Abstract

This paper compares and contrasts estimates of the extent of intergenerational income mobility over time in Britain. Estimates based on two British birth cohorts show that mobility appears to have fallen in a cross-cohort comparison of people who grew up in the 1960s and 1970s (the 1958 birth cohort) as compared to a cohort who grew up in the 1970s and 1980s (the 1970 birth cohort). The sensitivity of labour market earnings to parental income rises, thereby showing less intergenerational mobility for the more recent cohort. This supports theoretical notions that the widening wage and income distribution that occurred from the late 1970s onwards slowed down the extent of mobility up or down the distribution across generations.

Changes in Intergenerational Mobility in Britain

Jo Blanden, Alissa Goodman,

Paul Gregg and Stephen Machin

1. Introduction

The extent to which an individual's economic or social success is shaped by the economic or social position of their parents is a contentious and hotly debated issue, both within academic circles and in a wider policy context. There is a large body of academic work, carried out predominantly by sociologists, on social mobility[1] where social class of individuals is related to parental social class, and a smaller body of work which considers mobility in terms of economic status (usually measured by labour market earnings of children and parents).[2] Time and again the issue of intergenerational inequalities crops up in the political arena, and one increasingly sees discussion of the issue in the political press.

The experience of the last twenty years or so probably makes such issues even more relevant than ever. In the UK income inequality increased very rapidly since the late 1970s.[3] Much of this has been due to changing rewards from paid work as earnings gaps between the highest and lowest paid workers have widened out by a considerable amount.[4] One consequence of this has been a massive rise in the proportion of children growing up in poverty. In 1979 13 percent of children lived in households where income was less than half of the average income. By 1996 this had risen to 33 percent (Gregg, Harkness and Machin, 1999). However, despite the increase in public attention which culminated with Chancellor Gordon Brown's pledge to "end child poverty in a generation", there is so far limited evidence as to the true effect on children's prospects of the changing distribution of family incomes in the UK.

Such changes make the study of intergenerational mobility of economic status, in the form of correlations between children's and parents' economic outcomes, extremely important. If more children are growing up in an environment where they have less access to resources (at least relatively) then that may well have implications for their future economic success or failure. If this is the case their potential earnings as adults are likely to be more strongly tied to those of their parents. Furthermore, if this hinders high ability children from lower income families (for example by preventing them from entering higher education) there will be negative implications for productivity and national social welfare.

---

[1] See the survey undertaken in the recent Performance and Innovation Unit (2001) paper on social mobility.
[2] See the up to date survey of Solon (1999).
[3] See, *inter alia*, Goodman, Johnson and Webb (1997).
[4] Machin (1996, 1998, 1999).

We look at these questions using data on two British birth cohorts (one born in 1958, the other in 1970). We explore the extent to which the degree of intergenerational mobility has changed over time. The paper begins, in the next section, by considering how existing work relates to our questions of interest and by describing the empirical methods we use. Section 3 describes the data. Section 4 presents our empirical results, where we report evidence showing that intergenerational immobility has increased between the two cohorts we study. This occurs for both regression based and transition matrix approaches to studying intergenerational mobility. We also find that differing educational attainment accounts for part of the change in the association between parental income and children's earnings. We discuss the implications of these findings in the concluding section of the paper.

2. Related Work and Modelling Questions

The intergenerational mobility literature

There is hardly any research on changes over time in the extent of intergenerational mobility. However, there is much more on child-parent correlations of economic and social status, which has expanded rapidly in recent years as the availability of good quality data on parent and child economic status has grown. The usual approach adopted in this work is to estimate log linear regressions of children's economic status on that of their parents.[5] The typical formulation for children and parents in family i is:

$$\ln Y_i^{CHILD} = a + b \ln Y_i^{PARENTS} + e_i$$

where Y is economic status (usually labour market earnings) and ε is an error term. The coefficient b reflects how strongly children's status is associated with parental economic stature. The literature usually proceeds to say b of zero (where child and parental Y are uncorrelated) corresponds to complete intergenerational mobility and b of unity (child Y is fully determined by parental Y) corresponds to complete immobility. The empirical question of interest then concerns estimating the magnitude of b, paying careful attention to problems of measurement of Y and associated econometric difficulties.

---

[5] The other commonly adopted approach is to look at transition matrices between generations. All of what we discuss in this section could be framed in terms of the transition matrix approach and we do present estimates based on both the regression and transition matrix approaches later on. But for now, for reasons of clarity, we just focus on the regression based approach. The regression approach of course goes back a long way in time (for example see Galton's, 1886, analysis of child-parent height correlations).

The more recent work in this area very clearly points out the potential pitfalls associated with estimating b from data on children and their parents. An older literature surveyed in Becker and Tomes (1986) concluded that, for correlations based on labour market earnings, b was around 0.2. This led Becker and Tomes to say "aside from families victimized by discrimination, regression to the mean in earnings in the United States and other rich countries appears to be rapid" (Becker and Tomes, 1986, p.S32). However the methodological problems associated with the data used in the majority of this work meant that this estimate was biased downwards. Solon (1989) shows that the use of homogenous samples and measurement errors in $Y_i^{PARENTS}$ both induce an attenuation bias meaning that the b coefficients from the earlier work tended to be too low. More recent work using better quality data and appropriate econometric methods concludes that the labour market earnings b is in fact quite a lot higher, and more likely to be around 0.4 (Solon, 1999).[6]

These more recent findings suggest considerable persistence in economic status across generations. If b equals 0.4 a child from a family with a Y twice as large as another family will have on average 40 percent higher Y in their own generation. So, if one thinks of Y as family income, then in the plausible case of two families, one with parental income of £10000, and the other with parental income of £20000, the child's family will be predicted to have an income of £4000 higher in their own generation.

These findings have potentially important implications for social welfare. Various authors have demonstrated a link between inequality and the extent of intergenerational mobility, with less mobility (higher b) implying greater inequality. Atkinson (1981), for example, writes down a simple model where this occurs. This link is important, especially if lack of mobility constrains higher ability children from lower income families. For example, if a higher b results in such children having less access to resources whilst growing up or facing liquidity constraints that stop them attending university.

Changes over time in the extent of intergenerational mobility

The study of how b may change through time becomes very important when placed in the context of this discussion. As already noted above, income inequality has risen in recent years, especially in the UK and US, and there have been big increases in the numbers of

---

[6] Some studies, like the recent one by Mazumder (2000), report even higher estimates.

children growing up in relatively poor families. Yet we know little of how this relates to possible changes in the intergenerational mobility of economic status. Part of this lack of knowledge is due to the strong data requirements that are likely to hinder researchers who would like to address this question. The only work that we know of is Mayer and Lopoo's (2001) US study, which uses data from the Panel Survey of Income Dynamics to consider how intergenerational transmissions have changed in the US.   They find that intergenerational correlations between sons' age 30 earnings and fathers' earnings are lower for sons born in 1960-1962 than for those born in 1949-1952, despite the wider income distribution in the later group's childhood. This is partly due to a reduction in the connection between parental income and educational attainment. The authors argue that this is a consequence of the increased investments made in children by the state that have counteracted the differences in the investments parents are able to make. However they acknowledge that the sample sizes they use are small and the period estimated over is short.

What mechanisms are likely to underpin changes in the extent of intergenerational mobility? Mayer and Lopoo discuss three possibilities:

a) the relative investments in children made by rich and poor parents might change;

b) the payoff to these investments might change;

c) the returns to genetic or biologically transmitted characteristics change.

Solon (2001) has formalised the first two of these factors in an intuitively appealing economic model.   Suppose we are interested in intergenerational earnings mobility.   In generation t labour market earnings W are a function of human capital H so that:

$$W_t = \phi_t H_t + u_t$$

If we then believe that children's human capital is related to parental income through differences in investments made by rich and poor parents we can write

$$H_t = \psi W_{t-1} + v_t$$

One can combine these equations to generate an intergenerational mobility function:

$$W_t = \phi_t \psi W_{t-1} + \varepsilon_t$$

where $\varepsilon_t = \phi_t v_t + u_t$.

According to this formulation intergenerational mobility will be higher in this case if a) there are lower returns to human capital for children (ϕ_t is lower), or b) if children's human capital is less sensitive to parental earnings (ψ is lower). On the former, there is plenty of

evidence that labour market returns to education have been rising in the US and UK in recent years.[7] This would actually imply reduced mobility. We know less about links between education and parental income (though see Acemoglu and Pischke, 2001, who identify strong links between the two across US regions over time). But we do know that educational attainment has been rising very sharply. In the UK in 1975 5.6 percent of men had a degree. By 2000 this had risen to 17.9 percent.[8] For women the rise is even faster, from 2.3 to 15.3 percent over the same time period. If this increased educational attainment differentially benefited more children from lower income families (lower ψ) then this would raise mobility. On the other hand, if children from richer families were more likely to reach higher educational qualifications (higher ψ) this will result in reduced mobility. For these reasons we also consider the role played by changing educational attainment in the empirical work we present below.

Measurement of b when inequality varies over time

One of the motivating influences for our interest in changing intergenerational mobility is the fact that income inequality has been rising over time. This has important implications for the measurement of the intergenerational elasticity b. Grawe (2000b) demonstrates the implications of changing variances in parent and child earnings for the measurement of intergenerational mobility. His interest is in terms of the bias induced by measuring the parameter at different stages in the generations' lifecycles. Frequently in the literature the earnings measure for parents is taken later in life than the one for children. As the variance of earnings increases with age this can lead to biased estimates compared to when both measures are taken at the same point of the lifecycle. This leads to a downward bias in the estimated coefficient. Grawe shows that this can be corrected for by using the sample correlation between parental and child Y measures:

$$(Corr_{\ln Y^{PARENTS}, \ln Y^{CHILD}}) = b * (\frac{SD_{\ln Y^{PARENTS}}}{SD_{\ln Y^{CHILD}}})$$

where $(Corr_{\ln Y^{PARENTS}, \ln Y^{CHILD}})$ is the sample correlation between the generations' lnY and SD denotes a standard deviation.

In the light of this discussion, it becomes clear that when comparing intergenerational mobility over a period when inequality is changing it is particularly important to correct for changes in the inequality of Y. Therefore all our estimates report both the estimated regression coefficient **b** and the sample correlation, which we term '**b** adjusted for changes in inequality'.

3. The Data

The British birth cohorts

We look at changing intergenerational mobility using data from two very rich British birth cohorts. These are the National Child Development Study (NCDS), a survey of all children born in the UK between 3 and 9 March 1958, and the British Cohort Survey (BCS), a survey of all children born between 5 and 11 April 1970. The NCDS is a very rich data set that has been used for previous work on intergenerational mobility in the UK (Dearden, Machin and Reed, 1997) and consists of the birth population with follow-up samples at ages 7, 11, 16, 23, 33 and 42.[9] The BCS has been used less by economists, but is very similar in style, with data collected at ages 5, 10, 16, 26 and 30. As well as being similar in spirit the questions asked in the two cohorts are frequently identical, although there are some difficulties inherent in using them in a comparative study over time.

Ideally one would like to have measures of the same permanent economic status (be it wages or income) for both generations from both cohort studies. Unfortunately, due to different survey design, this is not possible using NCDS and BCS. The NCDS parental income data comes from separate measures of father's earnings, mother's earnings and other income (all defined net, i.e. after taxes). Because of this breakdown earlier work on the NCDS was able to compare sons and father's earnings. However, the BCS only has data on parents' combined income. We are therefore forced to base our estimates on the relationship

---

[9] The NCDS data have also been used to look at the transmission mechanisms that may underpin intergenerational mobility: see Gregg and Machin (1999, 2000), Hobcraft (1998) or Kiernan (1995).

between the cohort member's earnings or income and parental income and are not able to look at changes in the pattern of intergenerational correlations of earnings.

As already mentioned, previous work in this area stresses the need to look at parents and children at the same stage of the lifecycle. The reasons for this are obvious, namely that one does not want to contaminate estimates with measurement error due to the transitory components of earnings or income. We are able to get fairly close to this in our work, using income and earnings data on children at age 33 in the NCDS and 30 in the BCS. In case parents are of different ages across the studies we also control for the average age of parents. Controlling for average age rather than age of mother and father separately avoids limiting the sample to families with two parents.

Descriptive statistics

Table 1 shows some descriptive statistics for our estimation samples. The first thing to notice is confirmation of the rising inequality of earnings between the cohorts, as shown by the higher standard deviations for the 1970 cohort in the top row. There is also a rise in the inequality of cohort member's family incomes and in the inequality of parental incomes measured at age 16 (in 1974 for the NCDS and in 1986 for the BCS).

The Table also shows the fraction of cohort members who were in poor families at age 16 (defined as those a poverty line of half mean equivalised national income[10]) to be higher for the 1970 cohort, which is in line with the national trends in child poverty reported in Gregg, Harkness and Machin (1999). Finally, substantial educational upgrading occurs. Many more BCS cohort members have degrees and far fewer leave the education system possessing no educational qualifications as compared to the older cohort.

4. Estimates of Changes in Intergenerational Mobility

Baseline Results

Table 2 reports a set of baseline results, showing estimates of intergenerational mobility from both cohorts, for male and female cohort members separately. Three sets of results are

---

[10]   This poverty line is from income data in the appropriate years from the Family Expenditure Survey, a representative household survey carried out annually in Britain.

reported for each. The first, in the upper panel of the Table, is a regression of the log of cohort members' earnings on log parental income. The second, which we refer to as the augmented earnings regression, adds a large set of pre-labour market entry controls to the first specification. These variables (listed in the notes to the Table) are a set of child-specific and family factors. The inclusion of these variables is an attempt to identify the effect of changes in family income for otherwise identical individuals.[11] The final set of results uses cohort members' family income as the dependent variable.

Our main interest is in changes in the extent of mobility over time. The results in Table 2 paint a strong and very consistent pattern. In all cases the BCS parental income coefficient is higher than the comparable NCDS coefficient. This remains the case when the inequality adjustment described earlier is implemented. Furthermore, the changes are sizeable with the inequality adjusted estimates rising by .124 to .250 for men and by .114 to .231 for women. Similarly strong rises are seen in the augmented and family income regressions. All of these increases are strongly significant, showing a steep rise across cohorts that resulted in substantial falls in the extent of intergenerational mobility. This is the main empirical result of this paper. Links between child and parent economic status appear to have strengthened considerably in this cross-cohort comparison. We next go on to consider the robustness of this finding.

Comparison with Previous Estimates

Readers familiar with earlier work in this field may worry that the NCDS estimates of the intergenerational mobility coefficient for the NCDS are lower than the .4 'consensus estimate' mentioned earlier. Additionally they are lower than those found for the same data in Dearden, Machin and Reed (1997).

In this section we aim to allay these fears. We began by repeating the basic analysis of Dearden, Machin and Reed (1997) on our NCDS sample. We obtain an OLS coefficient (and associated standard error) from a regression of sons on father's earnings of .259 (.026) for

---

[11] One way of thinking about the inclusion of these characteristics is that they in some sense 'level the playing field' between cohort members by controlling for detailed observables and as such proxy child/family fixed effects. Or at least that they show how the coefficients would alter if one moved more towards a fixed effects specification that would wash out child and family characteristics not previously controlled. The cohort studies are particularly suited to this estimation strategy as they contain much richer childhood data than other similar surveys (like the US National Longitudinal Survey of Youth).

2317 observations. This compares with .240 (.027) for the more limited sample of 1565 observations in the original work.

These results make it clear that it is the use of family income rather than fathers' earnings as the independent variable of interest that results in different magnitudes in the estimated intergenerational elasticities. One plausible hypothesis that then emerges is that it may be differences in the influence of mother's earnings that underpin the rise in β between the cohorts. If true this would imply that if we looked at family income where father's earnings were the only component then the estimates of β would not change. To test this we repeated the baseline estimations for families in which only the father works. With these samples the gap in the adjusted $\boldsymbol{b}$ falls for both sexes, from .124 in the full sample to .106 in the restricted sample for sons and from .114 to .077 for daughters. Therefore there is some moderate evidence that the changing influence of mothers may be driving some of the observed change, and more so for daughters than sons. However, digging deeper into such gender differences is not the focus of this paper as that would require substantial effort to be devoted to the development of a more general framework where parental inputs may differ for sons and daughters and where mother's work is incorporated explicitly. This is on the agenda for future research.

Sensitivity checks and possible bias

Great care has been taken in the recent work in this area to try to ensure that results are not contaminated by measurement errors that can cause attenuation bias. This involves attempts to get rid of measurement errors in the variables entered on the right hand side of intergenerational mobility regressions. Two main approaches are followed. First, one can try and time average multiple observations on parental income to eliminate transitory components of income thereby getting closer to a measure of permanent economic status. Second, one can use instrumental variables techniques.

We have some difficulties with both of these approaches here. We only have a single data point for parental income in the NCDS and therefore cannot time average for both cohorts. Similarly we do not believe that we have any credible instruments for parental income.[12] Because of this we choose to follow a different route. Initially we take a look at

---

[12] This is despite the use of parental education and social class as instruments in Dearden, Machin and Reed (1997). Some limited experimentation here revealed that their use, especially in the cross cohort context,

the likely extent of measurement error in the BCS by time averaging over the age 10 and 16 income observations. Then we move to the cross-cohort comparison and discuss theoretically what potential biases could get rid of our falling mobility result. We discuss how plausible or implausible these might be, considering our own estimates of measurement error and those found in the literature.

Table 3 reports a set of *b* estimates based on the age 10 and age 16 income data contained in the BCS data. The reported estimates are the age 16 estimates from Table 2, plus estimates based on age 10 data and then upon the time averaged age 10 and 16 income data. The first thing to notice is that the estimates based on age 10 and 16 data are very close for the sons. There is a little more variation for daughters, but even here it is clear that the evidence of a cross-cohort rise in the regression *b* remains robustly in place. Furthermore, when one looks at the time averaged estimates of *b* they show the pattern one expects: the estimated *b* rises for both sons and daughters, revealing some evidence of attenuation bias from measurement errors, and the estimates rise by around .05 for sons and somewhere between .04 and .09 for daughters.

Moving on to the cross-cohort implications of measurement error, the starting point is clearly the observation that one would require more attenuation bias in the NCDS sample as compared to the BCS sample to start to question our findings. It is not obvious from the outset why there should be any reason to think this to be the case, but there are several relevant points to be made. In the past economists have worried that the timing of the UK "Three-Day Week" might have led to measurement error in the NCDS age 16 family income data. This question has been considered in Dearden, Machin and Reed (1997) and in Grawe (2000a). By comparing income measures taken during and after the policy Grawe finds that 5 percent of the whole NCDS sample is likely to have reported three-day income variables rather than standard ones, meaning that overall the attenuation bias from this possible source of measurement error is unlikely to be large.

Table 4 shows a calibration exercise on how much bigger the measurement error would be required to be in the NCDS for us to conclude there is no statistically significant rise in the adjusted β across the cohorts, for various assumptions on measurement error in the BCS. For example, the first row of the Table shows that if we assume complete accuracy in the BCS one would require measurement error in the NCDS to be 33.2 percent (for both sons

---

seemed rather dubious, both on the basis of Sargan tests and on the sensitivity of IV estimates to choice of instruments.

and daughters), so that around one third of the variance in measured income would need to come from error. As we relax the assumptions on the accuracy of the BCS data it is clear that the measurement error required in the NCDS to get rid of the rise also increases and is often substantial. For example, if measurement error in the BCS is as high as Mazumder's (2000) recent paper suggests, the NCDS measurement error would need to be 76 percent for sons (77 percent for daughters) for the rise we observe to be rendered statistically insignificant. The Table shows under various assumptions that one would need substantially higher measurement error in the NCDS data to eliminate the pattern of rising intergenerational mobility across the two cohorts.

As mentioned above transitory income is usually thought of as the main source of measurement error in parental earnings or income mentioned in the literature. In order to get a handle on the effect this may have on our cohort estimates we have also investigated changes in the permanent versus transitory component of labour income in a large British data source, the New Earnings Survey panel. The New Earnings Survey is a 1 percent employer reported data base covering all British employees carried out in April of each year. It contains very accurate wages data from employer records and enables us to follow people through time. One can use such data to work out the permanent and transitory components of earnings and compare them with our NCDS and BCS data.[13]

If the relative importance of the transitory component of income has decreased through time then this provides some independent evidence from another data source for the possibility of higher attenuation bias in the NCDS. It seems that the data is partly in line with this. Estimating a fixed effect earnings equation over 5 years of data for a cohort equivalent to the BCS fathers shows that transitory fluctuations in income account for 21 percent of the total variance. A comparable figure for NCDS fathers is slightly higher at 32 percent. However the last row of Table 4 shows the variance contribution of transitory income would need to be much higher than this (just over 50 percent) to result in no statistically significant fall in mobility. In summary then, Table 4 shows that measurement error in the NCDS would need to be very substantial indeed to even reduce our observed rise to statistically insignificant levels, let alone to account for it entirely.

---

[13] Dickens (2000) undertakes a detailed study of how much of the rise in earnings inequality seen in Britain is due to a rise in the permanent versus the transitory components of earnings. He finds about half of the rise in the variance of hourly earnings between 1975 and 1995 to be permanent.

All this gives us confidence that we are picking up a genuine rise in the child-parent correlations across the NCDS and BCS cohorts. We next therefore consider how much of the observed increase can be explained by the substantial educational upgrading we see across the cohorts.

The role of education

We noted in the earlier sections of the paper that changes in intergenerational correlations could come about if the correlations between earnings, education and parental income alter through time. To explore this we add variables measuring the education levels of cohort members to the intergenerational mobility regressions. The results are reported in Table 5. They show education to have an important impact on the magnitude of the estimated *b* for both cohorts, with a bigger (moderating) impact on the size of the BCS mobility parameter. As such the increased educational attainment of children and parents of the BCS cohort vis-à-vis the NCDS cohort can explain part of the fall in intergenerational mobility.

The magnitude of this differs for sons and daughters. For sons the increase in the inequality adjusted β is .124 unconditional on education. This falls to .098 once one controls for son's education. For daughters the fall is bigger, going from an unconditional rise of .114 to a rise of .068 conditional on daughter's education. Therefore measured education accounts for 21 percent of the fall in mobility for sons and 40 percent for daughters. According to the simple economic model outlined earlier this result is in line with the fact that, particularly for females, the expansion in educational achievement between the cohorts has been concentrated on those from higher income backgrounds. This inequality in increased education supply has been acknowledged by the British Department for Education and Employment[14] who say, "The increase in participation in the 1990s amongst socio-economic groups A to C has been double that among groups D and E". [15]

---

[14] The Department for Education and Employment has become the Department for Education and Skills since the 2001 General Election.
[15] From David Blunkett's forward to 'Higher Education for the 21st Century: Change in Higher Education' (1998) London, HMSO.

Transition matrices

All of our analysis so far has concentrated on regression based estimates of the extent of intergenerational mobility and how it has changed through time. The beauty of this approach lies in its simplicity and ease of interpretation but, of course, because of its focus on the single number average b it is unclear about the way in which the nature of the mobility process is altering. One can explore this in more detail by looking at transition matrices, which show where child-parent pairs are moving across the distribution of economic status. Tables 6a and 6b report a set of transition matrices for NCDS and BCS sons and daughters.

The Tables show the proportion in each parental income quartile that move into each quartile of the sons' or daughters' earnings distribution. One way of summarising the extent of immobility is to compute the sum of the leading diagonal and its adjacent cells. These are reported at the top of the Tables. It is clear that transition analysis confirms the regression finding that mobility has fallen between the cohorts. In almost every case a higher proportion remain in the same quartile as their parents in the later cohort and there are less extreme movements between generations. In the NCDS 19 percent of sons and daughters with parents in the bottom quartile rise to the top; in the BCS this falls to 16 percent for sons and 13 percent for daughters. Moving in the other direction the growth in immobility is more marked with almost one fifth (18 percent) of those who start life in the top quartile falling to the bottom in the NCDS while in the BCS the corresponding proportion is 13 percent for sons and 15 percent for daughters. The overall pattern of reduced mobility is very much confirmed by the pattern of results in the transition matrices.

We further investigate the role of education as an explanatory factor in accounting for the fall in mobility in the transition matrices presented in Tables 7a and 7b that control for education. For both sons and daughters an important portion of the observed fall in mobility is accounted for by the education variables. For sons, the immobility index rises by .10 conditional on education compared with .15 in the unconditional matrices in Table 6a. For daughters the conditional rise is .09 compared with .23 unconditionally. Thus the non-linearities allowed for in the transition matrix approach do seem to imply a bigger education effect for both sons and daughters as compared to the average regression approach considered earlier (the immobility index is reduced by 33 percent for sons and by 60 percent for daughters). As such the increased educational attainment of the younger birth cohort seems to matter in interpreting the fall in intergenerational mobility observed across cohorts.

5. Conclusions

In this paper we have considered how the extent of intergenerational mobility has altered across two British birth cohorts, the first born in March 1958 and the second born in April 1970. Even though these cohorts are only twelve years different in age we see sharp falls in cross-generation mobility of economic status between the cohorts. The economic status of the 1970 cohort is much more strongly connected to parental economic status than the 1958 cohort. In addition, there is some evidence that the fall in mobility can partly be accounted for by the fact that a greater share of the rapid educational upgrading of the British population has occurred for people from richer parents. This unequal increase in educational attainment is thus one factor that has acted to reinforce the link between earnings and income of children and their parents.

14

Table 1: Descriptive Statistics

	NCDS Males	BCS Males	NCDS Females	BCS Females
Weekly wage (NCDS Age 33; BCS Age 30)	304.47 (166.74)	331.56 (230.83)	150.70 (127.74)	222.79 (170.40)
Family income (NCDS Age 33; BCS Age 30)	**350.33 (217.42)**	426.58 (349.14)	**350.04 (269.22)**	423.25 (347.90)
Parental income (Age 16)	302.02 (124.70)	308.75 (148.86)	300.67 (132.61)	309.31 (147.80)
Proportion below poverty line (Age 16)	.06	.11	.07	.10
Proportion with degree	.15	.26	.11	.27
Proportion with no educational qualifications	.17	.08	.25	.09
Sample size	2751	2062	2931	2026

Notes:
1. Standard deviations in parentheses for wage and income measures.
2. Wage and income in January 2001 prices.
3. The sample sizes are as in the Table for all variables except for family income where they are: NCDS males 3102; BCS males 2214; NCDS Females 3367; BCS Females 2505.

**Table 2: Estimates of the Changes in the Extent
of Intergenerational Mobility**

	Regression β		β Adjusted For Changes in Inequality		Change in Adjusted β	Sample Size
Earnings Regressions						
	NCDS	BCS	NCDS	BCS		
Sons	.109 (.017)	.228 (.022)	.126 (.019)	.250 (.024)	.124 (.031)	NCDS: 2751 BCS: 2062
Daughters	.167 (.026)	.305 (.030)	.116 (.018)	.231 (.022)	.114 (.029)	NCDS: 2931 BCS: 2026
Augmented Earnings Regressions						
	NCDS	BCS	NCDS	BCS		
Sons	.049 (.016)	.167 (.025)	.056 (.019)	.184 (.027)	.127 (.033)	NCDS: 2751 BCS: 2062
Daughters	.069 (.027)	.220 (.036)	.048 (.019)	.166 (.027)	.118 (.033)	NCDS: 2931 BCS: 2026
Family Income Regressions						
	NCDS	BCS	NCDS	BCS		
Sons	.112 (.029)	.265 (.025)	.083 (.022)	.229 (.022)	.146 (.031)	NCDS: 3102 BCS: 2214
Daughters	.183 (.029)	.291 (.027)	.115 (.018)	.218 (.020)	.103 (.027)	NCDS: 3367 BCS: 2505

Notes:
1. Standard errors in parentheses.
2. All regressions control for parents' age and age-squared.
3. Augmented regressions include controls for ethnicity, parental education, family structure, whether father was unemployed during childhood and maths and reading test score quintiles at age 10/11.
4. In the family income regressions the dependent variable is the sum of cohort member's earnings plus those of any partner.

Table 3: Time Averaging Parental Income in the BCS

Sons	Regression β	BCS Sample size
Income at age 16	.228 (.022)	2062
Income at age 10	.220 (.017)	3367
Time averaged (age 10 and age 16) income	.276 (.026)	1779
Daughters	Regression β	BCS Sample size
Income at age 16	.305 (.030)	2026
Income at age 10	.253 (.025)	3140
Time averaged (age 10 and age 16) income	.340 (.032)	1737

Notes:
1. Standard errors in parentheses.

Table 4: Assumptions About the Extent of Possible Measurement Error Across Cohorts

Assumptions on BCS Error	BCS Regression β	BCS β Adjusted For Changes in Inequality	NCDS β Adjusted For Changes in Inequality That Would Mean No Statistically Significant Cross-Cohort Increase	Implied NCDS Regression β	Implied NCDS Error
Sons					
0	.228	.250	.189	.163	33.2%
10% Solon	.253	.277	.216	.187	41.8%
14.52% Mazumder	.267	.293	.232	.201	45.8%
58% New Earnings Survey	.543	.595	.534	.462	76.4%
21%	.289	.317	.256	.221	50.7%
Daughters					
0	.305	.231	.174	.250	33.2%
10% Solon	.339	.256	.199	.286	41.6%
14.52% Mazumder	.357	.270	.213	.306	45.4%
58% New Earnings Survey	.726	.550	.493	.709	76.5%
21%	.386	.292	.235	.338	51.6%

Notes:
1. For sons no significant rise would require a difference in the adjusted coefficients of .061 or less. For daughters it would require a difference of .057.
2. Empirical estimates of the permanent component of earnings in the New Earnings Survey panel indicate that in our worst case the transitory component of labour income can have only risen to 32% in the NCDS, well within the bounds in the Table (see text of main body of paper).

Table 5: Changes in Intergenerational Mobility and Educational Upgrading

	Regression β		β Adjusted For Changes in Inequality		Gap in Adjusted β	Sample Size
	NCDS	BCS	NCDS	BCS		
Sons						
Table 2	.109	.228	.126	.250	.124	NCDS: 2751
upper panel	(.017)	(.022)	(.019)	(.024)	(.031)	BCS: 2062
Plus son's	.063	.156	.073	.171	.098	NCDS: 2751
education	(.016)	(.021)	(.018)	(.024)	(.030)	BCS: 2062
Daughters						
Table 2 upper	.167	.305	.116	.231	.114	NCDS: 2931
panel	(.026)	(.030)	(.018)	(.022)	(.029)	BCS: 2026
Plus daughter's	.079	.163	.055	.123	.068	NCDS: 2931
education	(.024)	(.028)	(.017)	(.021)	(.027)	BCS: 2026

Notes:
1. Standard errors in parentheses.
2. All regressions control for parents' age and age-squared.
3. Educational attainment is modelled via educational qualification dummies (less than O level; O level or equivalent; greater than O level but less than degree; degree or higher).

Table 6a: Quartile Transition Matrices For Sons

Sum of leading diagonal and adjacent cells: NCDS 2.79 BCS 2.94

NCDS	Sons' earnings quartile			
Parental income quartile	Bottom	2nd	3rd	Top
Bottom	.31	.28	.22	.19
2nd	.29	.26	.25	.20
3rd	.21	.27	.27	.25
Top	.18	.21	.29	.32

BCS	Sons' earnings quartile			
Parental income quartile	Bottom	2nd	3rd	Top
Bottom	.36	.24	.22	.16
2nd	.29	.31	.23	.17
3rd	.20	.27	.26	.27
Top	.13	.16	.30	.41

Table 6b: Quartile Transition Matrices For Daughters

Sum of leading diagonal and adjacent cells: NCDS 2.66 BCS 2.89

NCDS	Daughters' earnings quartile			
Parental income quartile	Bottom	2nd	3rd	Top
Bottom	.27	.30	.24	.19
2nd	.29	.24	.23	.24
3rd	.26	.26	.25	.22
Top	.18	.22	.27	.33

BCS	Daughters' earnings quartile			
Parental income quartile	Bottom	2nd	3rd	Top
Bottom	.34	.31	.22	.13
2nd	.25	.29	.27	.19
3rd	.24	.22	.27	.27
Top	.15	.18	.26	.41

Table 7a: Quartile Transition Matrices For Sons
Conditional on Sons' Education

Sum of leading diagonal and adjacent cells: NCDS 2.67 BCS 2.77

NCDS	Sons' earnings quartile			
Parental income quartile	Bottom	2nd	3rd	Top
Bottom	.29	.28	.22	.21
2nd	.30	.25	.23	.22
3rd	.24	.24	.27	.25
Top	.20	.24	.26	.30

BCS	Sons' earnings quartile			
Parental income quartile	Bottom	2nd	3rd	Top
Bottom	.32	.26	.22	.20
2nd	.29	.28	.25	.18
3rd	.24	.25	.25	.26
Top	.16	.23	.27	.34

Table 7b: Quartile Transition Matrices For Daughters
Conditional on Daughters' Education

Sum of leading diagonal and adjacent cells: NCDS 2.63 BCS 2.72

NCDS	Daughters' earnings quartile			
Parental income quartile	Bottom	2nd	3rd	Top
Bottom	.27	.30	.23	.20
2nd	.27	.25	.25	.23
3rd	.26	.24	.25	.25
Top	.21	.24	.26	.29

BCS	Daughters' earnings quartile			
Parental income quartile	Bottom	2nd	3rd	Top
Bottom	.31	.29	.29	.18
2nd	.26	.26	.26	.22
3rd	.22	.27	.25	.26
Top	.19	.25	.27	.29

References

Acemoglu, D. and Pischke, S. (2001), 'Changes in the Wage Structure, Family Income, and Children's Education', <u>European Economic Review</u>, 45, pp. 890-904.

Atkinson, A. (1981), 'On Intergenerational Income Mobility in Britain', <u>Journal of Post Keynesian Economics</u>, 3, pp. 194-218.

Becker, G. and Tomes, N. (1986), 'Human Capital and the Rise and Fall of Families', <u>Journal of Labor Economics</u>, 107, 123-150.

Card, D. (1999), 'The Causal Effect of Education on Earnings', in O. Ashenfelter and D. Card (eds.), <u>Handbook of Labor Economics</u>, Volume 3A, North Holland.

Department for Education and Employment (1998), 'Higher Education for the 21st Century: Change in Higher Education', HMSO: London.

Dearden, L., Machin, S. and Reed, H. (1997), 'Intergenerational Mobility in Britain', <u>Economic Journal</u>, 107, pp. 47-64.

Dickens, R. (2000), 'The Evolution of Individual Male Earnings in Great Britain: 1975-95', <u>Economic Journal</u>, 110, pp. 27-49.

Galton, F. (1886), 'Regression towards mediocrity in hereditary stature', <u>Journal of the Anthropological Institute of Great Britain and Ireland</u>, 15, pp. 246-263.

Goodman, A., Johnson, P. and Webb, S. (1997), <u>Inequality in the UK</u>, Institute for Fiscal Studies.

Grawe, N. (2000a), 'The Three-Day Week of 1974 and Measurement Error in the NCDS and FES Data Sets', mimeo.

Grawe, N. (2000b), 'Lifecycle Bias in the Estimation of Intergenerational Income Persistence', mimeo.

Gregg, P., Harkness, S. and Machin, S. (1999), 'Poor Kids: Child Poverty in Britain, 1966-96', <u>Fiscal Studies</u>, 20, pp. 163-187.

Gregg, P. and Machin, S. (1999), 'Childhood Disadvantage and Success or Failure in the Labour Market', in D. Blanchflower and R Freeman (eds.), <u>Youth Employment and Joblessness in Advanced Countries</u>, National Bureau of Economic Research, Cambridge, MA.

Gregg, P. and Machin, S. (2000), 'The Relationship Between Childhood Experiences, Subsequent Educational Attainment and Adult Labour Market Performance', in Koen Vleminckx and Timothy Smeeding (eds.), <u>Child Well Being in Modern Nations: What do we Know?</u>, Policy Press.

Hobcraft, J. (1998), 'Intergenerational and life-Course Transmission of Social Exclusion: Influences and Childhood Poverty, Family Disruption and Contact With the Police', CASE Paper 15, Centre for Analysis of Social Exclusion, LSE.

Kiernan, K. (1995), 'Transition to Parenthood: Young mothers, Young Fathers - Associated Factors and Later Life Experiences', STICERD, LSE, Welfare State Programme Discussion Paper Number WSP/113.

Machin, S. (1996), 'Wage Inequality in the UK', Oxford Review of Economic Policy, 7(1), pp. 47-64.

Machin, S. (1998), 'Recent Shifts in Wage Inequality and the Wage Returns to Education in Britain', National Institute Economic Review, 166, pp. 87-98.

Machin, S. (1999), 'Wage Inequality in the 1970s, 1980s and 1990s', in P. Gregg and J. Wadsworth (eds.), The State of Working Britain, Manchester University Press.

Machin, S., Harkness, S. and McIntosh, S. (2001), 'Changes in Educational Wage Differentials in Britain: Supply Changes and the Evolution of Wage Differentials by Sex and Subject of Study, mimeo.

Mayer, S. and Lopoo, L. (2001), 'Has the Intergenerational Transmission of Economic Status Changed?', mimeo.

Mazumder, B. (2000), 'Earnings Mobility in the US: a New Look at Intergenerational Mobility', mimeo.

Performance and Innovation Unit (2001), 'Social Mobility: a Discussion Paper', available at http://www.cabinet-office.gov.uk/innovation/site/site.shtml.

Solon, G. (1989), 'Biases in the Estimation of Intergenerational Earnings Correlations', Review of Economics and Statistics, 71, pp. 172-174.

Solon, G. (1999), 'Intergenerational Mobility in the Labor Market', in O. Ashenfelter and D. Card (eds.), Handbook of Labor Economics, Volume 3A, North Holland.

Solon, G. (2001), 'A Model of Intergenerational Mobility Variation over Time and Place', mimeo.