

International Evidence on Intergenerational Mobility

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Abstract

This paper compares evidence on the extent of intergenerational mobility of males for four countries: the UK, the United States, West Germany and Canada. Evidence on the levels of mobility in these countries indicates that intergenerational mobility is higher in Canada followed by West Germany, with the US and the UK exhibiting less mobility. Unfortunately small sample sizes stand in the way of drawing stronger conclusions. I also examine the role of education in explaining the differences in mobility levels. I find that the higher persistence in the US and the UK can be partly explained by differences in the returns to education and in the relationship between parental education and income.

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1. Introduction

The level of intergenerational mobility in society is seen by many as a measure of the extent of equality of economic opportunity. Intergenerational mobility is often measured as $(1-\beta)$ where β is the estimated coefficient (or elasticity) in a regression of child's log economic status (earnings or income) on the same measure of his parents' status. The early literature on this topic suffered from interpretation difficulties; it was unclear the extent to which a particular estimate of the intergenerational elasticity (say .4) constituted an indication of a large or small amount of mobility. An important way in which this question has been illuminated has been through making comparisons of the extent of intergenerational mobility across countries. In addition, such comparisons can also help us begin to understand what mechanisms lie behind different levels of mobility in different places.

A number of papers have recently reviewed the international literature on intergenerational mobility (Solon, 2002, Corak, 2004), and I also provide my own review in the section 3 of this paper. Comparisons across studies are made problematic, however, by the lack of truly equivalent estimates found in the literature. Different researchers take their own decisions about variable choice, sample selection and estimation methods, meaning that it is impossible to know whether differences are a consequence of fundamentals, or a lack of comparability. In this paper I attempt to add to the literature with some really careful estimates of intergenerational mobility for males born around 1970 in the UK, the US, Canada and West Germany.

The datasets used here are the British Cohort Study, the Panel Study of Income Dynamics, the German Socio-Economic Panel and the Canadian Intergenerational Income Data. All of these studies have been used previously in intergenerational analysis. Comparisons of single country studies (i.e. Solon 1989, 1992, Dearden et al 1997, Wiegand, 1997 and Corak and Heisz 1999) encourage us to expect that mobility is lower in the US and the UK, and higher in Canada and Germany. The extent to which these conclusions remain true in a fully comparable study will reveal the degree to which concerns about making cross-study comparisons are justified.

As well as providing more information about how to evaluate levels of intergenerational mobility across countries “comparisons of intergenerational mobility across countries may yield valuable clues about *how* income status is transmitted across generations and *why* the strength of that intergenerational transmission varies across countries.” (Solon, 2002, page 59, original emphasis). Solon’s (2004) model emphasises the role of education in generating intergenerational persistence, showing that that the relationship between parental income and sons’ human capital and the returns to human capital both have crucial parts to play in the transmission of economic status between generations. In order to find out how the contribution of education to intergenerational persistence varies across countries, I decompose my estimates of the intergenerational elasticity into three parts; the part due to differential returns, the part due to educational inequality and the unexplained part.

This paper proceeds in the next section by describing my empirical approach followed by a discussion of the previous literature in Section 3. Section 4 describes the data. Section 5 discusses the results for the comparison of intergenerational mobility in levels while Section 6 concludes.

2. Empirical Approach

The majority of this chapter takes a standard regression approach to measuring intergenerational mobility, where the parameter of interest is β from the regression of sons’ earnings on parental income for individual i in country j .

$$\ln Y_{ij}^{son} = \alpha_j + \beta_j \ln Y_{ij}^{parents} + \gamma_{1j} Age_{ij}^{parents} + \gamma_{2j} Age_{ij}^{parents^2} + \phi_{1j} Age_{ij}^{son} + \phi_{2j} Age_{ij}^{son^2} + \varepsilon_{ij}$$

Blanden (2005) provides a full review of the methodological concerns associated with estimating this intergenerational relationship. The perfect data for measuring intergenerational mobility would include data on income for parents and children over their entire lives. However, as no data like this exists, the reality means attempting to reduce the biases which result from using the data that is available. The trick in estimating internationally comparable estimates is to ensure that the biases are similar across countries.

As intergenerational studies must rely on reported income rather than lifetime income for estimation purposes, measurement error is a particular concern. In the majority of the literature, the focus is on measurement error in the explanatory variable (parents' income) as under the classical model of measurement error this will result in an attenuation bias. Two approaches are taken by researchers to reduce the extent of measurement error. The first is to time average parental income over a number of years; this should move the income data closer to the ideal lifetime measure. The second is to use instrumental variables estimates based on parental education or social class to predict the permanent level of income. As shown by Solon (1992) this will result in an upward bias on the estimates.

In a recent paper Haider and Solon (2004) have shown that if measurement error in income is correlated, time averaging over a short period will not be sufficient to overcome measurement error. The authors show that if the relationship between permanent income and observed income varies through the lifecycle the age at which income is observed for both generations will have important effects on the estimates. In particular, they show that intergenerational estimates based on young sons and older fathers will be strongly downward biased.

Learning from this discussion I take care in my estimations to average the explanatory variable in the same number of periods in all countries. Secondly I ensure that parental and children's income is obtained at the same ages, to minimise the impact of lifecycle bias. Consequently, I use earnings at around 30 years old as the measure of sons' Y and parental income at around age 16 as the measure of parents' incomes. Thirdly, I try to use common sample selections across all data; Couch and Lillard (1998) show that sample selections can have an important impact on intergenerational estimates.

The majority of the intergenerational literature has concentrated on measuring the elasticity between fathers' earnings and sons' earnings. However not all the datasets used here have separate measures of father's earnings, so I use parental income instead. This seems to be an equally interesting measure and makes sense from an investment point of view, as I am able to see the impact of total resources in childhood. Also, I do not lose as

many observations due to missing fathers. I supplement the analysis with measures of father-son elasticity where possible, to improve comparability with the existing literature.

To take account of variations in the income distributions between the two generations I also report the partial correlation between parents and sons' incomes, r . In a regression which includes controls for age, the partial correlation will be equal to the coefficient on father's earnings times the ratio of the residual standard deviations. I report this as an alternative measure of persistence.

$$r_j = (\text{Corr}_{\ln Y^{\text{PARENTS}}|Age, \ln Y^{\text{SON}}|Age}) = \beta_j \left(\frac{SD^{\ln Y^{\text{PARENTS}}|Age}}{SD^{\ln Y^{\text{SON}}|Age}} \right)$$

The advantage of this measure is that it is insensitive to differences in the variance of sons' and parents' incomes within the sample. This is an issue for two reasons: first, as pointed out by Grawe (2003), the variance in parental income is likely to be larger because parents are further along in their lifecycle - this will reduce $\hat{\beta}$. In terms of comparisons over countries, different lifecycle patterns of income and earnings variance could lead to different estimates of $\hat{\beta}$ but will not affect the estimate of $(\text{Corr}_{\ln Y^{\text{PARENTS}}, \ln Y^{\text{SON}}})$. The correlation measure of mobility also takes account of the different levels of inequality between generations and changes in inequality between generations and over time. This may prove to be particularly important as I am considering mobility for young men growing up as inequality rose considerably in the US and the UK, and more moderately in Canada and West Germany (see Gottschalk and Smeeding, 1997, Table 4).

In addition to the regression results, I present some estimates of transition matrices. This approach involves dividing the income distributions of parents and children into equal numbers of quantiles (I use quartiles) and noting the proportion from each parental quartile which end up in each quartile of the children's distribution. Complete immobility is represented by all of the children who begin in a particular quartile remaining in the same quartile (all cells in the leading diagonal equal one, the others equal zero), complete mobility would be where the starting quartile had no effect

on the destination (all cells equal .25). An index of immobility is generated by adding the values found in the lead diagonal and adjacent cells.

To consider the role of education in underpinning intergenerational persistence I borrow a considerably simplified version of Solon's (2004) model. It is clear that education attainment varies according to parental income, such that $Ed_{ij}^{son} = \alpha_{0j} + \psi_j \ln Y_{ij}^{parents} + e_{ij}$. This is due to both differing endowments and differing investments across families. Education has benefits in the labour market such that $\ln Y_{ij}^{sons} = \alpha_{1j} + \phi_j Ed_{ij}^{sons} + u_{ij}$ where ϕ_j denotes the return to education in country j . This means that the overall intergenerational elasticity can be decomposed into the return to education multiplied by the relationship between parental income and education, plus the unexplained persistence in income that is not transmitted through education.

$$\beta_j = \phi_j \psi_j + \frac{Cov(u_{ij}, \ln Y_{ij}^{parents})}{Var(\ln Y_{ij}^{parents})}$$

The data available only allows education to be measured by quantity (and even this is done crudely, as discussed in the data section) so aspects of the quality of education, as well as many other unmeasured factors, will be included in the unexplained component.

3. Current Literature

In this section I motivate my own analysis by discussing how the current estimates of intergenerational mobility compare across a number of countries. In Table 1 I present a cross-section of studies which provide estimates of intergenerational mobility for developed countries. Specifically I include estimates for the US, Canada, West Germany, Sweden, Finland and the UK.

The first two rows show results from the two most influential US studies by Solon (1992) and Zimmerman (1992). These studies provoked a turning point in the way intergenerational persistence was measured and understood by showing how using representative samples and reducing measurement increases measured intergenerational

mobility dramatically. Early estimates of intergenerational mobility in the US from the 1970s and 1980s were around .2 in his 1999 review Solon describes the consensus estimate in the US is “.4 or a bit higher”.

A first glance at the rest of the estimates presented in Table 1 suggests that intergenerational persistence in the US is at the high end of the spectrum, although the UK also appears to have strong income persistence across generations. The studies also indicate lower mobility in the Nordic countries and Canada, while mobility for Germany falls in the middle.

In the second-to-last column of the Table I indicate the approach taken to measurement error by each study. This can be crucial, and means that we may be reluctant to compare studies which are not comparable on this basis. Both Couch and Dunn (1997) and Bjorklund and Jantii (1997) are explicit in their desire to produce estimates for their chosen countries (Germany and Sweden respectively) which are comparable with those they generate for the US.

Couch and Dunn (1997) compare estimates from the Panel Survey of Income Dynamics (PSID) and the German Socio-Economic Panel (GSOEP). The results of this exercise produce very low, but quantitatively similar, estimates of the intergenerational elasticity of earnings between fathers and sons of .11 for Germany and .13 for the US. These low estimates are likely to be a consequence of the young ages at which sons' earnings are measured in both countries. Haider and Solon (2004) demonstrate that estimates obtained at young ages tend to be downward biased; but it is less clear whether lifecycle bias will be equal across the two countries. Wiegand (1997) shows that when later earnings data are used for West Germany the measured elasticity rises substantially to around .25, so comparing single country studies indicates that mobility is higher in West Germany than in the US.

At the time when Bjorklund and Jantii (1997) were putting together their study there was no information for Sweden which included the incomes of two generations. They overcome this by using a two-sample instrumental variables approach. They have matched information on sons' earnings and father's education for Sweden but no information on fathers' earnings. Fathers' earnings are predicted using information on the

relationship between earnings and education from another dataset which has information for the fathers' generation when sons were teenagers. Sons' earnings are then regressed upon this prediction. Subject to certain assumptions this two-stage instrumental variable estimator will be upward biased. Therefore, to draw comparisons with the US Björklund and Jantti repeat Solon's PSID analysis to be comparable with their Swedish data. The elasticities from this approach are .28 for Sweden compared with .42 (.12) for the US.

Bjorklund and Jantti (1997) provide the first evidence that mobility in Sweden is higher than in the US. In the Table I also include results from Osterbacka (2001) using Finnish census data, this study relies on just two years of father's earnings and shows a very low, but precisely estimated elasticity of .13. This picture of high mobility in the Nordic countries is confirmed by the preliminary results from the intergenerational comparisons of Bjorklund et al (2004).

Results from Canada using matched tax data also indicate high mobility, with elasticities of .23, closer to the .2 of the early US analyses than the more recent literature. There may be a concern that conclusions on Canada are reliant on a single dataset but it is difficult to find a methodological reason why the US and Canadian results differ so much, as the authors of the Canadian study go to some lengths to show that the data is representative, and estimates are based on five year averages of fathers' earnings.

Knowledge on intergenerational mobility in the UK is summarized by the entries in the Table for Atkinson (1981) and Dearden, Machin and Reed (1997). There are two concerns about Atkinson's study, first it is based on a homogenous sample as all the fathers were resident in York, and only a single week's information on earnings was collected. Nonetheless, the estimate of β is high by international standards at .36. Dearden, Machin and Reed (1997) attempt to overcome measurement error problems by using a variety of techniques in their analysis, many of which are related to instrumental variables. Their results vary, but in general are quite high, with the elasticity between fathers and sons at .58 when father's education and social class are used as instruments. On the basis of this evidence it seems reasonable to conclude that US and British mobility is limited compared with other countries.

However as I noted above, methodological differences mean that it is difficult to draw firm conclusions based on a comparison of studies of one or two countries. Grawe (2004) attempts to be more systematic. In this study, Grawe computes average and quantile regression measures of mobility for many countries, including a number of developing countries. Grawe's emphasis is on the quantile regression results which allow mobility estimates to be derived for different points of the sons' distribution. Depending on the data available, Grawe uses a mix of OLS, IV and two-stage IV; although this has benefits in terms of bringing many datasets into play, we may continue to worry about comparability. Grawe's solution to this is to make only pair-wise comparisons based on the country of interest compared with results from the same estimation approach for the US. Grawe's conclusions are that any differences found between the results from the developed countries pale into insignificance compared with those between developing and developed countries. In Ecuador, it is not possible to reject the hypothesis that the intergenerational elasticity is greater than 1.

Corak (2004) also provides a review of the international evidence from a variety of studies; making assumptions to enable strong conclusions to be drawn from the current literature. Building upon Grawe's approach, he attempts to account for the biases introduced by different methodologies by studying how results from different approaches compare in the US (the country for which the most estimates are available). Corak then scales estimates from other countries up or down depending on the likely biases compared to a 'best estimate'. This scaling takes account of many of the aspects I have shown to be important; the father's age when his earnings are observed, the number of years used to generate the fathers' earnings variable and whether the estimate relied on IV methods or not.

The obvious difficulty with this approach is that it assumes that the extent of bias in the US estimates will be identical in other countries. There are several reasons why this may not be the case. The bias inherent in the IV estimate depends on the intergenerational transmissions of education or social class; we might expect that this will vary across countries just as much as the intergenerational income transmission. The impact on the estimates of varying father's age or the number of periods over which parental income is averaged, will depend upon the lifecycle pattern of earnings and the

ratio of transitory to permanent income. Both of these are also likely to vary by country. On the basis of his assumptions, Corak concludes that for the UK and the US β is around .5, for France .4, for Germany and Sweden .3 and that Canada and the other Nordic countries have β s of around .2¹. This is not inconsistent with the conclusions I derived from my review of the literature in Table 1, but the comparable estimates presented in this paper will provide further evidence.

4. Data

Intergenerational Mobility Data

The British analysis is the building block for the approach taken to the rest of the data used in this paper. In some respects the UK has ideal datasets for exploring intergenerational relationships, as it has two large cohort studies which observe children from birth to adulthood, also obtaining a variety of information about parents along the way. I use the second of these datasets, the British Cohort Study (BCS), for comparisons of mobility across countries. The members of this cohort are all those born in a single week in 1970; gross weekly parental income data (but not father's earnings) is available for age 10 and age 16, and gross weekly adult earnings are collected in 2000 when individuals are 30.

In both years in which parental income information is collected in the BCS, income is reported in bands rather than continuous amounts. I generate continuous variables by fitting a Singh-Maddala distribution to each set of data using maximum likelihood estimation. This allows me to find the expected value within the band. This is particularly helpful in allocating an appropriate value for those in the top category².

The dataset used in the US analysis is the Panel Survey of Income Dynamics. This is an annual survey which began with 4800 families in 1968. Analysis is restricted to those young men who are children of the initial sample members (excluding the Survey

¹ Estimates for the UK and France, are based only on IV results, and while Corak makes a small adjustment to account for this I am therefore skeptical about the high elasticities attributed to these two countries.

² Singh and Maddala (1976). Many thanks to Christopher Crowe for providing his program smint ado which fits Singh-Maddala distributions to interval data.

of Economic Opportunity members) who were born between 1965 and 1973. Parental income and father's earnings are observed at age 16 and the four adjacent years, and sons' earnings are observed in 2001 (and therefore refer to 2000).

The disadvantage of my precise approach to comparability is a very small sample of just 187 sons³. This is to a large extent a consequence of the reduction in the core sample from 1997. Such a small sample unsurprisingly leads to rather large standard errors. In order to reduce these difficulties, I also report estimates for a larger sample of all sons born between 1954 and 1970. I once again observe parental income in the years around age 16 and observe sons' earnings for age 30, and this leads to a much improved sample of 527.

There are a variety of variables available to measure parental income, after experimentation I have settled on the "family money" measure less the earnings of those other than the "head" and "wife"- this restriction is motivated by the fact that the teenagers own earnings will be correlated with his later labour market performance. I also present results using father's gross earnings as the explanatory variable.

For West Germany I use the German Socio-Economic Panel, which is based on very similar principles to the PSID. Unfortunately it began much later, in 1984. As in the PSID, I select the sample of young men born between 1965 and 1973. The short panel available means that I am unable to follow the full sample from 14-18, instead I use parental income information from 1984-1988⁴. The parental income variable is household net monthly income; once again the teenager's own income is subtracted. The outcome measure used is gross monthly earnings in 2000. The GSOEP consists of a number of sub-samples; I restrict to the core nationally representative sample. As with the PSID, the stringent approach to comparability leads to a small sample of around 220, so I also use a supplementary sample which includes some older sons, raising the sample to 289.

The Canadian analysis is based on information from the Canadian Longitudinal Tax Records held by Statistics Canada. The tax records provide information on all income tax

³ If the sample is selected symmetrically around the BCS year of birth, so I focus on those born from 1967-1973 the sample size falls even further to 170. The parameter estimates do not change much depending upon whether these older people are included or not.

⁴ This means that the age at which family income is measured ranges from 11-15 to 19-25 and is collinear with sons' age. This affect should be ameliorated by controlling for son's age.

returns in Canada between 1979 and 1998. Information on names, addresses and ages included in the data allowed Statistics Canada to match individuals born between 1962 and 1970 with their parents, this was possible provided both generations filed a tax return while the child was living at home in his or her late teens.⁵ The matched data forms the Intergenerational Income Data (IID) and its basis on administrative records means its size is considerable; with Statistics Canada estimating that the data includes around 70 per cent of the relevant age group (Cook and Demnati, 2000). A more complete description of the creation of the data is given in the appendix to Corak and Heisz (1999) and Oreopoulos (2003).

One of the main advantages of using administrative data is that there is considerably less concern about attrition and measurement error, particularly as most earnings reports come directly from the employer. The reliance on tax records brings with it a worry that the data may not be fully representative of the Canadian population. One of the key requirements to be included in the dataset is that the parent and child both file for tax while living in the same household. The dataset will therefore exclude those with no labour market attachment in their teenage years, those who leave home before they start working, or those whose parents have no labour market attachment. Evidence from Corak and Heisz (1999) indicates that the selections introduced by the matching process do not change the results.

For comparability purposes, I focus on a young group within the sample, those born between 1967 and 1970. Sons' gross earnings are obtained from the most recent year available, 1998. Parental income is, as with the PSID, obtained at age 16 and the surrounding four years. I use total parental income as the explanatory variable; this is market income plus pensions, grants and employment insurance. Significantly, it does not include welfare payments, as these were not required on the tax return until 1992.

In all the samples which include more than one son per family, I include all the sons available and cluster the standard errors by family identifier, thus accounting for the correlation between unobservables among brothers. Other studies also restrict only to

⁵ This requirement is less stringent than it would be in the UK as individuals are legally required to file a tax return if they worked at all in the previous year so this will include part-time and holiday work of those in education.

sons who have both parents present in the household, I do not. Consequently, I use the average age of the parents to control for differences in parents' ages. One additional restriction is necessary. The British and Canadian data do not include self-employment income in the earnings variables; I therefore exclude the self-employed from all samples.

Education Variables

In order to decompose the intergenerational elasticities into those parts explained and unexplained by sons' education level, it is necessary to have comparable measures of continuous education across countries. Unfortunately, the Canadian tax data does not offer any information about education levels; it is therefore not possible to include Canada in this analysis. In order to believe the decompositions for the other countries, it is essential that the education variables used are comparable. The difficulties in measuring educational attainment in a comparative context naturally place a limit on the conclusions which can be drawn from the decomposition analysis.

The custom of measuring educational attainment by years of schooling is quite reasonable in the US system. Young people take one grade per year and measured schooling naturally takes the form of 'grades completed'. This measure is particularly useful as not only does it measure schooling continuously but it also has an attainment component, as students sometimes have to repeat grades in order to pass them.

The situations in the UK and West Germany are not so simple. The education systems in these two countries are clearly based on qualifications attained rather than grades completed, and students follow different tracks. For example, in West Germany students are split into qualitatively different schools at around age 13. In order to resolve this difficulty I convert the qualifications attained into years of schooling in the British and West German data. In the UK this is done crudely on the basis on the usual age that individuals leave education after attaining the highest qualification recorded. In West Germany I use the schema developed by Pischke (1993) which is based on adding the years spent at school (which depends on the school type) to the years spent in vocational training (where the work-experience component of apprenticeship is acknowledged by allocating half a years schooling to each year spent achieving one) and the years spent at

university. The resulting coding is extremely similar to the one derived specifically for cross country comparisons by Lillard et al (2002).

Educational attainment can also be measured categorically, to better recognise the different structures of the education systems in different countries. Steedman, McIntosh and Green (2004) derive a categorisation of comparable education levels in order to conduct a cross-country comparison of skill attainment. This is a difficult task, as some qualifications do not match up well across countries. In order to overcome this difficulty Steedman et al allocate proportions of individuals with a particular qualification to different codes. This is not suitable for my purposes as I wish to conduct a micro-level rather than aggregate analysis. Instead, I use four categories of attainment similar to the Steedman schema which are broadly comparable with lower secondary attainment, secondary attainment, some post-secondary schooling and higher education (more details are provided in the Appendix). While this categorical variable cannot be used to decompose the explained part of persistence, it can be used to check how the levels of returns compare across countries and to derive the unexplained part of persistence.

5. Comparative Measures of Mobility

Table 2 summarizes the samples used in my comparative estimates of intergenerational mobility for the UK, the US, Germany and Canada, and provides a survey of the information in the previous section. This Table highlights my focus on individuals born around 1970 and my aim to measure parental income when they are approximately 16 and their own earnings at around 30 years old. In addition, it shows clearly the difference between the comparable samples and the extended samples used for the US and West Germany.

In order to minimise the impact of measurement error I wish to use time-averaged measures of parental income wherever possible. However, the extent to which this is possible varies across the surveys. The particular problem here is the British data where income measures are only available at ages 10 and 16. I therefore present some of my results for three different income measures, single year income, averages of income over two years and income averaged over five years (for all countries except the UK).

Descriptive Statistics

Table 3 describes the data used in this section of the analysis. Means and standard deviations are set out for the variables used, both in levels and logs. Direct comparisons of the measures are made difficult by changes in the exchange rate over time, however some issues are apparent.

The first two lines of the Table show how the mean ages of sons and parents compare between countries. These re-emphasise the focus of the samples upon sons at around age 30 to 31, although the sons from the extended West German sample are rather older with a mean age of almost 33. The average parental age is very similar across countries and around 43-45, parents in the UK and the US appear to be somewhat younger than those in West Germany.

Moving on to the income measures, for the UK sons' average earnings at age 30 are slightly larger than their parents' income at age 16; in all other countries the opposite is true. Additionally it is the case that there is greater inequality in the UK in the sons' generation than for parents, which is not the case for the other countries. This appears to indicate that measurement problems in the British data lead to an underestimate of the mean and variance of parental income. To a certain extent the low variance found in the data is a mechanical consequence of the fact that it is based on banded data. It is difficult to know what to do about this; however the fact that the correlation is independent of relative variances should help. For all the countries considered averaging over several years reduces the amount of variation in parental incomes, as we would expect.

I was initially surprised to see that the earnings and incomes are lower in Canada than in the US, as the US dollar has been worth more than the Canadian dollar since 1973, and by 2000 there were 1.5 US dollars to each Canadian dollar. However closer inspection reveals these to be quite plausible figures. Figures derived from the US March Current Population Survey by the US Census Board show that in 2000 25-34 year old men earned 3429USD on average per month⁶. Figures from Statistics Canada based on

⁶ Figures were obtained from the Historical Income Tables section of the US Census Bureau website and can be found at www.census.gov/hhes/income/histinc/p32.html.

the Canadian Survey of Consumer Finances show that in 1997 men aged 25-34 earned on average 2787CAN monthly (in 2000 prices)⁷. These compare with 3993USD and 2970CAN in Table 3, so it appears that my samples focus on somewhat well-off samples in both the US and Canada. While this is not ideal it is at least reassuring that the different data collection approaches do not lead to strongly different sample selections.

Results

The first results comparing intergenerational mobility for four countries are given in Table 4. Three sets of results are reported; in the top panel family income is measured from one survey, in the centre panel it is based on two surveys and in the lower panel income is averaged over five observations, for the countries where this is possible. The β s reported in panel (1) for the single income observations are low by the standard of the literature, indicating that measurement error may be a problem when using single year estimates. The estimate for the US extended sample is the highest, and this is just .262. Somewhat more mobility is found in the UK with a beta of .209. The West German estimates are .146 for the comparable sample and .203 for the extended sample. The difference between these results is likely to be due to the older sons used in the extended sample, an issue I return to below. Canada has more mobility with a β of .165. The inequality adjusted measures given by the partial correlations paint a slightly different picture; in these estimates mobility in the UK and the US are at similar levels, with West Germany rather lower. After the adjustment, the gap between mobility in Canada and in the other countries increases.

The results based on two-year averages of income in the second panel are slightly higher than in panel (1). This indicates that averaging over two years of data reduces measurement error to a certain extent. The patterns are very similar as for the single year estimates with weaker mobility exhibited in the US and the UK and more mobility shown in West Germany. Unfortunately I cannot add comparable estimates for Canada to this table at present, but as we shall see, estimates using five years of data also indicate high

⁷ Statistics Canada, 1999.

mobility, so it is reasonable to say that mobility in Canada is high compared to the other countries considered here.

The five year averaged results given in the lower panel are higher in all countries as one would expect, showing that the use of a more permanent measure of income reduces measurement error. The largest changes when we move between the single-year and averaged results are for the US, where the unadjusted β rises from around .25-.3 to around .3-.4. This large change indicates more transitory income mobility in the US. It also raises questions about the extent to which estimates for the UK would rise if more years of data were available. Comparing across countries, the results are similar to those presented for a single measure of income, although the gap between the US compared with Canada and Germany has widened.

These results seem to broadly confirm our expectations from the literature; however before taking these conclusions too far, it is important to see to the extent to which it is possible to distinguish the estimates from each other when some of the samples used are so small. To consider this question, I include 95% level confidence intervals for all the estimates. The small sample sizes used for the US and West Germany lead to very large confidence intervals, although it is clear that the use of the extended samples reduces them somewhat. The very large sample that the administrative data gives us in Canada gives us much more confidence about the level of mobility there, and I can say that mobility in Canada is significantly greater than mobility in The UK and, for the extended sample at least, the US.

Table 5 provides results for the father-son elasticity of earnings for the US, West Germany and Canada. Once more the averaged results show a higher elasticity of earnings from father to son in the US than in other countries. For West Germany the estimates of β for father's averaged earnings on the extended sample is .303 and .283 adjusted. This is substantially higher than obtained by Couch and Dunn (1997) and Grawe (2004), but much more similar to the results obtained by Wiegand (1999). This increase in the estimate closes part of the gap found in Table 4 between the US and Germany, although persistence in the US still appears to be greater. Once again, the

point-estimates of the correlations imply that there is more mobility in Canada than in the other countries under study.

The Inequality Adjustments

It is worth taking a moment to consider the implications of the inequality adjustments

made in Table 4. If $(\frac{SD_{\ln Y^{PARENTS}|Age}}{SD_{\ln Y^{SON}|Age}}) > 1$ then the inequality adjustment made leads to a rise

in β , this indicates that parental inequality is greater than sons' inequality. Under stable aggregate inequality, this is the result that we would expect for two reasons; first, because I am measuring parental income rather than earnings and the variation in income from other sources will magnify the dispersion; second, because parents will be older than sons when incomes are observed and we know that the variance in income and earnings increases with age. If inequality is rising fast enough between the two generations to

counteract these effects then $(\frac{SD_{\ln Y^{PARENTS}|Age}}{SD_{\ln Y^{SON}|Age}}) < 1$ and the adjustment will mean that β falls.

The evidence from Tables 4 and 5 on which of these effects dominates is mixed. Despite the large rises in inequality experienced in the US over this period the adjustment is more likely to result in a fall in the estimate, indicating that the lifecycle effect is dominating.

Parental Income Mobility v Father's Earnings Mobility

In the US and Canada β is slightly higher for family income than for father's earnings. This is what might be expected if total resources during childhood are more important than the earnings of each individual parent; this is in line with the human capital investment perspective. In West Germany the reverse is true when comparing averaged results, and as we have seen, this difference is important as it reduces the gap between estimated mobility in the US and West Germany.

This difference could have several causes. In the first case it could be a consequence of sample selection; to be included in the fathers' earnings regressions there must be a working male head of household. However, imposing this restriction on the

parental income regressions does not explain any of the differences. Second, in the German data income is measured net of tax with transfer payments included, while the US data will account for less redistribution as although transfer payments are included taxes are not subtracted. Of course, we would expect there to be less redistribution in the US even if the data was measured comparably. If the appropriate transmission mechanism within the family is based on endowments rather than investments, more redistribution will result in less persistence from family income to son's earnings. I have checked this hypothesis by using gross joint parental earnings; once again there is substantially less persistence than when mobility is measured using fathers' earnings.

This leads to the conclusion that there is a genuinely stronger transmission mechanism to sons' earnings from fathers' earnings than parental income in West Germany. This is confirmed by splitting the sample into families where both parents' work and where only the father works. If father's earnings are truly more closely linked with sons earnings then we would expect a larger association on parental income when the father is the only breadwinner. There is suggestive evidence that this is the case, for the extended sample the partial correlation is .169 (.089) among families where both parents work while it is .259 (.082) for families where only the father works.

In West Germany the sole-breadwinner model lasted rather longer than in any of the other countries studied, for example Fitzenberger and Wunderlich (2002) show that the rise in employment for females in West Germany has been much smaller than in The UK. In 1986 50 percent of mothers are working in my German sample compared with 70 percent for a comparable sample of 16-year-olds in the US, this is likely to mean that the selection of mothers into work is different and have implications for the contribution of mother's wages to household income. These differences between West Germany and the US provide some suggestive evidence in favour of the importance of endowments rather than human capital investments in generating intergenerational persistence. In the investment model, it should be income as a whole which determines investment, in Germany this is very clearly not the case, with a stronger relationship between fathers' sons' earnings only too apparent. If assortative mating on endowments is similar for parents in the US and West Germany, then we would imagine that higher female participation leads to parental income being more closely related to parental endowments

in the US, which accounts for the stronger relationship between sons earnings and income in this country.

This important distinction between measuring family resources by either parental income or fathers' earnings has been given scant attention in a research area which began when father's earnings and family income were more legitimately interchangeable. This is clearly no longer the case, and this discussion has illustrated that comparing intergenerational estimates that use alternative explanatory variables may be able to tell us more about the mechanisms which underlie mobility. This area is clearly ripe for further research.

Transition Matrices

Tables 6, 7, 8 and 9 show transition matrices between sons' earnings and averaged parental income for all four countries. For the US and West Germany I use the extended samples. For the US, The UK and West Germany I use two year averages of parental income and remove the age variation before dividing the data into quartiles. These transition matrices imply rather more persistence across generations for the US than for the other countries. The aggregate index of immobility is 3.092 for the US compared with 2.885 for The UK, 2.798 for West Germany and 2.771 for Canada. One of most important features of these transition matrices is the higher proportion of individuals with parents in the poorest quartile who remain in this quartile in the US; .417 compared with .374 in The UK, .322 in Canada and .304 in West Germany. There is also a higher degree of persistence at the top in the US and The UK compared with the other countries, so not only is it harder to climb up, but it is also more difficult to fall down the income distribution relative to one's parents.

Life-cycle earnings profiles

Taking on board the findings of Solon and Haider (2004) about the biases introduced by observing sons at a young age, I have been careful to observe sons at the same age in all countries, apart from in Germany where the sons in extended sample are somewhat older.

In this section, I demonstrate the importance of this restriction, the implications of relaxing it, and comment upon whether it is sufficient to ensure that estimates are truly comparable across countries.

A simple way to consider this question is to return to the decomposition presented earlier:

$$\beta = \phi_A \psi + \frac{Cov(u_i, \ln Y_i^{parents})}{Var(\ln Y_i^{parents})}$$

where ϕ_A is the return to education at age A and ψ is the relationship between education and parental income; it is obvious that intergenerational persistence will increase with the return to education. Since Mincer (1958), it has been acknowledged that workers with more training have steeper earnings-experience profiles, and therefore that the returns to education tend to increase with age, hence the age subscript on the return to education. Ideally we wish to compare sons at the same point in their age-experience profile, if the relationship between age and the returns to education is not the same in all countries, then comparability is not achieved by comparing sons at the same age.

Figures 1 to 4 explore age-earnings profiles for men between 25 and 38 of different education levels for all four countries. In order to minimize the impact of the sample selections inherent in the intergenerational data, I use the Labour Force Survey for the UK, the Current Population Survey for the US, the full GSOEP for Germany and the Survey of Labour and Income Dynamics for Canada. Mincer's prediction is true in all cases with steeper earnings growth for the most educated group. In the US and Canada there appear to be higher returns to college education than in the UK, but the age profiles are similar. In West Germany however, the wages of college graduates rise much more steeply than for other groups in their early thirties and the full returns do not appear to be reaped until men are around 35. This is around 4-5 years later than in the other countries. It may be, then, that this effect leads to an underestimate of β in Germany for younger sons and explains why the results for West Germany increase when I include older sons in my expanded sample. It also helps to explain why the estimates for young sons in Couch and Dunn (1997) are so much lower than my own.

Decomposing Intergenerational Mobility

In order to motivate the education decompositions which follow, Table 10 shows a breakdown of education levels in the intergenerational samples for The UK, West Germany and the US⁸, both by years of schooling and by my categorical education variable. The average number of completed years of education is broadly similar across the three countries, at around thirteen years. In all cases the distributions are bi-modal with a concentration of young people completing between 10 and 12 years, and a further concentration at 16 years. The lower part of the table indicates that the implications of different years of education for the level of qualifications vary substantially across countries. In West Germany, many students leave after 11 or less years of education; but Germany does extremely well when education is measured by qualification level with only 7 percent of the sample achieving below level 3. This is due to the success of West Germany in producing well-qualified apprentices who have spent relatively little time in formal schooling. In the US and The UK there are more students with qualifications at levels 2 and 3. In all three countries more than one fifth of the sample are graduates, with The UK performing particularly well in this regard with almost 30 percent achieving a degree.

Table 11 provides an analysis of the returns to education by country, using both measures of education. The return to a year of education varies substantially across countries. It is highest in the US at .106, .075 in The UK and .064 in West Germany. These results can be compared with those found by Denny, Harmon and O'Sullivan (2004) who use data from the International Adult Literacy Survey to estimate the returns to education from many countries. Their samples of all working individuals find returns to a year of education of .100 for The UK, .089 for the US and .054 for Germany. These seem broadly comparable with my findings; bearing in mind that my samples focus on a particular cohort of young men.

The second set of results in Table 11 present returns to qualification level. These present a rather different picture from the years of education results. Again, the returns to

⁸ Once again, I focus on results for the extended samples for the US and West Germany.

education in the US are higher than in the other countries; but the gap between The UK and West Germany has closed with returns to qualifications in these two countries now appearing extremely similar. This indicates that the years of education variable for West Germany should be treated with some caution in the decompositions; this is not surprising given the descriptive patterns which showed many people attaining level 3 qualifications after a short period of schooling.

Table 12 shows decompositions of intergenerational mobility. These are based on the intergenerational coefficients, when two-year averages of parental income are used as the explanatory variable of interest. The estimates of β reported here imply that the UK is least mobile, followed by the US and then Germany. The partial correlations presented in Table 4 gave a slightly different pattern showing mobility to be weakest in the US, then the UK followed by West Germany. The difference in the ranking of the UK and US is due to the larger variance in parental income in the US, as discussed previously in the text. Either way, the large standard errors mean that the estimates are essentially indistinguishable.

The first aspect to note from the decompositions is the importance of educational levels in explaining intergenerational mobility. Differential levels of education explain between 35 and 50 percent of intergenerational mobility across countries, this is the case even when education is measured crudely by years of schooling. The largest contribution of education to intergenerational persistence is made in the US, where 50 percent of the β coefficient can be explained by my simple decomposition. In particular, the strong returns to education in the US play an important role. The UK has the highest extent of persistence in this specification, this is driven both by a relatively strong relationship between educational attainment and parental income and also by a large unexplained component. Further investigation of this unexplained component is an obvious target for future research.

As noted above, the large variance in parental income in the US leads to an underestimate of β for that country. It is clear from the parts of the decomposition shown in Table 12 that both the returns to education and the relationship between parental income and education (measured by the covariance) are stronger in the US, and that these

lie behind the strong income persistence found in this chapter. It is possible to use these results to calculate some counterfactuals. To take two examples: if the UK had the same relationship between education and parental income as the US⁹, β would equal .340, much higher than its actual level. Similarly, closing the gap in returns between West Germany and the US would lead to closure in the gap in β for the two countries; β for West Germany would be .262.

As I have already stated, these results are strongly contingent upon us having faith in the measures of educational attainment used. Although it is not possible to do a complete decomposition using the categorical measures, these alternative measures of educational attainment can be used to make a number of comments about the decomposition results presented in Table 12. The results presented in Table 11 suggest that the use of the years of education variable is underestimating the role of educational returns in generating intergenerational persistence in West Germany. This implies either that the relationship between parental income and years of schooling or that the extent of unexplained persistence is exaggerated for West Germany in Table 12.

To investigate the sensitivity of the results to the education measure, I recalculate unexplained persistence for all countries, using the four category education attainment variable. The change to the unexplained component is remarkably small. In the UK slightly less mobility is explained by education, with the unexplained component estimated as .184 using the education categories, compared with .177 using years of education; for the US this comparison is .138 compared with .134. In West Germany, where we might expect the strongest influence from changing the education variable, there is no difference; the new model reveals unexplained persistence to be .135 regardless of which education variable is used. This indicates that the West German results may overestimate the importance of differences in years of schooling by parental income level and underestimate the importance of the returns to education in generating intergenerational persistence.

⁹ In calculating this counterfactual it is important to remember that both variances and co-variances contribute to regression coefficients. I vary the relationship between parental income and education while keeping the variance of parental income constant.

6. Conclusions

This research has attempted to provide a new approach to the data sources for estimating intergenerational mobility across countries. By attempting to make the mobility estimates as comparable as possible, I illustrate some of the issues and limitations of the current cross country estimates of intergenerational mobility.

This comparative study of intergenerational mobility indicates that there is somewhat more mobility in Canada than in the other countries under examination. Drawing further firm conclusions about relative mobility in the US, The UK and Germany is prevented by small sample sizes. The small samples used for the GSOEP and PSID are generally a consequence of the stringent approach I take to ensuring comparability; this implies a trade-off between precision and comparability. In general, point estimates of the elasticities appear to indicate somewhat less mobility in the US and The UK, with West Germany more mobile. My results are broadly in line with the literature up until this point.

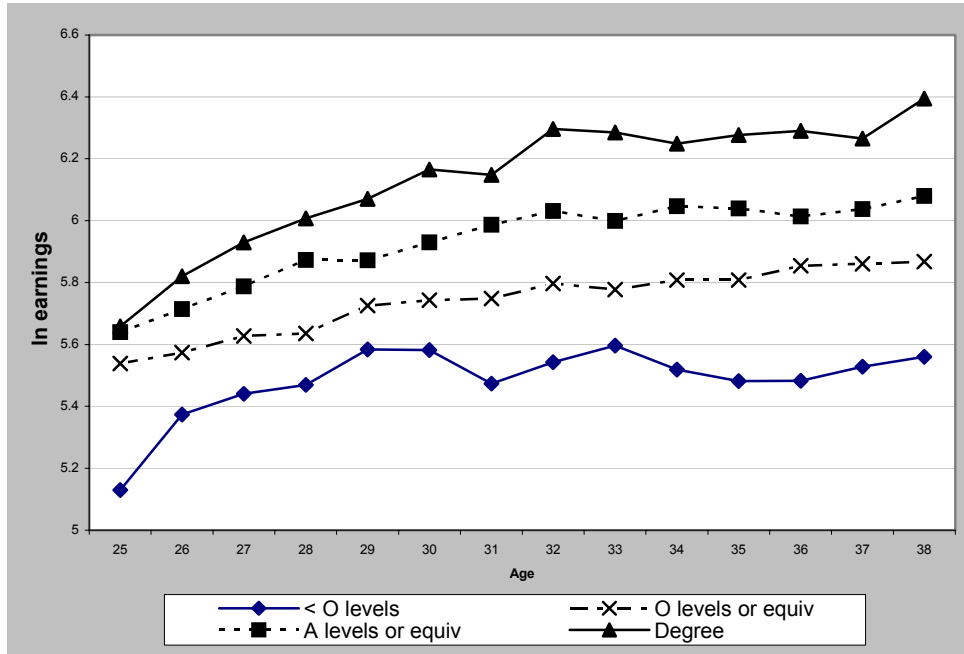
While measurement questions are clearly central, a more interesting question is to begin to understand why mobility varies across countries. Many models of intergenerational mobility stress the role of education in determining the persistence of incomes across generations. My investigation indicates that education does have a large role with education crucial in driving the low mobility found in the US, and also important for The UK. Results for The UK, however, suggest there is also a substantial unexplained component of intergenerational persistence; this sets a clear direction for future research to begin to explore other explanations for the relatively low mobility found for The UK.

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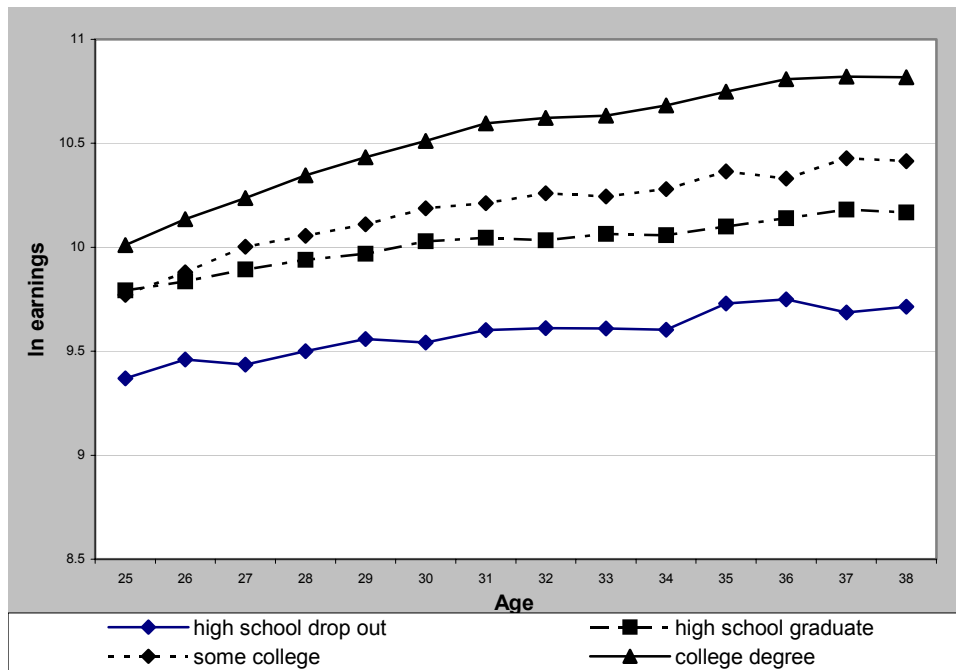
Figure 1: Male Earnings Profile in the UK



Notes:

1. The data is from the Labour Force Survey 1994-2002, all quarters pooled.
2. Males born between 1958-1973.
3. Earnings are reported as gross weekly.

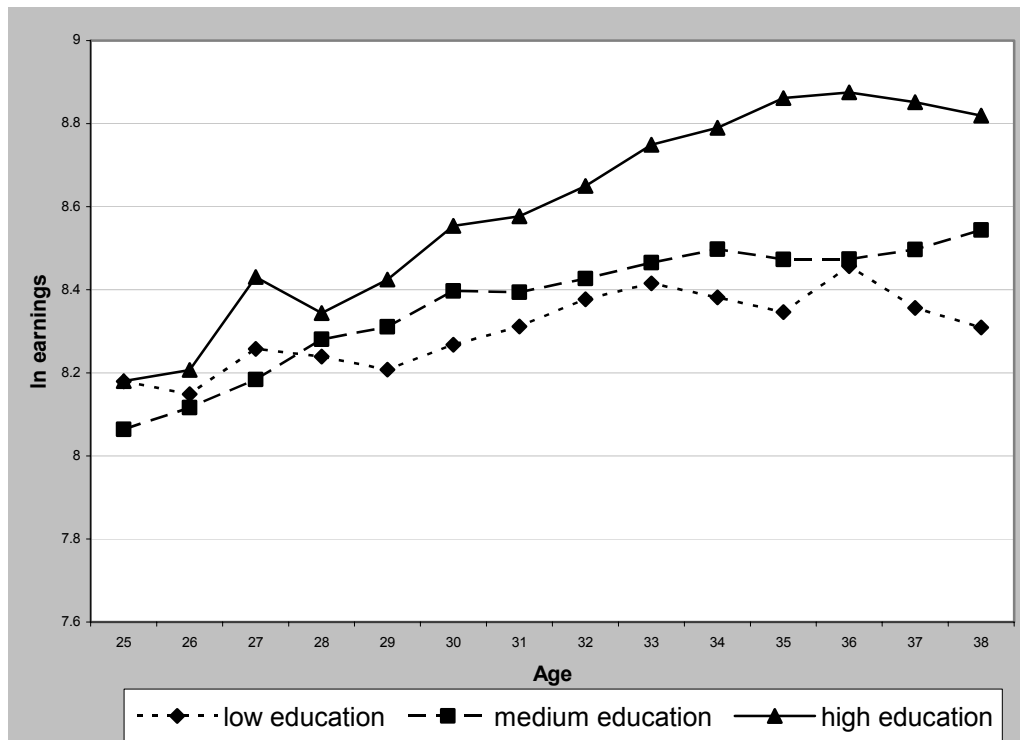
Figure 2: Male Earnings Profile in the US



Notes:

1. The data is from the Current Population Survey 1990-2000.
2. Males born between 1960 and 1973.
3. Earnings are reported as gross annual.

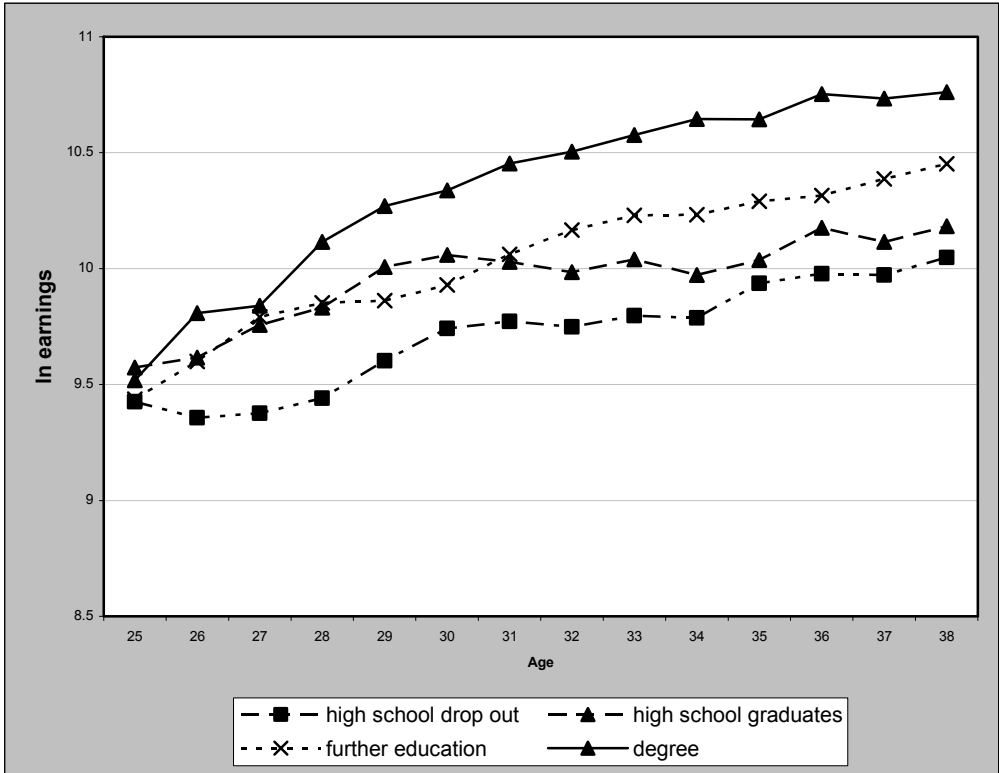
Figure 3: Male Earnings Profile in West Germany



Note:

1. The data is drawn from the full GSOEP sample 1993-2001.
2. Males born between 1960 and 1973.
3. Low education is defined as no school degree or a secondary or intermediate school degree only. Medium education is classed as upper secondary school or apprenticeship. High education is degree and technical college.
4. Earnings are reported as gross monthly.

Figure 4: Male Earnings Profile in Canada



Notes

1. Data is taken from the cross-sectional sample of the Survey of Labour and Income Dynamics, 1993 to 2001.
2. Sample is all men born between 1965 and 1970, 41775 observations.
3. Earnings are annual and adjusted to 2000 prices.

Table 1: Summary of International Literature on Intergenerational Persistence for Sons

Study	Country	Data Source	Son's Outcome Variable	Parental Income Variable	Approach to Measurement Error	$\hat{\beta}$
Solon (1992)	US	PSID	Log annual earnings in 1984, ages 25-33	Log fathers' annual earnings, 1967-1972	Five year average of father's earnings	.41 (.019)
Zimmerman (1992)	US	National Longitudinal Survey	Log annual earnings in 1981, ages 25-33	Log fathers' annual earnings, 1966-1971	Four year average of father's earnings	.54 (.08)
Couch and Dunn (1997)	Germany and US	German Socio-Economic Panel and PSID	Log annual earnings averaged 1984-1989, sons on average aged 23 in Germany, 25 in US	Log annual earnings averaged 1984-1989,	Five-year averages	Germany: .11 (.06) US: .13 (.06)
Wiegand (1997)	Germany	German Socio-Economic Panel	Log monthly earnings in 1994; sons aged 27-33	Log monthly earnings, 1984-1989	Five year average	.32 (.07)
Bjorklund and Jantti (1997)	Sweden and US	Swedish Level of Living Survey and PSID	Log annual earnings in 1990, born 1952-1961.	Father's earnings predicted from observables	Two – sample instrumental variables (TSIV)	Sweden: .28 (.09) US: .42 (.12)
Osterbacka (2001)	Finland	Finnish quinquennial census	Log average annual earnings, 1985, 1995, 2000, sons born 1950-1960	Log average annual earnings, 1970 and 1975.	Two year average, but 5 years apart.	.13 (.005)
Corak and Heisz (1999)	Canada	Matched income tax data	Log annual earnings in 1995. Sons born 1963-1966	Father's log annual earnings, 1978-1982.	Five year average of father's earnings	.23 (.01)
Atkinson (1981)	UK	Follow up of Rowntree York Sample	Log weekly earnings at survey date (1975-1978)	Log weekly earnings in 1950	None	.36 (.03)
Dearden, Machin and Reed (1997)	UK	National Child Development Survey	Weekly earnings at age 33 for a cohort born in 1958	Log weekly father's earnings when son 16.	Instrumental variables using father's ed and social class	.58 (.06)

Table 2: Summary of Comparative Samples

Country	Years of birth	Year of Earnings Data	Parental Income Measure		
			Single measure	Two year average	Five year average
UK	1970	2000	Age 16	Age 10 and age 16	N/A
United States	1965-1973	2000	Age 16	Age 10 and age 16	Age 14 through age 18
United States Extended Sample	1954-1970	Age 30	Age 16	Age 10 and age 16	Age 14 through age 18
West Germany	1965-1973	2000	1986	1984 and 1988	1984-1988
West Germany Extended Sample	1960-1973	2000	1986	1984 and 1988	1984-1988
Canada	1967-1970	1998	Age 16	N/A	Age 14 through age 18

Notes:

1. The two year average for the US is based on age 10 and age 16 parental income in 70 percent of cases, for the remaining cases age 16 income is averaged with the nearest available income observation to age 10.
2. An explanatory variable based on age 10 and age 16 income would be perfectly possible using the Canadian IID, however as I cannot currently access this data I am able to add this analysis.

Table 3: Descriptive Statistics for Comparative Samples

	UK (£)	US (\$)	US (\$) Extended	W. Germany (DM)	W. Germany Extended	Canada (CDN\$)
Sons' Ages	30	31.67 (2.38)	30	31.13 (2.51)	32.60 (3.46)	29.55 (2.40)
Fathers' Ages	43.40 (5.30)	43.16 (5.27)	43.47 (5.64)	45.26 (6.20)	46.55 (6.35)	-
Sons' Earnings	1929 (1326)	4230 (2756)	3799 (2307)	5164 (2808)	5332 (2692)	2970 (2575)
Ln Sons' Earnings	7.440 (.472)	8.196 (.524)	8.108 (.505)	8.444 (.465)	8.480 (.464)	7.706 (.942)
Parental Income (One year)	1732 (1037)	6019 (3674)	5806 (3772)	4782 (3888)	4730 (3565)	5153 (5314)
Ln Parental Incomes (One year)	7.283 (.613)	8.522 (.634)	8.487 (.633)	8.343 (.472)	8.331 (.490)	8.285 (.836)
Parental Income (Average)	1571 (726)	5911 (3248)	5774 (3584)	4660 (1889)	4774 (2388)	5207 (4704)
Ln Parental Incomes (Average)	7.255 (.463)	8.542 (.550)	8.501 (.577)	8.374 (.383)	8.376 (.431)	8.328 (.755)
Dads' Earnings (One year)		4289 (2588)	4760 (3489)	5494 (3891)	5417 (3630)	4175 (3540)
Ln Dads' Earnings (One year)		8.169 (.700)	8.244 (.768)	8.457 (.448)	8.485 (.438)	8.143 (.709)
Dads' Earnings (Average)		4257 (2359)	4738 (3202)	5357 (2635)	5319 (2600)	4187 (3331)
Ln Dads' Earnings (Average)		8.200 (.600)	8.285 (.613)	8.506 (.381)	8.500 (.377)	8.182 (.590)
Sample Size	1708	187	527	220	289	428022

Notes:

1. The table reports sample means with standard deviations reported in parentheses.
2. All incomes are in 2000 home currencies (Deutsch Marks for West Germany).
3. All earnings and incomes are converted to monthly amounts. Parental incomes are gross for all countries except Germany where it is "post-government".
4. Fathers' and sons' earnings are gross in all countries.
5. Averages include missing years in the US, Canada and Germany.
6. The statistics for averaged results are based on the 10 and 16 averages for the UK and five-year averages for all other countries.

Table 4: Comparisons of Intergenerational Mobility Based on Parental Income

(1)					
Single measure of parents' income					
	β	Confidence Interval	Partial Correlation	Confidence Interval	Number of Observations
UK	.209 (.020)	.169 - .250	.267 (.026)	.216 - .318	1708
US	.262 (.071)	.121 - .403	.307 (.084)	.412-.472	187
US Extended	.236 (.042)	.153 - .319	.292 (.052)	.097 - .470	527
W. Germany	.146 (.056)	.036 - .256	.154 (.059)	.038 - .270	220
W. Germany Extended	.203 (.070)	.102 - .304	.223 (.056)	.113 - .330	289
Canada	.165 (.002)	.160 - .169	.143 (.002)	.139 - .146	428022
(2)					
Two year averages of parents' income					
UK	.281 (.028)	.226 - .336	.271 (.027)	.218 - .324	1708
US	.289 (.082)	.127 - .450	.289 (.082)	.128 - .450	187
US Extended	.259 (.032)	.195 - .322	.321 (.040)	.243 - .399	527
W. Germany	.153 (.071)	.014 - .292	.136 (.062)	.014 - .258	215
W. Germany Extended	.175 (.073)	.033 - .318	.171 (.071)	.032 - .310	273
(3)					
Five year averages of parents' income					
US	.379 (.073)	.236 - .522	.385 (.074)	.240 - .530	187
US Extended	.308 (.039)	.232 - .384	.349 (.040)	.263 - .435	527
W. Germany	.171 (.070)	.033 - .309	.146 (.060)	.028 - .264	220
W. Germany Extended	.210 (.057)	.096 - .324	.197 (.054)	.091 - .303	289
Canada	.205 (.002)	.200-.210	.178 (.002)	.173 - .182	428022

Notes:

1. Regressions are of sons' earnings on parent's incomes, with controls for sons' and parents' ages.
2. The variables used are detailed in the text and Table 2.
3. Standard errors are shown in parentheses and are corrected for correlations between brothers.
4. When weights are used in the Canadian analysis the coefficients are depressed by around .005.
5. Two year averages for the US are based on ages 10 to 16 where information at age 10 is available or using the closest information to age 10 where it is not.
6. For Germany income from 1984 and 1988 is used for the two year average.

Table 5: Comparisons of Intergenerational Mobility – Father’s Earnings

(1)					
Single measure of father’s earnings					
	β	Confidence Interval	Partial Correlation	Confidence Interval	Number of Observations
US	.201 (.072)	.059 - .343	.256 (.091)	.078 - .434	172
US Extended	.168 (.044)	.081 - .256	.255 (.067)	.124 - .386	492
W. Germany	.204 (.066)	.072 - .336	.213 (.069)	.078 - .348	174
W. Germany Extended	.225 (.059)	.108 - .342	.242 (.064)	.117 - .367	227
Canada	.135 (.003)	.130- .140	.113 (.002)	.109 - .117	303953

(2)					
Five year average of father’s earnings					
	β	Confidence Interval	Partial Correlation	Confidence Interval	Number of Observations
US	.330 (.065)	.201 - .458	.355 (.070)	.218 - .492	185
US Extended	.286 (.038)	.211 - .360	.343 (.045)	.254 - .432	472
W. Germany	.284 (.082)	.122 - .446	.254 (.073)	.111 - .397	174
W. Germany Extended	.303 (.071)	.162 - .443	.283 (.067)	.152 - .369	227
Canada	.189 (.003)	.183- .196	.159 (.003)	.154 - .164	303953

Notes:

1. Regressions are of sons’ earnings on parent’s incomes, with controls for sons’ and parents’ ages.
2. Standard errors are shown in parentheses and are corrected for correlations between brothers.

Table 6: Transition Matrix for the UK

Parental average income quartile	Sons’ earnings quartile			
	Bottom	2 nd	3 rd	Top
Bottom	.374	.222	.247	.157
2 nd	.293	.310	.242	.155
3 rd	.217	.248	.264	.271
Top	.119	.220	.252	.409

Notes

1. Immobility Index: 2.885
2. Sample size: 1707
3. Data drawn from the British Cohort Study as described in the text.
4. Variation due to age is removed before the data is split into quartiles.

Table 7: Transition Matrix for the US

Parental average income quartile	Sons' earnings quartile			
	Bottom	2 nd	3 rd	Top
Bottom	.424	.296	.189	.091
2 nd	.267	.282	.290	.160
3 rd	.189	.250	.242	.318
Top	.130	.160	.282	.428

Notes

1. Immobility index: 3.079
2. Sample size: 526
3. Data drawn from the Panel Survey of Income Dynamics as described in the text.
4. Variation due to age is removed before the data is split into quartiles.

Table 8: Transition Matrix for West Germany

Parental average income quartile	Sons' earnings quartile			
	Bottom	2 nd	3 rd	Top
Bottom	.355	.329	.197	.118
2 nd	.275	.362	.194	.188
3 rd	.219	.137	.370	.274
Top	.155	.225	.211	.409

Notes

1. Immobility index: 2.916
2. Sample size: 289
3. Data drawn from the GSOEP as described in the text.
4. Variation due to age is removed before the data is split into quartiles.

Table 9: Transition Matrix for Canada

Parental average income quartile	Sons' earnings quartile			
	Bottom	2 nd	3 rd	Top
Bottom	.332	.289	.218	.160
2 nd	.245	.269	.262	.223
3 rd	.211	.238	.272	.279
Top	.211	.203	.248	.337

Notes

1. Immobility index: 2.771
2. Sample size: 428022
3. Data drawn from the IID as described in the text.

Table 10: Descriptive Statistics for Education

	United Kingdom	United States	West Germany
Mean Years of Education	13.08 (2.21)	13.77 (1.88)	12.55 (2.27)
% with:			
<11 years	7.34	2.28	29.29
11 years	34.60	3.61	26.18
12 years	10.80	33.84	3.91
13 years	7.34	7.98	8.59
14 years	0	12.74	7.03
15 years	12.98	5.70	1.17
16 + years	26.91	33.84	21.48
Level 1	23.89	5.89	6.25
Level 2	32.56	33.84	1.04
Level 3	14.88	26.42	69.10
Level 4	28.67	33.84	23.61

Notes

1. The standard deviation for years of education is in parentheses.
2. For qualifications codings see the appendix.

Table 11: Returns to Education

	UK	United States	West Germany
		Regression (1)	
Years	.075 (.005)	.106 (.011)	.064 (.011)
		Regression (2)	
Level 2	.126 (.035)	.231 (.064)	.165 (.163)
Level 3	.209 (.039)	.364 (.070)	.266 (.125)
Level 4	.423 (.035)	.656 (.070)	.595 (.139)
Sample	1702	526	288

Note:

The omitted category in the second regression is Level 1.

Table 12: Educational Decompositions

Country	β	Return to Education	$\frac{Cov(Ed^{son}, \ln Y^{parents})}{Var(\ln Y^{parents})}$	$Cov(Ed, \ln Y^{parents})$	$Var(\ln Y^{parents})$	Explained Component	Unexplained Component $\frac{Cov(u^{son}, \ln Y^{parents})}{Var(\ln Y^{parents})}$
UK	.281 (.028)	.075 (.005)	1.329 (.113)	.275	.207	.099	.182 (.027)
US	.259 (.032)	.107 (.011)	1.169 (.134)	.423	.362	.125	.134 (.032)
West Germany	.211 (.058)	.064 (.012)	1.187 (.293)	.216	.182	.076	.135 (.054)

Note:

I include the variance of parental income in this Table as it is necessary to calculate the counterfactuals – for example, the extent to which intergenerational mobility would change if countries had an equal relationship between parental income and educational attainment.

Appendix

Table A.1: Qualifications Categories

Education Category	United Kingdom	United States	West Germany
1	No qualifications, CSEs grades 2-5	High school drop out	Secondary school leaving certificate or no leaving certificate
2	O levels, Apprenticeship	High school graduate	Intermediate school leaving certificate
3	A level, Advanced Vocational (Advanced City and Guilds etc)	Some college	Upper school leaving certificate, apprenticeship
4	Professional qualification, Degree	College degree (grade 16 and above)	University degree