively. This difference is

in turn compared to corresponding sibling differences in intact families. The conclusion from this part of the analysis is that we cannot identify a divorce effect on intergenerational earnings elasticity.

The paper is organised as follows. Estimation is discussed in Section 2. Section 3 introduces the data material and discusses the design of the study. In Section 4, the results are presented and discussed in detail. Section 5 summarizes the findings.

2. Method

We follow the standard approach used in the intergenerational earnings mobility literature and formulate the association between parents' and offspring's economic status as

$$y_i^c = \alpha + \beta y_i^p + \varepsilon_i \tag{1}$$

Here, y_i^p is a measure of parental log lifetime earnings in family *i*, y_i^c is an according measure for the child, ε_i is a random error term, and β is the intergenerational earnings elasticity. This parent-child regression may be motivated by parents investing a part of their income in their children's education, see Becker and Thomes (1979, 1986), Solon (1999) for formal models. Following Solon (1992) and Zimmerman (1992), much attention in empirical work has been directed at measurement error bias following from using single-year observations as proxies for lifetime earnings. The resulting attenuation bias may be reduced by using instrumental variables or earnings averages over several years. This paper follows the latter approach.

An alternative – or supplement – to running parent-child regressions is to report quantile transition matrices. The earnings distributions of parents and children are divided into a number of percentiles, and then transition matrices are computed for the fraction of

children that belongs to percentile *k*, given that the parent belongs to percentile *j* for all (*j*, *k*) pairs. In this paper, we report quartile transitions.

As our purpose is to explore the potential effect of parental divorce on intergenerational earnings elasticity, we run separate regressions for children from divorced and intact families. We also report transition matrices for the same groups. In most of the intergenerational earnings literature, what is termed 'parental income' is represented either by family earnings or father's earnings. Because we consider divorced families, we report regressions and transition matrices for mothers and fathers separately.

As noted in the introduction, comparing the intergenerational earnings elasticities of divorced and intact families is problematic if unobserved factors that affect the probability of divorce also affect parental earnings. To alleviate this problem, we have constructed a subsample of divorcing families where we can observe an older sibling who was not exposed to the divorce in adolescence and a younger sibling who was affected by the divorce in his or her youth. We have also constructed a comparison group with older and younger siblings in families that did not divorce. Let t denote older ($t = 0$) and younger ($t = 1$) siblings, and define two dummy variables as $D_i = 0$ for intact families, $D_i = 1$ for divorcing families, and $T_t = 0$ for $t = 0$ and $T_t = 1$ for $t = 1$. Our joint regression equation for the siblings sample is

$$y_{it}^{c} = \alpha + \gamma_1 D_i + \gamma_2 T_t + \gamma_3 T_t D_i + \beta y_{it}^{p} + \delta_1 D_i y_{it}^{p} + \delta_2 T_t y_{it}^{p} + \delta_3 T_t D_i y_{it}^{p} + \varepsilon_{it}\,. \qquad (2)$$

γ_1, γ_2, and γ_3 allow the earnings level of the younger generation to differ between family types and between older and younger siblings. δ_1, δ_2, and δ_3 allow the intergenerational earnings elasticity to vary accordingly[4] (the interactions of y_{it} with T_i can be identified because parental earnings are observed separately for older and younger siblings). The test for a divorce effect is $\delta_3 \neq 0$.

[4] There is some evidence that intergenerational earnings elasticity changes over time, cf. Bratberg *et al*. (2005).

Consistency of OLS estimation of (2) relies on independence of the error term and divorce status, i.e. $E(\varepsilon_{it} \mid D_i) = 0$. If divorce is endogenous to unobserved family characteristics, this approach produces inconsistent estimates. However, if unobserved family characteristics are constant over time, i.e. if $\varepsilon_{it} = u_{it} + f_i$, where f_i denotes the family effect, fixed effect estimation of (2) yields consistent results. For this approach to work, there must be sufficient within-family earnings variation to identify the elasticities.

In the results section, we report OLS and fixed effects estimates of equation (2). First, we explain in more detail how the samples for the different estimations were identified.

3. Data and sample

The data used in this study is extracted from Norwegian administrative registers recorded by Statistics Norway. In the database, family and individual characteristics are available from censuses in 1960, 1970 and 1980, and from administrative data from 1990. Information on yearly earnings is available from 1967 to 2008 in separate series.

Our sample consists of 62,071 married couples with children born in either 1960 or 1970. The families are divided into intact and divorced families when the children are 10 and 20 years of age, as the registers only contain data on family characteristics between 1960 and 1980 in ten-year intervals. Table 1 shows the number of intact and divorced families during the children's adolescence.

We follow Bratberg *et al*. (2005, 2007) and apply earnings from five subsequent years as a proxy for lifetime earnings.[5] [6] The earnings of children are measured at ages 32 to 36. For

[5] The earnings series were originally collected for the purpose of calculating old-age pension. They include earnings but exclude interest, capital income, etc. Unemployment benefits, disability benefits, and sick pay are included. The fraction of 'true' zero earners in our data is very low. Zero recorded earnings in most cases are due to registration errors.

[6] If earnings are missing or equal zero in one, two or three years, we use the average of the non-zero observations. If four or five years are missing or equal zero, the person is excluded from the study.

parents, the earnings are measured between ages 39 and 65,[7] with an average age of about 50 for the main part of our analysis.[8] Descriptive statistics on (log) earnings and age averages are presented in Table 2.

Table 3 compares earnings distributions for divorced and intact families by placing them in quartiles for the full sample. The fractions of parents and children in intact families in the four categories mostly coincide with the full earnings distribution. In divorced families, fathers and sons are over-represented in the lower quartile and under-represented in the upper quartile. Divorced mothers are strongly under-represented in the lower and over-represented in the upper quartile, indicating that post-divorce, mothers typically become breadwinners.

In the sample, we have identified 8,994 divorced and intact families that are used to investigate potential selection effects. These families consist of couples with at least two children, where the younger sibling is part of our main sample of children born in 1960 or 1970.[9] Ideally, we would like to observe families where the older siblings in both family groups grew up when the families were intact, while for the younger siblings, the family was still intact for one group and divorced for the other; see section 2 for formal details. In practice, this is more complicated. Because we would like to measure the parents' earnings prior to the potential divorce, data limitations restrict the analysis to families where the divorce occurs when younger siblings are between 10 and 20 years of age.[10] To reduce the influence of a potential divorce on the older siblings, we demand the age difference between the younger and older siblings to be at least five years. Finally, to avoid potential cross-gender noise, we only observe families where the children are of the same sex. Descriptive statistics for the siblings subsample are presented in Table 4.

[7] The upper age limit is 65 because a significant portion of the total labour force has the opportunity to retire before the official retirement age at 67.
[8] The age intervals of parents are chosen to make the earnings averages comparable for intact and divorced families.
[9] In families with more than two children, we use siblings that are closest in age, given the earlier mentioned restrictions.
[10] The earnings records do not start before 1967, so we are not able to explore families who got divorced during the children's first 10 years.

4. Results and discussion

The analysis is carried out as follows. First, the sons' and daughters' earnings are regressed on the fathers' and mothers' earnings, separately for intact and divorced families. Second, transition matrices are computed for the same groups. Finally, we explore the possible influence from unobserved family characteristics in the subsample of siblings.

4.1 *Intergenerational elasticities*

Estimated elasticities from OLS regressions of all parent-child pairs are reported in Table 5. Columns 1 and 2 show results for families that stayed intact during the first 10 and 20 years of the younger generation's lives, respectively, while columns 3 and 4 display estimates for families that broke up during the first 10 years or between 10 and 20. Column 5 shows joint estimates for all divorced families.

Starting with the son-father mobility in intact families, we find an intergenerational elasticity of about 0.15; slightly lower for the daughter-father mobility. This is clearly in accordance with earlier estimates for Norway, based on approximately the same measure of permanent income and approximately the same average age of fathers and offspring, see Bratberg *et al.* (2005), Jäntti *et al.* (2006). It confirms the relatively high degree of mobility for Norway (and the Nordic countries) compared, for example, to the US and the UK, cf. Björklund and Jäntti (1997) and Solon (2002).

The mobility between mothers and their offspring in intact families appears to be significantly higher, i.e. the elasticity is lower, than in the child-father case. This finding is consistent with fathers typically being breadwinners in intact families.

Turning to divorced families, there are two relatively clear tendencies. The mobility is higher, i.e. the elasticity is lower, between parents and children in divorced relative to intact families, the only exception being the daughter-mother mobility. Moreover, this pattern is

particularly strong for the families where the children were less than 10 years of age at the time of family dissolution (column 3), once again with the exception of daughter-mother mobility. This calls for several comments.

First, how are we to interpret the high parent-child mobility? As noted above, much of the empirical literature on intergenerational earnings correlation assumes, at least indirectly, that high earnings mobility is a good thing for society because it implies equal opportunities and the possibility of the younger generations becoming successful, no matter their parental background. The high intergenerational mobility in dissolved families, on the other hand, might indicate adverse effects on the children. Divorce leads to a drop in family resources and fewer opportunities for investing in the children's human capital. In that case, we may observe mobility *down* the earnings distribution. This conjecture is examined below using transition matrices.

Second, the finding that divorce in the early youth (first 10 years) affects the mobility much more powerfully than in later years (10-20 years) is consistent with recent research on closely related areas. For example, Cameron and Heckman (1998) and Carneiro and Heckman (2002, 2003), focus on the long-term relationship between family income and skill formation. Allowing the family resources in early childhood and throughout the adolescence years to play a role, they find that lack of resources in early years fosters poor cognitive and non-cognitive environment, low ability, and low expectations, leading to reduced college readiness for the children from the poorest quantiles. Such constraints are far more decisive for educational attainment than lack of family resources in late adolescence.

Third, there are significant gender differences in the child-parent earnings correlation. The strongest drop in correlation is between sons and fathers when divorce happens in early youth (intergenerational elasticity falls from 0.15 to 0.04). The equivalent daughter-father change is quite close: from 0.14 to 0.05. For the child-mother correlation, on the other hand,

the differences between intact and divorced families are more or less negligible. If divorced mothers are breadwinners, we would expect the elasticity to increase in divorced families, but we only observe this result for the daughter-mother elasticity when divorce comes before the age of 10, and to a small extent. The corresponding son-mother elasticity is insignificant. Previous research indicates that the father in general is the more important role model for his son(s) and the mother for her daughter(s) (McLanahan (1985). The most common outcome of divorce by far is that the mother gets daily custody for the children. This might affect the children differently if, in those cases, the boys are subject to weaker bonds with their (absent) fathers, while the daughters grow stronger bonds with their (present) mothers. Our results are inconclusive in this respect, as the difference between daughter-mother and son-mother elasticities are rather similar regardless of divorce status.

Finally, note that all the results in Table 5 are based on permanent earnings calculated relatively late in the parents' lives (around 50 years of age on average). Recent research – see Haider and Solon (2006) for the US, Böhlmark and Lindquist (2006) for Sweden, and Nilsen *et al.* (2011) for Norway – has revealed a strong, negative age dependency. Nilsen *et al.* compare mobility estimates between fathers when earnings are measured around 40 and around 50, respectively. They find the elasticity to be about 70 % higher when the earnings are based on the former group, arguing that the far smaller elasticity for the latter group is due to a substantial age and/or life cycle bias. Still, this bias need not be a problem when we compare intact and divorced families as long as it affects both groups equivalently.[11]

4.2 *Transition matrices*

The transition matrices displayed in tables 6 to 9 shows the same tendency to persistence in the upper and lower parts of the earnings distribution that was reported in Bratberg *et al*.

[11] It does, however, matter when we compare groups where the average age of the parents differ, as will be the case in the analysis of the sibling sample later in this section.

(2005), whose results for the 1960 cohort are quite similar to the results for intact families in the present sample. However, we also find that in divorced families, the children tend to end up lower in the earnings distribution relative to their parents' position than children in intact families. This tendency to increased downward mobility is present for all upper (2^{nd} – 4^{th}) quartiles and, in many cases, is quite substantial. The result is similar to those of Couch and Lillard (1997), who only report father-son transitions, but their results are more dominated by persistence in the lower quartile.

We have also computed transition matrices (not reported) that split divorced families according to child age at divorce. It appears that the time of divorce has an impact on the downward movement in the earnings distribution. For all mobility pairs except the son-father mobility, the downward movement is stronger when the parents separate when the offspring are below 10 years of age rather than between ages 10 and 20.[12] This observation coincides with the regression estimates for offspring and fathers, and suggests that the earlier the disruption takes place, the more disadvantaged the children are.

4.3 *Sibling results*

We now consider the siblings subsample. Due to the restriction that the included families should have at least two children, with age differences large enough for the older to not have been affected by divorce in adolescence while the younger is affected, we end up with rather few divorced families (365, with 8,629 families in the comparison group). We therefore pool children of both gender, and report only father-child elasticities.

In Table 10, we report OLS results for each of the four groups (divorced vs. intact, younger vs. older). The first thing to note is that older and younger siblings appear to have quite different intergenerational elasticities, even in the intact families. Recall, however, that

[12] These tables are available upon request.

the fathers are, on average, 10 years younger when we calculate the permanent earnings for the older siblings (40 years of age, vs. 50 years in the case of younger siblings). As in Haider and Solon (2006), Böhlmark and Lindquist (2006), and Nilsen *et al*. (2011), we expect an age bias to be present in cases of older fathers/younger siblings. Interestingly, the estimated elasticity for older siblings in intact families is about 65% higher than the younger ones, which is practically the same as the comparable fraction[13] in Nilsen *et al*. (70%). This lends support to the interpretation that the estimated earnings mobility in intact families is *stable* across siblings, which is the opposite of the impression from the first glance at Table 10.

The next question is whether the older siblings in families that later became dissolved have intergenerational elasticities that are comparable to their control group: the older siblings in intact families (0.21). Our point estimates for the former group is 0.19 but, as one might expect with the small sample at hand, with relatively large standard deviation (0.08). Hence, at the 5% level, we are not able to reject the hypothesis that the elasticities for older siblings in the two family types are identical.

Turning the attention to the younger siblings in dissolved families, we find an elasticity of 0.07, which clearly is smaller than the estimates for their siblings growing up while the family was intact. Even if we add the alleged age bias of the size referred to earlier, the estimates of younger and older siblings are quite far from being equal. Once again, the small sample calls for caution in the interpretations; the large standard errors do not support statistically significant differences at conventional levels – not between younger and older siblings in dissolved families, and not between younger siblings in dissolved vs. intact families.

[13] Our estimates are comparable to the ones in Nilsen *et al.* (2011) in terms of common data sources, approximately same average age for parents and offspring, and same size of earnings window (5 years) as a basis for the calculation of permanent earnings. The samples are different, however, in that Nilsen *et al*. do not condition on family type, and we do not condition on gender (in Table 10).

Table 11 shows OLS and fixed effect results for the joint regression expressed in equation (2). The results from the OLS regression in the left panel confirm what we saw in Table 10. First, the difference between older siblings in divorced vs. intact families is not statistically significant. Second, there is a significant difference between older and younger siblings. Third, the extra difference in divorced families, δ_3 (the 'divorce effect'), is negative but insignificant. The results from the fixed effect in the right panel of Table 11 are all insignificant. This may be because there are only two observations in each family, and there is not enough within-family variation to identify the coefficients.

Summing up the sibling results, they are inconclusive. On the one hand, the apparently large differences we found in Table 4 between children who grew up in divorcing families and children who did not, are not confirmed – we do find a difference but it is insignificant. On the other hand, we cannot conclude that the full sample results are due to unobserved family characteristics, as the fixed effect results do not identify the intact-family elasticities. This may be attributed to sample size and to little variation within families. Moreover, the large divorce effect in Table 4 was found for children who were exposed to divorce before the age of 10. For obvious reasons, we could not apply that age restriction when we constructed the siblings sample. Even without that restriction, the siblings sample is a selected group in the sense that each family have children with quite large age differences, a fact that may have affected the results.

5. Concluding remarks

The purpose of this study was to explore differences in the intergenerational earnings mobility between intact and divorcing families, using full population data on the Norwegian cohorts born in 1960 and 1970. At ages 10 and 20, their families were classified as intact or divorced,

and intergenerational earnings elasticities and quartile transition matrices were estimated for the according groups.

As in previous Norwegian studies, the intergenerational earnings mobility in general was found to be high compared with the US, i.e., the estimated elasticities were relatively low. We also found higher elasticities between fathers and children than between mothers and children in intact families. For divorced families, the father-child elasticities were clearly lower, in particular when divorce took place during the first 10 years of the child's life. For the mother-child elasticities, however, no noticeable differences were found. This finding suggests that in divorced families, where mothers in most cases have custody of the children, the mother's economic resources are still important for the offspring's outcomes. While intergenerational earnings regressions do not allow us to separate the importance of economic resources from 'nurture' effects, i.e. the cognitive and non-cognitive environment while growing up, the reduced importance of an absent father's earnings may be interpreted as evidence against a strong biological ('nature') component in this mobility measure. The fact that we find the largest intact-divorced differences for children who experienced a family split at a young age, is consistent with recent research, e.g. Carneiro and Heckman (2003), which highlights the importance of the early years in children's cognitive development.

Our full sample analysis was augmented by estimates from a subsample of sibling pairs from divorcing families where the oldest did not experience the divorce during childhood, and a comparable sample of siblings from intact families. Data limitations (marital status only observed in 10-year intervals) and the general problem of finding families with sufficient spacing of childbirths left us with a very small sample of divorced families. OLS estimates were consistent with the main results, but the divorced-intact differences were insignificant. The fixed effect results that could have differenced out a potential family effect were largely insignificant, and we could not identify the intact-family elasticities. Thus, we

cannot rule out that the observed differences between divorced and intact families may be due to *ex ante* unobserved heterogeneity.

Quartile transition probabilities revealed that the increased mobility in divorced families is driven by a higher propensity for children in divorced families to move downwards in the income distribution, in particular as compared to their fathers. This finding agrees with Couch and Lillard's (1997) study from the US in the sense that children in divorced families tend to end up in the lower part of the distribution, but differs in the sense that in the US study, divorcing families, to a larger extent, are in the lower part at the outset. Accordingly, Couch and Lillard find that father-son earnings elasticities are higher in divorced families. An explanation for this discrepancy could be that in the US, credit constraints are more important for educational choices in poor families, hence the high elasticity. In Norway, education is free and the reduced father – child elasticity in divorced families may be a 'nurture' effect, which reflects the reduced influence of an absent father on the family's cognitive environment.

We noted in the introduction that presently, one in four children will experience a parental break-up during childhood. The research presented in this paper is based on today's middle-aged, who grew up when divorce probabilities were lower. About 10% of the children in our sample experienced their parents divorcing before age 20. Our results may imply that, as the fraction of divorcing families increases, the traditional father-child earnings elasticity may decrease, not because of the reduced importance of economic resources, but as a result of changing family structures.

References

Amato, P. R. and B. Keith (1991). "Parental divorce and the well-being of children: a meta-analysis." Psychological Bulletin **110**(1): 26-46.

Becker, G. S. and N. Tomes (1979). "Equilibrium-theory of the distribution of income and intergenerational mobility." Journal of Political Economy **87**(6): 1153-1189.

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

Björklund, A. and L. Chadwick (2003). "Intergenerational income mobility in permanent and separated families." Economics Letters **80**: 239-246.

Björklund, A. and M. Jäntti (1997). "Intergenerational income mobility in Sweden compared to the United States." American Economic Review **87**(5): 1009-1018.

Bratberg, E., O. A. Nilsen and K. Vaage (2005). "Intergenerational earnings mobility in Norway: Levels and trends." Scandinavian Journal of Economics **107**(3): 419-435.

Bratberg, E., O. A. Nilsen and K. Vaage (2007). "Trends in intergenerational mobility across offspring's earnings distribution in Norway." Industrial Relations **46**(1): 112-129.

Bratsberg, B., K. Røed, O. Raaum, R. Naylor, M. Jäntti, T. Eriksson, and E. Österbacka, (2007). "Nonlinearities in intergenerational earnings mobility: Consequences for cross-country comparisons." Economic Journal **117**(519): C72-92.

Böhlmark, A. and M. J. Lindquist (2006). "Life-cycle variations in the association between current and lifetime income: Replication and extension for Sweden." Journal of Labor Economics **24**: 879–896.

Cameron, S.V. and J.J. Heckman. (1998). "Life cycle schooling and dynamic selection bias: Models and evidence for five cohorts of American males." Journal of Political Economy **106**(2): 262–333.

Carneiro, P. and J. J. Heckman (2002). "The evidence on credit constraints in post-secondary schooling." Economic Journal **112**: 989-1018.

Carneiro, P. and J. J. Heckman (2003). "Human capital policy." In Inequality in America: What role for human capital policies? edited by J. J. Heckman and A. B. Krueger, pp. 77-240. Cambridge, Mass.: MIT Press.

Couch, K. and D. Lillard (1997). "Divorce, educational attainment, and the earnings mobility of sons." Journal of Family and Economic Issues **18**(3): 231-245.

Fertig, A. (2007). "Is intergenerational earnings mobility affected by divorce?" Manuscript, University of Georgia.

Gruber, J. (2004). "Is making divorce easier bad for children? The long-run implications of unilateral divorce." Journal of Labor Economics **22**(4): 799-833.

Haider, S. and G. Solon (2006). "Life-cycle variations in the association between current and lifetime earnings." American Economic Review **96**(4): 1308–1320.

Heckman, J. J. and D. V. Masterov (2007). "The productivity argument for investing in young children." Review of Agricultural Economics **29**(3): 446-493.

Jäntti, M., B. Bratsberg, K. Roed, O. Raaum, R.A. Naylor, E. Österbacka, A. Björklund and T. Eriksson (2006). "American exceptionalism in a new light: a comparison of intergenerational earnings mobility in the nordic countries, the United Kingdom and the United States." IZA Discussion Paper No. 1938.

Lundberg, S. J. (2005). "Sons, daughters, and parental behaviour." Oxford Review of Economic Policy **21**(3): 340.

McLanahan, S. (1985). "Family structure and the reproduction of poverty." The American Journal of Sociology **90**(4): 873.

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

Nilsen, Ø., A. Aakvik, K. Å. Jacobsen , and K. Vaage. (2011) "Intergenerational earnings mobility revisited: Estimates based on lifetime earnings." Forthcoming in Scandinavian Journal of Economics.

Peters, H.E. (1992). "Patterns of intergenerational mobility in income and earnings," Review of Economics and Statistics **74**(3): 456-466.

Solon, G. (1992). "Intergenerational income mobility in the United-States." American Economic Review **82**(3): 393-408.

Solon, G. (1999). "Intergenerational mobility in the labor market." In Handbook of Labor Economics **3a**(29).

Solon, G. (2002). "Cross-country differences in intergenerational earnings mobility." The Journal of Economic Perspectives **16**(3): 59.

Statistics Norway (2011a). "Statbank Norway." [online] Available at: <http://statbank.ssb.no/statistikkbanken/?PLanguage=1> [Accessed 16 June 2011].

Statistics Norway (2011b). "One out of four children live with only one parent." [online] Available at: <http://www.ssb.no/english/subjects/02/01/20/barn_en/> [Accessed 16 June 2011].

Tjøtta, S. and K. Vaage (2008). "Public transfers and marital dissolution." Journal of Population Economics **21**(2): 419.

Zimmerman, D. J. (1992). "Regression toward mediocrity in economic stature." American Economic Review **82**(3): 409-429.

Table 1: Distribution of families during children's adolescence.

	Birth	10 years old	20 years old
Intact families	62.071	59.333	55.460
Divorced families		2.738	6.611

Table 2: Descriptive statistics by family type

	Intact families				Divorced families			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Sons								
Earnings average	12.53	0.63	6.53	16.35	12.43	0.72	6.70	14.98
Year of birth	1965.64	4.96	1960	1970	1967.19	4.49	1960	1970
N		*29,038*				*3,502*		
Daughters								
Earnings average	11.99	0.81	4.03	15.05	11.96	0.83	7.42	14.07
Year of birth	1965.67	4.96	1960	1970	1967.19	4.50	1960	1970
N		*26,870*				*3,160*		
Fathers								
Earnings average	12.37	0.63	5.35	15.78	12.21	0.89	5.22	14.41
Age average	49.92	0.95	48.00	57.00	50.16	3.37	40.00	63.00
Year of birth	1935.58	8.11	1912	1953	1939.91	6.96	1912	1953
N		*55,460*				*6,611*		
Mothers								
Earnings average	11.47	1.01	5.04	13.96	11.81	0.95	4.74	13.56
Age average	48.01	0.20	48.00	55.00	47.87	2.84	39.00	63.00
Year of birth	1938.82	7.29	1914	1954	1942.67	6.38	1916	1954
N		*55,460*				*6,611*		

Notes: The earnings measure is the average of log earnings from five subsequent years. The family structure is observed when the children are 20 years old. Age average for sons and daughters is 34.

Table 3: Earnings distributions by family type

	Intact families	Divorced families		Intact families	Divorced families
Sons			**Fathers**		
Lower quartile	0.25	0.30	Lower quartile	0.24	0.31
Lower middle quartile	0.25	0.25	Lower middle quartile	0.26	0.21
Upper middle quartile	0.25	0.23	Upper middle quartile	0.25	0.23
Upper quartile	0.25	0.22	Upper quartile	0.25	0.25
N	*29,038*	*3,502*	*N*	*55,908*	*6,662*
Daughters			**Mothers**		
Lower quartile	0.25	0.26	Lower quartile	0.26	0.14
Lower middle quartile	0.25	0.23	Lower middle quartile	0.26	0.15
Upper middle quartile	0.25	0.25	Upper middle quartile	0.25	0.27
Upper quartile	0.25	0.26	Upper quartile	0.23	0.44
N	*26,870*	*3,160*	*N*	*55,908*	*6,662*

Note: Marital status is observed when the children are 20 years of age.

Table 4: Descriptive statistics for the siblings subsample.

	Intact families				Divorced families			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Younger siblings								
Earnings average	12.27	0.75	6.50	15.14	12.23	0.79	7.86	13.94
Year of birth	1965.86	4.93	1960	1970	1966.63	4.73	1960	1970
N		*8,629*				*365*		
Older siblings								
Earnings average	12.07	0.86	6.03	14.15	12.15	0.77	8.15	14.21
Year of birth	1958.68	5.31	1941	1965	1959.97	4.94	1946	1965
N		*8,629*				*365*		
Fathers, pre-divorce								
Earnings average	12.18	0.41	8.25	13.16	12.36	0.49	7.54	13.34
Age average	39.24	6.07	29.00	57.00	40.20	4.06	31.00	50.00
Year of birth	1930.68	7.18	1912	1949	1934.76	6.37	1919	1947
N		*8,629*				*365*		
Fathers, post-divorce								
Earnings average	12.28	0.62	6.78	14.23	12.13	0.92	7.38	13.71
Age average	50.43	1.01	48.00	57.00	53.88	3.97	44.00	63.00
Year of birth	1930.68	7.21	1912	1949	1934.76	6.37	1919	1947
N		*8,629*				*365*		

Notes: The earnings measure is the average of log earnings from five subsequent years. The divorced families are couples that got divorced when the younger siblings where between 10 and 20 years. The intact families are couples that where not divorced during the same time period. Age average for sons and daughters is 34.

Table 5: Intergenerational earnings elasticities for the full sample. OLS

	Intact during first 10 years of child's life	Intact during first 20 years of child's life	Divorced during first 10 years of child's life	Divorced between first 10 and 20 years of child's life	All divorced families
Son-father mobility					
β	0.148***	0.149***	0.039**	0.122***	0.080***
sd(β)	(0.006)	(0.006)	(0.020)	(0.019)	(0.014)
N	*31,058*	*29,038*	*1,482*	*2,020*	*3,502*
Son-mother mobility					
β	0.059***	0.068***	0.027	0.056***	0.043***
sd(β)	(0.004)	(0.004)	(0.019)	(0.017)	(0.013)
N	*31,058*	*29,038*	*1,482*	*2,020*	*3,502*
Daughter-father mobility					
β	0.139***	0.145***	0.053**	0.087***	0.071***
sd(β)	(0.007)	(0.008)	(0.021)	(0.023)	(0.017)
N	*28,752*	*26,870*	*1,278*	*1,882*	*3,160*
Daughter-mother mobility					
β	0.099***	0.105***	0.115***	0.098***	0.105***
sd(β)	(0.005)	(0.005)	(0.022)	(0.022)	(0.016)
N	*28,752*	*26,870*	*1,278*	*1,882*	*3,160*

Notes: *** significant at 1 %, ** significant at 5%, * significant at 10%. The earnings measure is the average of log earnings from five subsequent years.

Table 6: Transition matrix with computed transition probabilities between fathers and sons.

	Sons				
	Lower quartile	Lower middle quartile	Upper middle quartile	Upper quartile	*N*
Married fathers					
Lower quartile	0.34	0.28	0.22	0.16	*7,073*
Lower middle quartile	0.26	0.29	0.25	0.19	*7,262*
Upper middle quartile	0.22	0.24	0.28	0.26	*7,349*
Upper quartile	0.16	0.18	0.25	0.40	*7,354*
N	*7,073*	*7,262*	*7,349*	*7,354*	*29,038*
Divorced fathers					
Lower quartile	0.37	0.26	0.21	0.16	*1,062*
Lower middle quartile	0.30	0.29	0.24	0.17	*874*
Upper middle quartile	0.26	0.25	0.25	0.24	*785*
Upper quartile	0.26	0.20	0.21	0.33	*781*
N	*1,062*	*874*	*785*	*781*	*3,502*

Notes: Family structure observed when the children are 20 years old. The quartiles refer to the position of the person in question relative to the income distribution of his or her cohort. The person's income is the average of log annual income over a period of five years.

Table 7: Transition matrix with computed transition probabilities between mothers and sons.

	Sons				
	Lower quartile	Lower middle quartile	Upper middle quartile	Upper quartile	*N*
Married mothers					
Lower quartile	0.30	0.28	0.24	0.19	*7,073*
Lower middle quartile	0.26	0.26	0.25	0.23	*7,262*
Upper middle quartile	0.23	0.25	0.25	0.27	*7,349*
Upper quartile	0.17	0.21	0.27	0.35	*7,354*
N	*7,073*	*7,262*	*7,349*	*7,354*	*29,038*
Divorced mothers					
Lower quartile	0.36	0.27	0.19	0.19	*1,062*
Lower middle quartile	0.33	0.29	0.20	0.18	*874*
Upper middle quartile	0.33	0.25	0.23	0.19	*785*
Upper quartile	0.26	0.23	0.24	0.27	*781*
N	*1,062*	*874*	*785*	*781*	*3,502*

Notes: Family structure observed when the children are 20 years old. The quartiles refer to the position of the person in question relative to the income distribution of his or her cohort. The person's income is the average of log annual income over a period of five years.

Table 8: Transition matrix with computed transition probabilities between fathers and daughters.

	Daughters				
	Lower quartile	Lower middle quartile	Upper middle quartile	Upper quartile	*N*
Married fathers					
Lower quartile	0.31	0.28	0.24	0.17	*6,675*
Lower middle quartile	0.27	0.27	0.26	0.19	*6,776*
Upper middle quartile	0.23	0.25	0.26	0.26	*6,724*
Upper quartile	0.18	0.20	0.24	0.38	*6,695*
N	*6,675*	*6,776*	*6,724*	*6,695*	*26,870*
Divorced fathers					
Lower quartile	0.31	0.25	0.25	0.19	*833*
Lower middle quartile	0.29	0.25	0.26	0.20	*731*
Upper middle quartile	0.25	0.23	0.26	0.26	*784*
Upper quartile	0.21	0.19	0.22	0.38	*812*
N	*833*	*731*	*784*	*812*	*3,160*

Notes: Family structure observed when the children are 20 years old. The quartiles refer to the position of the person in question relative to the income distribution of his or her cohort. The person's income is the average of log annual income over a period of five years.

Table 9: Transition matrix with computed transition probabilities between mothers and daughters.

	Daughters				
	Lower quartile	Lower middle quartile	Upper middle quartile	Upper quartile	*N*
Married mothers					
Lower quartile	0.33	0.28	0.23	0.17	*6,675*
Lower middle quartile	0.28	0.27	0.25	0.21	*6,776*
Upper middle quartile	0.22	0.25	0.27	0.26	*6,724*
Upper quartile	0.16	0.21	0.26	0.38	*6,695*
N	*6,675*	*6,776*	*6,724*	*6,695*	*26,870*
Divorced mothers					
Lower quartile	0.36	0.23	0.22	0.19	*833*
Lower middle quartile	0.36	0.22	0.21	0.21	*731*
Upper middle quartile	0.26	0.27	0.26	0.20	*784*
Upper quartile	0.20	0.21	0.26	0.33	*812*
N	*833*	*731*	*784*	*812*	*3,160*

Notes: Family structure observed when the children are 20 years old. The quartiles refer to the position of the person in question relative to the income distribution of his or her cohort. The person's income is the average of log annual income over a period of five years.

Table 10: Siblings sample. OLS results from separate regressions

Children-father mobility	Intact Families	Divorced families
Younger siblings	0.131***	0.073*
	(0.015)	(0.038)
N	*8,629*	*365*
Older siblings	0.214***	0.185**
	(0.025)	(0.080)
N	*8,629*	*365*

Note: *** significant at 1 %, ** significant at 5%, * significant at 10%.

Table 11: Siblings sample. Pooled OLS and family fixed effects

Children-father mobility	OLS		FE	
	Coeff.	St. Dev.	Coeff.	St. Dev.
Older siblings in intact families	0.214***	0.025	0.034	0.032
Older siblings in divorced families	-0.030	0.084	-0.052	0.126
Younger siblings in intact families	-0.083***	0.029	-0.042	0.027
Younger siblings in divorced families	-0.03	0.09	0.020	0.103
N	*17.988*		*8,184*	

Note: *** significant at 1 %, ** significant at 5%, * significant at 10%.