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**Ethnic and gender differences in intergenerational mobility:
a study of 26-year-olds in the USA¹**

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Abstract

This paper uses the traditional income framework and a non-monetary framework to estimate intergenerational mobility in economic status for a sample of 26 year-old whites, blacks and Hispanics in the USA using data from the first and fifth sweeps of the National Educational Longitudinal Study (1988 and 2000). Intergenerational income mobility is found to be greater for females than for males, though there are differences between whites, blacks and Hispanics. Transition probabilities indicate that Hispanics are the most upwardly mobile in terms of educational attainment and occupational status. Ordered logits are used to estimate the impact of parental education and occupation on educational and occupational outcomes.

JEL Classification: J62

Keywords: Intergenerational Mobility, Income, Occupation, Education

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I. Introduction

The persistence of economic and social inequality between one generation and the next is an issue of continuing interest to economists. A particular concern, especially among policy makers, is the challenge presented by the persistence of poverty across generations. The question of how parents and family background influence a person's lifetime economic status has consequently been the subject of many empirical studies, especially following the seminal work of Becker and Tomes (1986).² The basic hypothesis of these studies is that parents are altruistic and care about their children's welfare. Parents determine their children's endowments not only through the heredity of cognitive ability and other genetic traits but also through family environmental factors, which include parental attitudes to education and the willingness and ability of parents to invest in their children's human capital.

Intergenerational mobility occurs when children 'occupy different positions in their generation's distribution of economic status than their parents did in their generation's distribution' (Dearden *et al.* 1997, p.47). The vast majority of previous studies use income or earnings to measure intergenerational mobility since this provides a simple metric for measuring intergenerational persistence, namely the correlation between the income levels of two consecutive generations.³ This is usually measured by regressing child's (log) income on parental (log) income in cross-sectional data and then using the estimated elasticity as an indicator of the degree of intergenerational income mobility.

An alternative to using income or earnings to measure economic status is to use non-monetary measures, such as occupational status or educational attainment (Carmichael 2000; Erikson and Goldthorpe 2002; Ermisch and Francesconi 2002). A potential advantage of the non-

² These studies include Behrman and Taubman (1985, 1990), Peters (1992), Solon (1992), Mulligan (1997), Eide and Showalter (1999), Painter and Levine (2000), Naga (2002) and Gaviria (2002) for the US; Bjorklund and Jantti (1997), Couch and Dunn (1997) and Gang and Zimmermann (2000) for Germany; Corak (2001) and Corak and Heisz (1999) for Canada; Atkinson (1981), Atkinson *et al.* (1983), Dearden *et al.* (1997) and Carmichael (2000) for the UK; and Bjorklund and Chadwick (2003) and Osterberg (2000) for Sweden.

³ Bowles and Gintis (2002) note that income is a more inclusive measure than earnings.

monetary approach to measuring intergenerational mobility over the income-based approach is that the non-monetary approach takes a wider view of intergenerational mobility. Investigating intergenerational mobility on a range of different measures, such as educational attainment and occupational status in addition to income, may help to provide a more comprehensive picture of intergenerational linkages (Johnson, 2002). Goldberger (1989), for example, warns that by restricting attention to monetary measures such as income or earnings, the literature on intergenerational mobility may ‘understate the influence of family background on inequality’ (p. 513). On the other hand, focusing entirely on non-monetary measures runs the risk of misclassification and hence of obtaining biased estimates of intergenerational mobility. Taking this into account, we use both the income-based approach and the non-monetary approach in the present paper to estimate intergenerational mobility among a sample of 26 year-olds in the USA. Such a mix of approaches should provide a more comprehensive picture of intergenerational mobility than is provided by focusing exclusively on income.

The primary purpose of this paper is to estimate *ethnic and gender differences* in the transmission of economic status between generations. With few exceptions, such as Gang and Zimmermann (2000), Chadwick and Solon (2002) and Lauer (2003), previous studies have focused almost exclusively on the intergenerational linkages between fathers and sons. We address gender issues in this paper by investigating intergenerational transmission to both sons and daughters respectively. In addition, we investigate ethnic differences in intergenerational mobility since this has also been neglected in earlier studies. An exception is Hertz (2002), who reports a significant ethnic gap in intergenerational mobility between blacks and whites. We add to this literature by investigating intergenerational mobility among

three separate ethnic groups: whites, blacks and Hispanics. The statistical analysis is based on data obtained from the first and fifth sweeps of the National Educational Longitudinal Study.⁴

The paper is structured as follows. Section II describes the data. Section III provides some background information about income levels, educational attainment and occupational status for parents, sons and daughters in the NELS:88/00 dataset. Section IV previews the methods used to estimate the intergenerational mobility in income, educational attainment and occupational status of whites, blacks and Hispanics respectively. Section V discusses the results of the statistical analysis and section VI concludes.

II. Data

The data used in this study is from the recently released fifth sweep of the National Educational Longitudinal Study (NELS:88/00). The NELS is a longitudinal survey designed to provide data about young people focusing on the transitions that they experience as they progress from school to work. It is based upon a nationally representative sample of 8th grade students in 1988 and follows them through until 2000 in four successive sweeps (1990, 1992, 1994 and 2000). Data from the survey in 2000 allows us to examine what these 8th grade students had accomplished 8 years after the end of high school, when the majority of respondents were aged 26-27. Since the fifth sweep was in 2000, this allows us to get a contemporary picture of intergenerational mobility in the USA. The dataset contains not only information on the educational attainment and occupational status of the respondent but also similar data about their parents when the respondents were in grade 8. Students were asked to report on a range of topics including school, work and home experiences. These, and the fact that the information on parental income, educational attainment and occupational status is obtained directly from parents themselves, are some of the strengths of the NELS data.

⁴ Source of survey: National Centre for Educational Statistics, US Department of Education, Office of Educational Research and Improvement (<http://www.nces.ed.gov/surveys>).

There were a total of 12,144 observations available in the data set by 2000. Of this total, 7,750 respondents have information on own and parental income, and make up the starting sample we use for measuring the intergenerational transmission in income.⁵ The income information we use is annual income relating only to those in full-time employment. The final sample that we use in the income analysis has 7,162 individuals. The data set is able to provide a larger sample for measuring intergenerational mobility in educational and occupational outcomes. Accordingly, we have 11,459 and 11,327 respondents with information on own and parental educational and occupational status respectively. Table A in the appendix provides summary statistics for the sample used in our analysis.

As pointed out by Corak and Heisz (1999) and Mazumder (2001), previous research for the USA is almost entirely based on the Panel Study of Income Dynamics and the National Longitudinal Survey. However, these data sets result in relatively small data samples and suffer from considerable attrition when constructing intergenerational samples. Recently, Painter and Levine (2002) have used the NELS to examine the correlations between family structure and youth outcomes, namely educational attainment and out-of-wedlock fertility. Hagy and Staniec (2002) use the NELS to model the educational choice facing high school graduates with a focus on ethnic immigrants. Although we use the same data set, the focus of our study and the methods of analysis are quite different. Moreover, these previous authors use earlier follow-ups focusing on the period when these students were still in high school. In this study, we use the most recent follow-up and are able to focus on outcomes that go well beyond school outcomes since respondents have left high school for 8 years by the time of the survey in 2000.

III. Income, educational attainment and occupation: parents, sons and daughters

⁵ A disadvantage of the NELS is its lack of information on father's and mother's income separately which prevents us from investigating gender issues in intergenerational transmission of income by looking into the father-son, father-daughter, mother-son and mother-daughter transmissions.

Parental background varies markedly between whites, blacks and Hispanics. This is clear from Table 1, which shows how income, educational attainment and occupation vary between ethnic groups for both the respondents themselves and their parents. Family income in the base year (1988), for example, was 80% higher on average for whites than for blacks and nearly 70% higher than for Hispanics. Given these income disparities, it is not surprising that there are corresponding disparities in the educational attainment and occupation of parents between ethnic groups. Compared to Hispanics, for example, whites are more than twice as likely to have a parent with a higher education degree while being only one-third as likely to have a parent with no qualifications. Similar disparities are apparent for the occupational mix of parents: nearly 40% of white parents are in the top occupational category compared to only 21% for Hispanics.

There are also substantial disparities between ethnic groups in income, educational attainment and occupation for the respondents as well as for their parents. In comparing the outcomes of respondents and their parents, however, it is important to keep in mind that the respondents are in their mid-twenties and their interim outcomes are therefore likely to be incomplete. Nevertheless, there are still substantial disparities between the three ethnic groups. The income gap between white and black males, for example, is over 30%. This is considerably wider than the income gap between white and Hispanic males, which is nevertheless still substantial, standing at 19%. The income gap for females in different ethnic groups is much less pronounced.

As might be expected given the very different educational attainment of their parents, whites are much more likely to be higher up the educational attainment scale than blacks or Hispanics. Nearly 40% of white females, for example, have a degree compared to 26% for black females and 17% for Hispanic females. These are huge disparities and are matched by equally large disparities in educational attainment between the male ethnic groups. At the other end of the educational spectrum, whites are about half as likely to have no qualifications

as blacks and Hispanics. These results hold equally for males and females. The occupational disparities between ethnic groups are somewhat less severe than the educational disparities, though whites still have a substantially greater chance of being in the top group than is the case for blacks and Hispanics.

There is therefore substantial *prima facie* evidence that the ethnic disparities in income, educational attainment and occupation of parents are perpetuated in the next generation.

IV. Framework of analysis

The traditional framework used to measure intergenerational mobility relates to estimating the relationship between a child's economic status in family i and the same measure of economic status for his or her parents:

$$y_i^{child} = \alpha + \beta y_i^{parent} + \varepsilon_i \quad (1)$$

Usually, y_i^{child} is the child's long-run economic status or permanent income as an adult and y_i^{parent} is his/her parents' long-run economic status or permanent income during the child's adolescence. The coefficient β reflects how strongly children's economic status is associated with parental economic status.⁶ There are two extreme cases of intergenerational mobility:

(i) If β is zero, there is complete intergenerational mobility (regression to the mean), where children's and parents' economic status are uncorrelated.

(ii) If β is unity, there is rigid immobility where, ruling out ε_i , children's economic status is completely determined by their parents.

⁶ If y_i^{child} and y_i^{parent} are measured in logarithms, the coefficient β corresponds to the elasticity of the child's income with respect to his/her parents' income. In case of equal variances across generations, β represents the intergenerational correlation coefficient. In case of differing variances, the correlation coefficient can be estimated as $\rho = \beta (\hat{\sigma}^{parent} / \hat{\sigma}^{child})$ (Osterberg 2000, Bowles and Gintis 2002).

Early empirical studies on intergenerational mobility estimate equation (1) using OLS, where y^{child} and y^{parent} are measures of contemporary incomes. However, when ordinary least square is applied to equation (1), the estimate of β will be downwardly biased. The main problem with estimating equation (1) is caused by errors-in-variables. This is because parents' permanent incomes are typically unobserved and we can only observe some transitory income in one or several periods. It has been pointed out repeatedly by others that failure to address the measurement error problem will lead to a downwardly biased estimate of intergenerational mobility (e.g. Bowles, 1972; Solon, 1992, 2002; Zimmerman, 1992; Dearden et al, 1997; Naga, 2002).

In recent studies, several approaches have been suggested to deal with the problem of measurement error. The first approach, suggested by Solon (1992) and Zimmerman (1992), involves the use of parents' average income over several years.⁷ A variant of this method, regressing the average of child's income over several years on the average of parents' income, has also been used (Behrman and Taubman, 1990; Mulligan, 1999). Naga (2002) has shown that this method is more efficient than using only the average of parents' income although they both have the same probability limit. Mazumder (2001) points out, however, that due to data limitations most of the applied work uses only a short time-series, which can lead to flawed estimation results since a transitory shock leads to high serial correlation in the earnings variable.⁸

The second approach used to address issues of measurement error involves the estimation of the intergenerational income elasticity by the use of instrumental variables. Solon (1992) argues that this approach produces an upward-inconsistent estimate but provides an upper bound on the true intergenerational income mobility. Parents' education is normally used as

⁷ This is done by regressing child's income on a time-series average of parents' income. Solon (1992) states that the inconsistency of this estimator diminishes as the length of the time-series increases.

⁸ Mazumder (2001) also recommends the use of income instead of earnings, as the former is likely to be a less noisy measure of economic status than earnings.

an instrument. The idea here is that the child's long-term economic status or permanent income is determined not only by parents' income but also by parents' education. The third approach uses parents' predicted income as a proxy for permanent income (Dearden *et al*, 1997; Naga, 2002). This approach assumes that although permanent income is not observed, a model of the determination of parents' income is known to the researchers, which can then be used to estimate parents' permanent income.⁹ We use this approach in the present paper.

The second framework we use is based on Goldberger's (1989) suggestion of using non-monetary measures to determine intergenerational mobility. This framework involves focusing on occupational and educational mobility, so that y^{child} represents the occupational status or educational attainment of the son or daughter and y^{parent} is the corresponding variable for the parent. As stated earlier, one of the criticisms directed at the traditional framework of monetary measures is the difficulty of measuring the long-term economic status, or permanent income, of children and parents accurately. Usually, income is measured for a particular year, which is too short since the transitory variance of measured income may lead to bias in β . We argue here that educational attainment and occupational status provide a less noisy measure of long-term economic status than income.

A number of arguments have been used to support the non-monetary framework over the income approach to measuring long-term economic outcomes. First, educational attainment and occupational status are highly correlated with income (Nickell, 1982; Johnson, 2002), therefore providing a complementary estimate of intergenerational mobility. Secondly, educational attainment and occupational status are relatively stable over time (Nickell, 1982; Ermisch and Francesconi, 2002) and are therefore less sensitive to transitory shocks than

⁹ For example, in the first stage regression Naga (2002) uses the following instruments: parents' education; whether parents are unskilled workers; and dummies for whether resident in the southern region, a union member, a smoker, a house owner, health status and ethnicity (white).

income. For example, Ermisch and Francesconi (2002) have focused on a measure of occupational mobility for the UK using the Hope-Goldhorpe score of occupational prestige.

Taking into account suggestions in the literature for using non-monetary measures of intergenerational mobility, we calculate transition probabilities to investigate the intergenerational mobility in educational attainment and occupational status (see Tables C and D in the appendix). This is simply an origin-destination matrix that gives the proportion of respondents with an educational attainment level of j whose parents have an educational attainment level of i . These transition probabilities can be used to calculate: (a) the proportion of all respondents who have an educational attainment level that is lower than that achieved by their parents (i.e. the sum of the proportions *below* the main diagonal in the transition probability matrix); (b) the proportion of all respondents who have an educational attainment level that is the same as that achieved by their parents (i.e. the sum of the proportions *on* the main diagonal); and (c) the proportion of all respondents who have an educational attainment level that is higher than that achieved by their parents (i.e. the sum of the proportions *above* the main diagonal). These proportions are calculated for each ethnic/gender group (discussed in section V below) in order to compare ethnic/gender differences in the proportion of respondents who achieve a different educational attainment outcome than their parents. We repeat the analysis for occupational status.

An alternative to using transition probabilities to measure the degree of intergenerational mobility is to use an ordered logit model to estimate the influence of parental education on the respondent's educational attainment. The ordered logit can also be used for estimating the influence of parents' occupational status on the respondent's occupational status. This approach has the advantage that it allows other family-related factors, such as family structure and the number of siblings, to be taken into account in estimating the influence of family background on educational and occupational outcomes. In particular, we hypothesise that family background factors during adolescence can influence the transmission process and

several controls can be included to capture the influence of these effects on educational and occupational outcomes. For example, a two-parent family may have more resources and will consequently be more likely to invest in their children's education than a single parent family. We also take into account the child quality-quantity trade-off by controlling for the number of siblings, following the suggestion by Becker (1991) and Hanusheck (1992) that increases in family size lead to resources being spread more thinly within the family.

For the purpose of using the non-monetary approach to measuring intergenerational mobility, we identify the following four occupational rankings for both children and parents: (i) unskilled/semi-skilled ($y = 0$); (ii) skilled manual ($y = 1$); (iii) skilled non-manual ($y = 2$); (iv) professional or managerial ($y = 3$). The highest category attained by either parent is used to define the occupational status of the respondent's parent. We recognise that the ordering of the two skill categories is somewhat arbitrary since there is likely to be a large degree of overlap between them (Erikson and Goldthorpe, 2002). The fact that the mean income level is higher for families with skilled non-manual parents than for families with skilled manual parents provides some support for ranking skilled non-manual workers higher than skilled manual workers.¹⁰

For educational attainment, we rank parents as follows: (i) less than high school diploma ($y = 0$); (ii) high school diploma ($y = 1$); (iii) some college education such as obtaining an associate degree ($y = 2$); and (iv) college education ($y = 3$). Again, the highest level of education attained by either parent is used to define the education level of the respondent's

¹⁰ Mean family income in 1987 in the NELS:88 sample is \$30,440 for skilled manual workers and \$33,420 for skilled non-manual workers. These compare to \$25,690 for unskilled and semi-skilled workers and \$60,600 for professional and managerial workers. The highest occupational level of either parent is used to determine the family's appropriate occupational category.

parents. Given the ordinal nature of these rankings, we use an ordered logit specification to estimate this model.¹¹

V. Results

1. Intergenerational income mobility

The first set of results (Table 2) relate to the income measure of intergenerational mobility. Since we use predicted family income as a proxy for parental (permanent) income, we first estimate family income using OLS (see Table B in the appendix). We then regress the child's annual income (at age 26) on the predicted (permanent) income of the parent to obtain a measure of intergenerational income mobility.

The results given in Table 2 indicate that the correlation between parental income and respondent's income is very low in all regressions, thus indicating a high degree of intergenerational income mobility across all ethnic groups for both males and females. Nevertheless, the estimated slope coefficients (β) are highly statistically significant in nearly all cases and inspection of these coefficients indicates that the degree of intergenerational dependence varies significantly between ethnic/gender groups. The three main findings are as follows. First, the estimated β is substantially smaller for males than for females, indicating that males have greater income mobility than females. This finding is common across all three ethnic groups. Second, the low β for Hispanics (both males and females) indicates that this group has greater income mobility than both whites and blacks. Third, white females are the least mobile of all ethnic/gender groups.¹²

We note that our estimates of β are relatively low compared to other recent US-based studies (for example Solon, 1992; Chadwick and Solon, 2002) and are more in line with the results

¹¹ The second model we estimate is therefore given by $y_i^{child} = \alpha + \beta y_i^{parent} + \eta R_i + \varepsilon_i$ where R_i is a vector of child and family characteristics during adolescence.

¹² We also investigated whether the relationship between respondent's income and parental income varied over the income distribution (using quantile regression) but found little evidence of any consistent differences.

obtained in earlier work (Behrman and Taubman, 1985; Becker and Tomes, 1986). The likely reason for these low estimates of β is that the NELS respondents are at an early stage in their work history and current income is unlikely to be a good proxy for lifetime income, especially for those who are on a rapidly rising income trend. Previous studies have shown that using income at an early age in a child's work history can induce a serious downward bias into the estimated elasticity. Naga (2002), for example, finds that the estimated elasticity increases with the child's years of experience in the labour market. Using a Brazilian data set, Dunn (2004) demonstrates that the estimated elasticity rises with the age at which the son's income is measured. The estimated elasticities reported here may nevertheless be useful for comparison between ethnic and gender groups since all of the respondents are around the same age (of 26).

2. Intergenerational mobility in educational and occupational status

Measuring educational and occupational mobility is complex. We are interested not only in the extent but also the direction of mobility for different ethnic/gender groups. Are blacks and Hispanics more or less likely than whites to achieve a higher educational or occupational status than their parents? Are some ethnic/gender groups more upwardly mobile than others? We attempt to answer such questions by comparing the proportion of respondents who achieve higher educational attainment than their parents across ethnic/gender groups.

Table 3a shows, for example, that 49% of Hispanic females are in a higher educational attainment category than their parents compared to 33% for white females. This difference is highly statistically significant and therefore indicates that Hispanic females are more upwardly mobile (in terms of their educational attainment) than white females. Similar results are obtained for Hispanic males. The considerably greater upward mobility of Hispanics than whites is not surprising, however, given the much lower levels of educational attainment of Hispanic parents relative to white parents (see Table 1). It is also important to note that

Hispanic sons and daughters are less than half as likely as whites to obtain a degree and that their greater mobility is driven by the very high proportion of Hispanic parents who have no qualifications (see Table C in the appendix). Despite their upward mobility, Hispanics still lag far behind whites in their educational attainment levels. Blacks lie between these two extremes.¹³

There is also evidence that Hispanics are more upwardly mobile than whites in terms of their occupation (at least by the age of 26). This is evident from the fact that 43% of Hispanic females have a higher occupational status than their parents compared to only 30% for white females (see Table 3b). Hispanic males are also more upwardly mobile than white males. But again, it must be remembered that the reason for this high degree of upward mobility is a direct consequence of their parents having very low occupational status relative to the parents of white respondents (see Table 1).

Since the mobility measures provided in Table 3 indicate the existence of substantial disparities in both educational and occupational mobility between ethnic/gender groups, it is useful to probe these disparities further by investigating the extent to which the educational attainment and occupation levels achieved by respondents (by age 26) are related to their family background. In particular, the ordered logit model can be used to estimate the probability that a respondent will be in a particular educational attainment (or occupation) category conditional on the educational attainment (or occupation) of their parents. Tables 4 and 5 contain the results of these analyses. Table 4 reports only the estimated marginal effects on the educational attainment variables given that the focus of the paper is on the specific

¹³ An alternative method (suggested by a referee) of estimating the degree of upward mobility is to calculate the conditional probability of a respondent being in a higher group, for example, than the highest group attained by either of their parents. The number of respondents in a higher group than their parents is then expressed not as a proportion of the *total* number of parents but as a proportion of parents who are not in the highest group. Similarly, the number of respondents in a lower group than their parents is expressed as a proportion of parents who are not in the lowest group. The results obtained from this alternative approach (available on request from Jim Taylor) are very similar to those reported in Table 3. The conclusions are therefore unchanged.

relationship between the respondents' educational attainment and their parents' educational attainment (and similarly for the occupational status variables in Table 5).

The estimated marginal effects obtained from the ordered logit equations indicate that the transmission of educational attainment from parent to son is much higher for whites than for blacks or Hispanics. White males, for example, are 45 percentage points more likely to have a degree if their parents also have a degree (compared to the base group of parents who have no qualification). This compares to 20 and 15 percentage points respectively for black and Hispanic males. Even more striking is that white males whose parents have at least some college education are 66 percentage points more likely to have a degree than those whose parents have no qualification. The corresponding estimates for black and Hispanic males are 34 and 19 percentage points respectively. These estimated marginal effects therefore indicate a much stronger link between the educational attainment of sons and the educational attainment of their parents for whites than for blacks and Hispanics.

The results for daughters are very similar to those for sons. Table 4 shows that white females whose parents have at least some college education are 74 percentage points more likely to obtain a degree than white females whose parents have no qualification. This compares with estimated marginal effects of 57 and 31 percentage points respectively for black and Hispanic females.

Finally, we turn to the ordered logits for the occupational outcomes. The results reported in Table 5 follow the same general pattern as those obtained for the educational attainment outcomes, though the transmission of occupational outcomes from parents to sons and daughters is estimated to be much weaker than is the case for the educational attainment outcomes. One reason for the absence of a strong relationship between the occupation of parent and child is that occupational outcomes are being measured at a very early stage in the respondent's work history in the case of the present dataset. This is probably the main reason

why the estimated marginal effects are much larger for educational outcomes since education is largely complete by age 26. The only notable finding is that Hispanic males whose parents have a professional occupation are only 14 percentage points more likely to have a professional occupation than Hispanic males whose parents are unskilled. This compares to a 24 percentage point higher likelihood for white males.

VI. Conclusion

This paper has investigated the intergenerational transmission of economic status between parents and their sons and daughters in a sample of 26 year-olds using data from the first and fifth sweeps of the US National Educational Longitudinal Study (1988 and 2000). The paper has two distinctive features compared to previous studies. First, it investigates not only the mobility in income levels between one generation and the next, but also investigates the intergenerational mobility in educational attainment and occupational status for the same sample. Second, in view of the vast ethnic disparities in economic status in the US, the aim is to gain a better understanding of the extent to which intergenerational mobility varies between whites, blacks and Hispanics. Moreover, the statistical analysis is undertaken for males and females separately.

Before drawing conclusions, we need to reiterate a major weakness of the present study: the respondents were only in their mid-twenties when the data were collected, which means that the actual income of the respondents may be a poor measure of their permanent income. This weakness is at least partially offset by investigating intergenerational mobility in two additional outcomes that are likely to be related to lifetime income, namely educational attainment and occupational status.

The main findings of this paper are as follows:

1. Intergenerational income mobility is estimated to be high for both males and females in all three ethnic groups. The estimated income elasticities, however, indicate that income mobility is lower for females than for males across all three ethnic groups. The lower income elasticities found in the present study compared to those found in other recent US studies is a likely consequence of the relatively young age of the respondents. This limits the usefulness of the estimates of income mobility reported in this paper.

2. There are substantial disparities in educational and occupational mobility between ethnic groups. The main finding is that Hispanics are much more upwardly mobile than whites, both in terms of their educational attainment and their occupational status. It is also the case, however, that Hispanics are less than half as likely as whites to obtain a degree and that the main reason for their greater upward mobility is that they are far more likely than their parents to have obtained a high school diploma. The upward mobility of Hispanics is explained predominantly by their greater probability of graduating from high school compared to their parents. The conclusion that the observed upward mobility of Hispanics in educational attainment is greater than for whites must therefore be qualified. Despite their greater upward mobility, Hispanics still lag far behind whites in their educational attainment levels and in their occupational status (by age 26). Blacks lie between these two extremes. These conclusions hold for males and for females separately.

3. The results from the ordered logit regressions indicate that the transmission of educational attainment from parent to child is much stronger for whites than for blacks or Hispanics. The ordered logit results therefore add to concerns about the persistence of the ethnic gap in educational attainment across generations.

4. Finally, parental occupation is found to influence the occupational status of sons and daughters, though the impact is somewhat weaker than is the case for the transmission of educational attainment. Moreover, ethnic differences in the impact of parental occupation on

the occupational status of their sons and daughters are generally rather small. The weaker transmission of occupational status from parent to child (compared to the effect of parents' educational attainment) is probably a result of the relatively short time that the respondents have been in the labour market.

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Table 1 Income, educational attainment and occupation of respondents and their parents

Outcome variable	White	Black	Hispanic
		<i>Income (\$)</i>	
Total family income in 1987	45010	25050	26740
Male respondent's income in 1999	31190	23800	26880
Female respondent's income in 1999	20760	18700	18270
		<i>Educational attainment (% in each group)</i>	
<i>Either parent (in 1992)</i>			
No qualification	13.1	21.4	40.2
High school graduation	29.2	30.5	26.4
Some college (e.g. associate degree)	22.4	24.4	17.6
Degree or higher degree	35.3	23.7	15.7
<i>Male respondent (in 2000)</i>			
No qualification	4.8	9.4	9.5
High school graduation	47.1	58.7	59.4
Some college (e.g. associate degree)	13.3	13.8	16.5
Degree or higher degree	34.8	18.1	15.5
<i>Female respondent (in 2000)</i>			
No qualification	4.0	8.7	11.7
High school graduation	40.7	45.9	51.6
Some college (e.g. associate degree)	16.1	19.1	19.3
Degree or higher degree	39.1	26.3	17.4
		<i>Occupation (% in each group)</i>	
<i>Either parent (in 1992)</i>			
Unskilled / semi-skilled	12.0	17.3	23.8
Skilled manual	7.3	6.8	11.6
Skilled non-manual	41.8	50.2	43.5
Professional / manager	38.9	25.7	21.1
<i>Male respondent (in 2000)</i>			
Unskilled / semi-skilled	12.6	23.1	16.1
Skilled manual	26.0	24.3	25.0
Skilled non-manual	26.3	26.7	32.6
Professional / manager	35.1	25.9	26.4
<i>Female respondent (in 2000)</i>			
Unskilled / semi-skilled	11.9	11.4	11.1
Skilled manual	5.0	8.7	3.8
Skilled non-manual	44.9	48.6	57.2
Professional / manager	38.1	31.4	27.8

Note: 'High school graduation' includes those who obtained the General Education Development qualification (e.g. those who decided to take this qualification after dropping out of high school). The sample sizes are as follows: for males (white = 3968, black = 511, Hispanic = 740); for females (white = 4296, black = 644, Hispanic = 870). *Source:* National Educational Longitudinal Study (NELS:88).

TABLE 2 Intergenerational income mobility for males and females:
dependent variable = (log) income of respondent in 1999

Explanatory variable = (log) estimated total family income from all sources in 1987						
Ethnic group	n	Males Estimated elasticity	R	n	Females Estimated elasticity	R
<i>All</i>	3760	0.205*** (0.022)	0.15	3402	0.342*** (0.021)	0.27
White	2805	0.174*** (0.027)	0.12	2479	0.381*** (0.028)	0.27
Black	265	0.249** (0.078)	0.19	305	0.323*** (0.069)	0.26
Hispanic	451	0.147* (0.075)	0.09	407	0.242*** (0.065)	0.17

Note: See Appendix Table B for the equation used to estimate permanent family income in 1987. The significance levels are as follows: * = 5%, ** = 1% and *** = 0.1% (using a two-tailed test).

Table 3a Intergenerational mobility in educational attainment by ethnic group and gender

Educational attainment	% of respondents ^b					
	White	Males Black	Hispanic	White	Females Black	Hispanic
% in a lower group than their parents ^a	28.7	35.2#	27.0	22.6	24.8	20.7
% in the same group as their parents	45.4	35.3*	29.6***	44.0	37.7#	30.4***
% in a higher group than their parents	26.1	29.5	43.5***	33.4	37.6	49.0***
	100	100	100	100	100	100

Notes:

^aThe first row is the proportion of respondents in a lower educational attainment group than the *highest* group attained by either of their parents, and similarly for the second and third rows. The definition of the educational attainment groups is given in Table 1. See also Table C in the appendix.

^bThe asterisks indicate whether the percentage in each ethnic/gender group is significantly different from the corresponding group for whites. The significance levels are as follows: # = 10%, * = 5%, ** = 1% and *** = 0.1% (using a two-tailed test).

Source: National Educational Longitudinal Study (NELS:88/00).

Table 3b Intergenerational mobility in occupational status by ethnic group and gender

Occupational status	% of respondents ^b					
	White	Males Black	Hispanic	White	Females Black	Hispanic
% in a lower group than their parents ^a	41.0	41.0	33.1*	29.1	25.6	20.7*
% in the same group as their parents	32.7	30.0	29.3	40.9	39.7	36.2
% in a higher group than their parents	26.5	29.1	37.6***	29.9	34.6	43.2***
	100	100	100	100	100	100

Notes:

^aThe first row is the proportion of respondents in a lower occupation group than the *highest* group attained by either of their parents, and similarly for the second and third rows. The definition of the occupation groups is given in Table 1. See also Table D in the appendix.

^bThe asterisks indicate whether the percentage in each ethnic/gender group is significantly different from the corresponding group for whites. The significance levels are as follows: * = 5%, ** = 1% and *** = 0.1% (using a two-tailed test).

Source: National Educational Longitudinal Study (NELS:88/00).

Table 4 Estimated marginal effects from ordered logits: educational attainment equations

(a) Males

Parents' educational attainment (highest level of either parent)	No qualifications	High school diploma	Some college	Degree
<i>White</i>				
High school diploma	-0.013*** (0.003)	-0.098*** (0.025)	0.009*** (0.002)	0.101*** (0.027)
Some college	-0.023*** (0.003)	-0.190*** (0.025)	0.007** (0.002)	0.205*** (0.029)
Degree	-0.058*** (0.005)	-0.405*** (0.020)	0.012** (0.004)	0.451*** (0.023)
<i>Black</i>				
High school diploma	-0.003 (0.017)	-0.008 (0.042)	0.004 (0.020)	0.008 (0.039)
Some college	-0.047*** (0.014)	-0.156** (0.056)	0.058*** (0.017)	0.145** (0.053)
Degree	-0.061*** (0.014)	-0.211*** (0.056)	0.073*** (0.016)	0.199*** (0.055)
<i>Hispanic</i>				
High school diploma	-0.002 (0.014)	-0.004 (0.027)	0.003 (0.018)	0.004 (0.024)
Some college	-0.022 (0.014)	-0.048 (0.035)	0.028 (0.019)	0.041 (0.030)
Degree	-0.058*** (0.012)	-0.167*** (0.043)	0.077*** (0.016)	0.147*** (0.040)

(b) Females

Parents' educational attainment (highest level of either parent)	No qualifications	High school diploma	Some college	Degree
<i>White</i>				
High school diploma	-0.011*** (0.002)	-0.089*** (0.021)	-0.000 (0.001)	0.100*** (0.024)
Some college	-0.024*** (0.002)	-0.220*** (0.019)	-0.018*** (0.005)	0.262*** (0.024)
Degree	-0.049*** (0.004)	-0.396*** (0.016)	-0.036*** (0.005)	0.481*** (0.020)
<i>Black</i>				
High school diploma	-0.028 (0.012)	-0.090* (0.043)	0.024* (0.010)	0.093* (0.045)
Some college	-0.050*** (0.012)	-0.179*** (0.045)	0.035*** (0.008)	0.194*** (0.051)
Degree	-0.079*** (0.014)	-0.320*** (0.042)	0.021 (0.015)	0.379*** (0.056)
<i>Hispanic</i>				
High school diploma	-0.029* (0.014)	-0.051 (0.027)	0.031* (0.015)	0.049 (0.025)
Some college	-0.054*** (0.013)	-0.117*** (0.037)	0.058*** (0.014)	0.113** (0.036)
Degree	-0.078*** (0.012)	-0.202*** (0.041)	0.077*** (0.011)	0.203*** (0.044)

Note: The estimated coefficients for the other variables included in these ordered logit models are not provided here. The full set of results is available on request to the authors. The significance levels are as follows: * = 5%, ** = 1% and *** = 0.1% (using a two-tailed test).

Table 5 Estimated marginal effects from ordered logits: occupational group equations

(a) Males

Parents' occupation (highest level of either parent)	Unskilled or semi-skilled	Skilled manual	Skilled non- manual	Profess- ional, managerial
<i>White</i>				
Skilled manual	-0.025* (0.012)	-0.035 (0.019)	-0.002 (0.003)	0.061 (0.033)
Skilled non-manual	-0.043*** (0.010)	-0.058*** (0.013)	0.001 (0.002)	0.099*** (0.022)
Professional, managerial	-0.099*** (0.009)	-0.133*** (0.013)	-0.005 (0.004)	0.238*** (0.023)
<i>Black</i>				
Skilled manual	-0.058 (0.048)	-0.034 (0.034)	0.015 (0.008)	0.078 (0.075)
Skilled non-manual	-0.099* (0.041)	-0.047* (0.020)	0.033* (0.015)	0.113* (0.047)
Professional, managerial	-0.133*** (0.035)	-0.080*** (0.027)	0.027** (0.011)	0.186** (0.059)
<i>Hispanic</i>				
Skilled manual	-0.026 (0.030)	-0.024 (0.031)	0.007 (0.006)	0.043 (0.056)
Skilled non-manual	-0.030 (0.023)	-0.027 (0.021)	0.010 (0.007)	0.047 (0.036)
Professional, managerial	-0.075*** (0.022)	-0.076** (0.026)	0.011 (0.007)	0.140** (0.049)

(b) Females

Parents' occupation (highest level of either parent)	Unskilled or semi-skilled	Skilled manual	Skilled non- manual	Profess- ional, managerial
<i>White</i>				
Skilled manual	-0.027* (0.011)	-0.010* (0.004)	-0.037 (0.019)	0.075* (0.034)
Skilled non-manual	-0.023* (0.009)	-0.008* (0.003)	-0.024* (0.010)	0.055* (0.023)
Professional, managerial	-0.084*** (0.009)	-0.031*** (0.004)	-0.103*** (0.013)	0.217*** (0.023)
<i>Black</i>				
Skilled manual	-0.026 (0.028)	-0.019 (0.022)	-0.033 (0.051)	0.078 (0.100)
Skilled non-manual	-0.048* (0.021)	-0.032* (0.014)	-0.038* (0.017)	0.118* (0.049)
Professional, managerial	-0.069*** (0.017)	-0.050*** (0.014)	-0.100** (0.036)	0.219*** (0.061)
<i>Hispanic</i>				
Skilled manual	-0.043** (0.016)	-0.015* (0.006)	-0.006 (0.038)	0.123* (0.058)
Skilled non-manual	-0.018 (0.016)	-0.006 (0.005)	-0.017 (0.017)	0.041 (0.038)
Professional, managerial	-0.053*** (0.015)	-0.018** (0.006)	-0.080* (0.032)	0.152** (0.051)

Note: The estimated coefficients for the other variables included in these ordered logit models are not provided here. The full set of results is available on request to the authors. The significance levels are as follows: * = 5%, ** = 1% and *** = 0.1% (using a two-tailed test).

Appendix

TABLE A: Mean characteristics of education and occupation samples

Education sample			Occupation sample		
Variables	Female	Male	Variables	Female	Male
White	0.689	0.704	White	0.683	0.703
Black	0.096	0.086	Black	0.100	0.087
Asian	0.069	0.073	Asian	0.067	0.071
Hispanic	0.132	0.126	Hispanic	0.135	0.128
Mother no high school	0.309	0.269	Mother not working	0.119	0.125
Mother high school graduate	0.270	0.275	Mother manual	0.055	0.058
Mother some college	0.170	0.168	Mother non-manual	0.453	0.453
Mother college graduate	0.131	0.145	Mother managerial	0.042	0.038
Mother PhD	0.121	0.144	Mother professional	0.331	0.325
Father no high school	0.276	0.240	Father not working	0.126	0.135
Father high school graduate	0.319	0.337	Father manual	0.127	0.129
Father some college	0.197	0.179	Father non-manual	0.179	0.182
Father college graduate	0.123	0.148	Father managerial	0.169	0.170
Father PhD	0.085	0.096	Father professional	0.399	0.384
No sibling	0.054	0.057	No sibling	0.055	0.058
One sibling	0.308	0.331	One sibling	0.307	0.330
Two siblings	0.266	0.268	Two siblings	0.266	0.268
Three siblings	0.160	0.152	Three siblings	0.161	0.151
Four siblings	0.200	0.174	Four siblings	0.199	0.174
Number of observations	6046	5413	Number of observations	5955	5372

Table B: OLS equation used to estimate family income in 1987

	Estimated coefficient (robust standard error)	Standard error
Father manual	0.031*	0.014
Father non-manual	0.020	0.014
Father managerial	0.164***	0.017
Father professional	0.125***	0.018
Mother Manual	0.115***	0.025
Mother non-manual	0.038***	0.012
Mother managerial	0.130***	0.023
Mother professional	0.122***	0.016
Black	-0.155***	0.019
Asian	-0.061**	0.020
Hispanic	-0.135***	0.017
Live with both parents in 1988	0.202***	0.012
Parents high school graduate	0.166***	0.021
Parents some college	0.287***	0.019
Parent college graduate	0.492***	0.022
Parents postgraduate degree	0.605***	0.025
Mother working	0.091***	0.019
Father working	0.226***	0.021
Both parents unemployed	0.002	0.054
Lived in suburban area	0.067***	0.012
Lived in rural area	-0.083***	0.013
Lived in North East region	0.0160	0.014
Lived in North Central region	-0.036**	0.012
Lived in West region	-0.004	0.014
Constant	9.601	0.034
<hr/>		
Number of observations	8270	
R ²	0.324	

Note: Standard errors are in parentheses. The significance levels are as follows: * = 5%, ** = 1% and *** = 0.1% (using a two-tailed test).

Table C Cross-tabulation of parent's and respondent's educational attainment:
% of total sample in each cell by ethnic group and gender

Highest qualification of respondent's parent	Occupation of respondent							
	Males				Females			
	No qualifi- cations	High school diploma	Some college	Degree	No qualifi- cations	High school diploma	Some college	Degree
White								
No qualifications	1.8	6.7	1.6	1.8	1.9	7.3	2.9	2.1
High school diploma	1.8	17.5	4.8	5.3	1.4	15.5	6.0	6.0
Some college	0.6	11.2	3.7	5.9	0.5	9.5	4.3	9.1
Degree	0.4	11.4	3.3	22.4	0.2	8.1	2.9	22.3
Black								
No qualifications	2.9	12.4	2.9	1.6	4.1	11.7	4.4	2.6
High school diploma	4.1	19.8	4.3	2.9	2.4	15.3	7.2	4.7
Some college	0.6	13.8	3.7	5.4	1.0	11.2	5.9	7.0
Degree	0.6	13.4	2.7	8.9	0.7	7.7	1.8	12.4
Hispanic								
No qualifications	4.5	22.3	6.5	3.7	8.2	21.2	8.3	5.2
High school diploma	3.0	15.8	4.7	3.0	1.8	14.8	6.9	2.8
Some college	1.4	10.5	3.3	3.3	0.8	9.2	2.3	4.6
Degree	0.3	9.7	16.6	6.0	0.4	6.2	2.3	5.1

Source: NELS:88/00.

Table D Cross-tabulation of parent's and respondent's occupational status:
% of total sample in each cell by ethnic group and gender

Occupation of respondent's parent	Occupation of respondent							
	Males				Females			
	Unskilled or semi- skilled	Skilled manual	Skilled non- manual	Profess- ional or manager	Unskilled or semi- skilled	Skilled manual	Skilled non- manual	Profess- ional or manager
White								
Unskilled / semi-skilled	2.0	5.0	2.1	2.8	1.9	1.1	5.5	3.4
Skilled manual	1.2	2.6	1.5	2.2	1.0	0.4	3.5	2.5
Skilled non-manual	5.7	11.9	10.4	12.9	6.2	2.4	20.1	13.9
Professional / manager	3.6	6.3	12.3	17.7	2.6	1.0	15.9	18.5
Black								
Unskilled / semi-skilled	5.6	5.4	2.9	3.4	2.7	2.3	7.7	3.9
Skilled manual	1.8	2.5	3.1	1.3	0.5	0.5	2.3	1.4
Skilled non-manual	11.0	10.3	13.4	13.0	5.4	4.3	26.1	17.0
Professional / manager	3.8	5.4	8.7	8.5	1.4	1.1	12.9	10.4
Hispanic								
Unskilled / semi-skilled	4.5	8.3	6.2	6.1	2.4	1.6	13.4	5.0
Skilled manual	1.7	2.8	3.1	2.8	0.8	0.5	7.1	4.1
Skilled non-manual	6.5	10.7	14.5	11.1	5.5	1.4	25.4	12.0
Professional / manager	2.8	3.3	8.1	7.5	1.7	0.4	10.9	8.0

Source: NELS:88/00.