STANFORD CENTER
on Poverty and Inequality Inequality.com

How do we characteristically measure and analyze intergenerational mobility?

Florencia Torche, New York University

The Stanford Center on Poverty and Inequality is a program of the **Institute for Research in the Social Sciences (IRiSS)**.
Support from the **Elfenworks Foundation** gratefully acknowledged.

This working paper series is partially supported by Grant Number AE00101 from the U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation (awarded by Substance Abuse Mental Health Service Administration).

Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation (awarded by Substance Abuse Mental Health Service Administration).

How do we characteristically measure and analyze intergenerational mobility?

Florencia Torche

florencia.torche@nyu.edu

July 2013

* Preliminary draft, please do not cite or quote without the author's permission. Paper presented at the Social Mobility Workshop June 10th 2013, Committee on Population, the National Research Council of the National Academy of Sciences.

How do we characteristically measure and analyze intergenerational mobility?

Abstract: This paper reviews the sociological and economic literature on intergenerational mobility. The author reviews mobility analysis in terms of social class, occupational status, earnings, and income. The conceptual foundations and empirical strategies to analyze these different types of mobility are examined, and factors accounting for discrepancies between them are discussed. The review also discusses the assessment of non-linearities in the intergenerational association; variation in mobility across advanced industrial countries; and recent mobility trends in the US. While the review focuses on the parent-children associations, it briefly describes sibling correlations as a measure of mobility.

How do we characteristically measure and analyze intergenerational mobility?

Introduction. Intergenerational mobility: Definition and Measures. Mobility is measured by the association between parents' and adult children's socioeconomic standing, where higher association means less mobility. Socioeconomic standing is captured by different measures – the most common are social class, occupational status, individual earnings and family income. The methodological approaches used to measure mobility depend on the measure of socioeconomic attainment used. This paper reviews the analysis of mobility based on each one of these four measures, and briefly discusses the factors accounting for discrepancies between them. I also review the assessment of non-linearities in the intergenerational association, mobility comparisons across countries and its potential determinants, and recent trends in mobility in the US. Finally, while this review focuses on the parent-children association, the final section describes sibling correlations as a measure of mobility.

Sociologists favor occupational measures to evaluate intergenerational mobility while economists focus on earnings and income. The distinction is not just disciplinary, nor is it trivial. Empirical research shows that findings about levels of mobility in different countries and trends over time differ depending on the measure used. While the empirical analysis of class and status mobility dates back to the 1960s and may have experienced its golden years in the 1970s-1990s, the analysis of economic mobility has burgeoning in the last two decades. Interestingly, topics that have been long researched by sociologists –for example, the mediating role of education in the mobility process, or the distinction between absolute or relative mobility – are being tackled from slightly different perspectives by recent studies of economic mobility (e.g. Eide and Showalter 1999, Bowles and Gintis 2002, Blanden et al. 2007). Much mobility analysis is descriptive and bivariate – no small feat given the methodological challenges to obtain unbiased estimates—but analysis of "mediating factors" and variation across time and place are interesting extensions. Whether much is currently known about levels, patterns, and trends of mobility, the attribution of causality –to what extent and through which mechanisms does family economic standing affect children's socioeconomic attainment?—is a more challenging question that researchers are starting to consider.

1. Occupational Status Mobility: Sociological analysis of mobility relies on occupations, collapsed into highly aggregated classes or ranked into a one-dimensional status hierarchy. *Occupational status* is a weighted average of the mean level of earnings and education of detailed occupations. Occupational status has important advantages as a measure of economic standing: Collecting information about occupations is relatively easy and faces much less issues in terms of recall, reliability, refusal, and stability than measures of earnings of income. Furthermore, information about parents can be reported retrospectively by adult children, circumventing the need for long panels. Status strongly correlates with other social and economic variables, and it remains relatively stable over the individual occupational career, so a single measure provides adequate information of long-run standing (Hauser et al. 2000, Hauser 2010). Some economists have claimed that status may be a better indicator of long term economic standing than single-year income measures (Goldberger 1989, Zimmerman 1992).

However, status has also some limitations for the analysis of mobility. The occupational education of women tends to exceed men's while the occupational earnings of men usually surpass women. This makes the composite status measure problematic to account for differences in occupational standing (Warren el al. 1998). Furthermore, Hauser and Warren (1997) demonstrated that occupational education rather than occupational earnings accounts for the large majority of intergenerational association over time.

A long and rich tradition of sociological research has examined the intergenerational stratification process using occupational status, starting as early as in the 1960s. *Absolute* status mobility has been operationalized as the change in average occupational status over time. In the US, substantial increase occurred for cohorts born in the first half of the 20th century, but there has not been further upgrading in mean status after that (Hauser et al. 2000). *Relative* status mobility is measured by a regression model in which child's status is regressed on parental status, and the regression coefficient captures status persistence. Over the last few decades, the occupational status association for white men has ranged between .30 and .45, with an average value close to .40. The occupational status association is much weaker (and imprecisely estimated) for Black men (Blau and Duncan 1967, Hauser et al 2000). There is some indication that the occupational status association has declined from the 1960s to the 1980s but evidence is weak and formal tests of trends are usually missing (Grusky and DiPrete 1990, Beller and Hout 2006).

While current studies of economic mobility are rediscovering the mediating role that education and other factors play in the mobility process, this topic has a long tradition in sociology (Blau and Duncan 1967, Sewell and Hauser 1975, Hauser and Sewell 1978). Sociologists have modeled the life course including parents' status and education, adult children's education, cognitive ability, significant other's influences, and status in first and current job among other variables by means of structural equation models. As it has been well-demonstrated, education is the main factor in both upward mobility and the reproduction of status across generations (Hout and DiPrete 2006). The intergenerational status association is largely mediated by schooling, i.e. more advantaged parents are able to afford more education for their children, which in turn pays off in the labor market. At the same time, because factors other than parental resources account for most of the variance in schooling, educational attainment provides the most important avenue for mobility. The "direct" effect of parental status, once education is accounted for, is nonzero but very minor (Blau and Duncan 1967, Sewell et al. 1969, Sewell and Hauser 1975).

Measurement issues in the analysis of status mobility: Even if occupational status is a relatively stable measure with limited reporting error, it is still affected by measurement error resulting from "within occasion between variable" and "within variable between occasion" variation. Measurement error results in a downward bias in the intergenerational association estimate. Research suggests that measurement error results in a 15-20% downward bias in the intergenerational association (Bielby et al 1977). Surprisingly (and reassuringly) no substantially higher measurement error was found in retrospective reports of parental status than in contemporary reports about own status. Some analyses of occupational mobility adjust for measurement error, but many do not.

The intergenerational status regression coefficient captures the average change in children's status associated to a one-unit increase in parents' status, assuming a linear relationship. Research on occupational status does not evaluate (or at least does not report) the distribution of occupational status, tacitly assuming that it is approximately normal or, if not normal, that the intergenerational regression coefficient is not affected by departures from normality. Depending on the population under analysis, this assumption may be problematic, as there may be kinks in the distribution. In addition, analyses do not explicitly attempt to evaluate departures from linearity in the intergenerational status association (for example by adding higher-order terms, spline functions,

quantile regression), although these strategies are easy to implement. Nor have insights from the economic mobility literature showing that simply comparing regression coefficients across groups (for example, blacks and whites) could provide a misleading or at least incomplete assessment of mobility been incorporated. In general, the regression analysis of status mobility restricts estimation to the simplest of formulations.

2. Class mobility: Measures of status subsume all sources of socioeconomic advantage into a single scale. Classes are instead categorical groupings based on specific occupational assets that determine life chances as expressed in outcomes such as income, health and wealth (Grusky and Weeden 2006), and which are differentially affected by economic and institutional factors such as technological change, and labor market and welfare policy (Breen and Whelan 1996).

The most widely used class classification was devised by Erikson, Goldthorpe and Portocarero (1979), based on different types of "employment relations". First, a distinction is made among employees, self-employed and employers. Among employees, a further distinction is made between a "service relationship" – a long-time exchange entailing a comprehensive compensation package and career prospects, which characterizes highly skilled workers – and a "labor contract relationship", involving a short-term specific exchange of time or product for pay. Classes are claimed to be defined by the varying amounts of these relationships. In its most detailed formulation this classification distinguishes 12 classes, but it is usually collapsed into 7 or 5 groups for comparative analysis (Erikson and Goldthorpe 1992, Breen 2005). In the 7-class formulation, this schema distinguishes: Professional and managers, clerical workers, self-employed, farmers, skilled manual workers, unskilled manual workers, and farm workers.

As with status mobility, there is a long tradition of class mobility analysis studying the mediating role of education and other factors in the intergenerational transmission process. Research indicates that education plays a substantial role in the intergenerational transmission of class, but in virtually all national context, a "net" intergenerational association remains after schooling has been accounted for (this may be an artifact of highly aggregated measured of schooling and/or absence of educational quality measure, however). Importantly, Ishida et al. (1995) have demonstrated that the mediating role of education widely varies across classes. For example, reproduction of the professional

class is almost entirely mediated by educational credentials, while the reproduction of self-employment largely bypasses the educational system.

Measurement issues in the analysis of class mobility: Given that classes entail occupational assets that vary in their type and not only amount, the analysis of class mobility is not restricted to movements up and down in a socioeconomic ladder, but rather considers barriers to mobility emerging from the ownership of different types of assets such as property ownership, sectoral barriers, or authority in the workplace. Analysis of the intergenerational class association treats classes as nominal (although orderable) categories.

At the most basic level, the mobility table provides information on the total observed flows between classes of origins and classes of destination, called 'absolute mobility'. Measures of absolute mobility include, for instance, the proportion of individuals that remain in the same class of their parents ('immobile'), and –if a ranked order of classes is assumed— the proportion that moves upwards or downwards, gaining or losing status. It also communicates the origins composition of each class of destination --the column percentages in the mobility table, conventionally called 'inflow distribution'-- and the destination distribution of each class of origins --row percentages, called 'outflow distribution'. Inflow and outflow distributions provide information about class formation and transformation across generations.

Absolute mobility flows can be meaningfully divided into two dimensions. The first dimension is the transformation of the class structure over time, called *structural mobility*, and expressed in disparity in the mobility table marginals. Structural mobility is interpreted as a consequence of exogenous economic and demographic factors such as technological change, economic policy, foreign trade, fertility and immigration (Hout 1989). The most important of these factors during the 20th century is the transformation from an agricultural to a service-based economy. This transformation has led to a significant upgrade in national class structures, creating 'room at the top' --in the professional and non-manual classes-- and reducing positions in agriculture, thereby inducing a large amount of upward class mobility.

The second dimension of mobility, called *relative mobility* refers to the association between origins and destinations, net of structural change. Strong association means that class of origins determines to a large extent what a person becomes in life, whereas weak association indicates that

destination is largely independent from origins. Relative rates of mobility indicate the level of *social fluidity* or 'social openness' or the degree of 'equality of opportunity' in a society.

Relative mobility is measured through odds-ratios in the mobility table. Free from marginal effects, odds-ratios express the competition between people with different origins to attain diverse classes of destination. To put it crudely but correctly, the odds ratio between, for instance, the professional and the manual class expresses the chances that someone with origins in the professional class becomes himself a professional rather than a manual worker, relative to the chances that someone with origins in the manual class becomes himself a professional rather than a manual worker. Thus, odds ratios combine the unskilled manual class' 'chances of success' and the professional class' 'chances of failure' in the same measure, providing a margin-free measure of competition for advantaged positions (Goldthorpe 2000: 252).

Odds-ratios close to unity (1) reflect relative equality of opportunity. Relative rates of mobility are analyzed using log-linear models, which capture the association between origins and destinations through a relatively small number of parameters that are a function of the odds-ratios. Examining all non-redundant odds ratios in a saturated model is not very interesting because they lack parsimony. Log-linear models are used to account for main sources and types of intergenerational association, interpreted as the main barriers to mobility. Some of these models are topological, i.e. they use a single matrix to model different levels of association without assuming a rank-order for social classes. These models include, for example, the quasi-independence model (assuming a higher probability of remaining in the class of origin), the quasi-symmetry model (assuming that flows are symmetrical around the main diagonal), the "levels" model (postulating zones of the table with different levels of association). The "crossing" model uses multiple matrices to capture the varying difficulty of crossing barriers between classes. Yet other log-linear models treat classes as strictly ordinal and estimate a single parameter similar to a linear regression coefficient to capture the intergenerational association – for example linear-by-linear association model, and the row-and-column model (Hout 1983, Hauser 1978).

An important, theoretically derived model of class mobility is the *core model*, claimed to represent basic similarity in mobility across industrialized countries (Erikson and Goldthorpe 1987a,b, 1992). The core model is topological but instead of emerging from a single allocation of cells it uses several matrices intended to capture different factors driving the intergenerational association:

Hierarchy (status differences between classes), inheritance (class-specific propensity to remain in the class of origins), sector (barrier between agricultural and non-agricultural classes) and affinity/disaffinities between specific pairs of classes. Log-linear analysis of class mobility provides a very flexible tool to capture the intergenerational association, not constrained by linearity or even ordinality assumptions; although these possibilities can be empirically tested by means of goodness of fit statistic comparisons.

Specific methods have been devised to compare mobility across units, such as countries, cohorts, or time points. A parsimonious comparative approach is the log-multiplicative layer effect model also known as uniform difference model (Xie 1992 Erikson and Goldthorpe 1992. This model formulates the origin-destination association across tables as a function of two components: One describes the pattern of association for all units being compared, and the other captures the layer-specific deviation from the overall association. This model captures departures in strength of the association while assuming a common pattern across units, which can be restrictive in some empirical instances. Goodman and Hout (1998) offer an extension of this formulation, a "modified regression-type approach", which can accommodate differences in pattern as well as strength. This model is however more challenging to implement and interpret and has not yet been widely used in the comparative analysis of class mobility.

It is important to mention that relative class mobility is a construct without empirical correlate and that it accounts for a small portion of the total mobility experienced by individuals across generations, while structural mobility accounts for most of it –or, put in other words "people live in the margins" (Breen 1987; Hout and Hauser 1992; Hauser et.al. 1975a, b; Featherman and Hauser 1978: 217). However, class mobility analyses focus on the relative dimension of mobility because, by controlling for changes in the class structure, the study of relative mobility uncovers the underlying social mechanism that allocates people of different origins to different destinations, identifying the *causes* and *patterns* of transmission of advantage across generations. Depending on contextual features, the relative and structural dimensions of mobility could offset each other. For example Hout (1988) demonstrated that absolute mobility remained relatively constant between 1972 and 1985 in the US as a result of two offsetting forces: Increased social fluidity and decline in structural mobility.

Unit of analysis for the study of class mobility: Even though proponents of class analysis maintain that the family, rather than the individual worker, is the "unit of class fate" (Erikson and Goldthorpe 1992:233), it is not self-evident how the class status should be measured at the family level (Sorensen 1994). Several alternatives have been offered by the literature, including measuring the class position of the father / husband ("conventional view"), a combination of both spouses (if both are employed), or the class position of the "dominant spouse" i.e. the spouse with a stronger labor market involvement or higher class position.

This issue is not trivial because the assessment of mobility depends on how class is measured. Beller (2009) shows that when the social class of mothers is included, models fit better than those including only fathers'. Furthermore, assessment of mobility trends in the US changes when mother's class origins are incorporated -- while stability over time is found using only father's class, declining mobility is found after including mother's class position.

3. Earnings Mobility: The study of earnings mobility evaluates the intergenerational association by means of a linear regression of the log-transformed measure of parents' and children's earnings. The log transformation addresses the severe right-skew of earnings distributions. Given the double-log formulation, the regression coefficient is an elasticity which captures, approximately, the average percent change in children's earnings associated with a one percent change in parental earnings. With this formulation, a regression coefficient of, say, 0.4, indicates that a 10% difference in parents' earnings will lead, on average, to 4% difference in the children's generation. In other words this indicates that if two fathers earnings differ by 10%, their children's earnings will differ, on average, by 4%.

The elasticity is not affected by the change in mean income across generations. By measuring the association in terms of percent change, it adjusts for economic growth or contraction over time. Thus, the elasticity captures relative, not absolute, mobility. By construction, the intergenerational elasticity is however sensitive to the variance of the dependent and independent variables, i.e. by the extent to earnings inequality in each generation and its change across generations. While empirical values of elasticities usually range between 0 and 1, it is possible for an elasticity to take values larger than 1 if earnings dispersion increases substantially across generations (something seldom seen, but see Grawe 2004).

The intergenerational correlation adjusts the elasticity by the ratio of the standard deviation of father's earnings and children's earnings (σ_{FE}/σ_{CE}). As a result, the correlation is not mechanically affected by changes in inequality across generations, and ranges between 0 and 1, with 0 indicating independence between origins and destination and 1 indicating perfect association. The distinction between the elasticity and the correlation coefficient is important if there is substantial change in earnings inequality across generations, such as experienced in the recent past in the US. In a context of rising inequality, the elasticity will be higher than the correlation because (σ_{FE}/σ_{CE}) will be less than 1.

Measurement issues in the analysis of earnings mobility: Initial assessments of intergenerational earnings mobility in the 1980s considered single-year measures of earnings for either generation. These analyses yielded father-son intergenerational elasticities of about 0.15- 0.20 (Becker and Tomes 1986, Behrman and Taubman 1985), leading to the conclusion that earnings were not strongly transmitted across generations. As concluded by Becker and Tomes (1986) "aside from families victimized by discrimination ... almost all earnings advantages and disadvantages of ancestors are wiped out in three generations". But the consensual figure of intergenerational elasticity were raised to about 0.40 in the 1990s (Solon 1999), and an even higher value of around 0.50 in the 2000s (Hertz 2005; Mazumder 2005). These updates were due to better measurement of earnings in either generation, and to the use of larger, nationally representative, datasets.

The recent literature has shown at least three sources of bias in early measures of the intergenerational earnings elasticity, which usually result in attenuation bias: (A) Transitory (and autocorrelated) fluctuation around long-run income, (B) Age-related errors in variables bias, and (C) lifecycle bias (Jenkins 1987, Mazumder 2005a,b, Black and Devereux 2011).

Transitory Fluctuation: The analysis of intergenerational mobility has its conceptual basis on the notion of "permanent income" (Friedman 1957), which states that it is the permanent expectation of income that determines consumption and ultimate economic welfare. So the relationship of interest is between parents' and children permanent standing. However, data on mobility is usually taken from surveys that contain measures for a single or a few years, with only Scandinavian countries and Canada having –to date— exploited administrative records that contain information over extended periods of time for both generations.

From a permanent income perspective, transitory fluctuation and error from one year to the next is a form of measurement error. Under classical measurement error assumptions, error in the dependent variable (children's earnings) is not a source of bias. But measurement error in the explanatory variable (father's earnings) results in biased and inconsistent coefficients –usually downwards (Zimmerman 1992, Solon 1992, Altonji and Dunn 1991, Peters 1992).

In order to reduce measurement error researchers resort to averaging father's earnings over several years to better approximate permanent income. Research has shown that attenuation bias declines as the number of averaged years increases. Using high-quality social security data on earnings Mazumder (2005a, b) found an intergenerational earnings elasticity of about .25 when father's earnings are averaged over two years. But the estimate increased to about 0.6 when father's earnings are averaged over 16 years. Mazumder (2005a) shows that 5-year averages are not enough because observations are usually too close together to be representative of lifecycle earnings, and that the remaining bias crucially depends on the extent of temporal autocorrelation in father's earnings. In a useful empirical exercise, Mazumder assumed that transitory variance is half of total income variance and that there was no autocorrelation, and found that the attenuation factors goes from .51 with a single-year measure of income to .91 with ten years' worth of data. However, with autocorrelation of 0.7 (not an unreasonable figure), the figures are .50 and .71, respectively. Even with as many as 30 years' worth of data, the downward bias of the elasticity remains .85 if autocorrelation coefficient is 0.7.

Age-related errors-in-variables: If the variance of the transitory component of earnings changes considerably over the lifecycle, averages taken at a time when earnings are noisy may lead to further bias. Baker and Solon (2003) find that innovations to the transitory component of earnings follow a U-shaped pattern across age, with vertex around age 40. This suggests that earnings measured at that age minimizes attenuation bias.

Life-cycle bias: Furthermore, the association between current and lifetime earnings is not constant over the lifecycle because of heterogeneous age-earnings profiles. Individuals who will have high lifetime earnings typically have steeper earnings growth than those with low lifetime earnings. As a result, the early-career earnings gap between low and high lifetime earners tends to underestimate the gap in lifetime earnings. One important implication of this source of bias is that the age in which earnings are measured for both parents *and* children matters for producing an

unbiased estimate of the elasticity (Jenkins 1987, Haider and Solon 2006, Mazumder 2008, Grawe 2006). In other words, the standard errors-in-variables assumption that measurement error in the dependent variable (children's earnings) is innocuous is wrong. Estimations of the relationship between current and permanent income reveal that income should be measured between the early 30s and the mid-40s in the US (Haider and Solon 2006).

Methodological alternatives to address measurement error: An alternative to address measurement error in father's earnings is to use an instrumental variable approach. For this approach, a variable related to parents' earnings but unrelated to measurement error (and, of course, to children's earnings) is needed. Such a variable is very difficult to find. Usually, variables selected as instruments are related to children's earnings via factors other than parents' income, violating the exclusion restriction. This usually induces upward bias in the estimated elasticity, resulting in IV estimates usually providing an upper bound for the intergenerational elasticity.

If parental income is not available in the main dataset but other parental characteristics predicting income are, then a two-sample instrumental variable (TSIV) approach can be used (Arellano and Meghir 1992, Angrist and Krueger 1992). This strategy is used when there is no information on actual father-child pairs but there is matched information on children's earnings and some father's characteristics, such as schooling, experience and occupation. The strategy uses information from two surveys. In a first step, earnings equations can be estimated on an older sample of men (which will represent the parental generation) in order to obtain coefficients of some earnings determinants such as schooling, experience and occupation. Then, these coefficients can be used to predict the earnings of the fathers of a sample of adult children, employing the socio-demographic characteristics of the fathers reported by the children. This strategy will produce estimators of intergenerational persistence that will be upward biased in the same way as other IV estimators (they will convey not only the association between children's and parental earnings, but also the net influence of the instrumental variables used to predict parental earnings), and can therefore be used as an upper-bound of intergenerational persistence. This approach has been used for mobility analysis in several national cases and in international comparisons (Bjorklund and Jantti 1997, Mocetti 2007, Piraino 2007, LeFranc and Tannoy 2005, Andrews and Leigh 2007).

4. Total Family Income Mobility and the Mobility of Women: Early economic analysis of mobility focused on father-son pairs and on individual earnings. Over the last two decades, the study of economic mobility has expanded in three related directions: Considering total family income, including daughters and considering the role of assortative mating in the mobility process.

Like class and status, earnings provide a measure of well-being strictly based on the labor market. As a result, they do not include those who are not working or extra-occupational resources, such as financial assets and public and private transfers. These extra-occupational resources are central at either extreme of the economic distribution—among the "underclass" poorly attached to the labor market (Grusky and Weeden 2008) and among the "overclass," whose income largely depends on returns to capital. By focusing on the family rather than the individual or the occupational group as the unit of analysis, measures of total family income capture the economic position of those not in the labor force and include occupational and extraoccupational sources of well-being. Furthermore, this measure accounts for family-level dynamics, such as spousal selection (assortative mating) and intrahousehold division of labor, and for institutional arrangements that may mediate the consequences of economic factors on the household's well-being (Torche 2011). Given that women's labor market engagement is still weaker than men's, the examination of income mobility may provide a more comprehensive account for women. Furthermore, when the analysis is extended from individual earnings to family income, the question about the contribution of assortative mating becomes central.

Increasingly, studies of mobility has considered family income as a measure of standing in the parental or in both generations. These analyses indicate that the intergenerational association is higher when measured by income rather than earnings (Solon 1992, Harding et al 2005, Mayer and Lopoo 2004, 2005, Lee and Solon 2009), suggesting avenues for the transmission of advantage beyond labor market resources and rewards. To date, research has examined assortative mating as one of these mechanisms, but there are plausible others such as direct transmission of income-producing assets.

Much research links analysis of women's mobility with the question of assortative mating. Chadwick and Solon (2002) examine total family income mobility for sons and daughters and include the contribution of assortative mating to intergenerational persistence using a model introduced by Lam and Schoeni (1993). They find an income elasticity of around 0.4 for daughters and around 0.5

for sons. They also find that assortative mating plays a crucial role for both genders, but more strongly for women because spouse's contribution to household income tends to be larger for women than for men. Ermisch et al. (2006) use the same model and extend the analysis to a US-Germany comparison. As Chadwick and Solon, they find that assortative mating plays an important role –about 40-50% of the covariance between parents' and own permanent income can be attributed to one's spouse, for both sons and daughters. Hirvonen (2008) extends Chadwick and Solon's (2002) model to Sweden. She finds similarly important role of assortative mating as in the US and a similar level of family income elasticity across gender. Her research is consistent with other studies reporting similar levels of total family income for men and women in the US context (Mayer and Lopoo 2005b, Torche 2011). This suggests that while women feature a lower intergenerational earnings elasticity than men (e.g Jantti et al 2006), the intergenerational association in family income tend is very similar across genders.

A weaker earnings elasticity among women than men may be related to assortative mating and labor supply among women, at least in the US. Raaum et al. (2007) using a comparative analysis of the US, UK, and Scandinavian countries, show that married women with children and husbands with affluent backgrounds tend to reduce their labor supply in the US and UK but not in Scandinavia. This weakens the intergenerational association between married women's own earnings and their parents' earnings in the Anglo countries.

Less work exists that explicitly distinguishes mothers from fathers in the parental generation. Although mothers' economic contributions are implicitly included in measures of parental family income analysts have not examined a potentially different contribution by mothers' economic resources. One exception is Fertig (2005) who examines mother-children as well as father-children pairs and finds impressively low individual earnings elasticities for mother-son and mother-daughter pairs.

In sum, research shows that the persistence of total family income is stronger than the persistence of individual earnings, and that assortative mating substantially contribute to intergenerational persistence for both men and women. This suggests that the family rather than the individual is the relevant unit of intergenerational stratification, not only for women.

5. Divergences in Findings between Sociological and Economic measures of Mobility: The analysis of occupational status, class, earnings and income mobility does not need to yield the same results, as these variable capture different dimensions of socioeconomic advantage (Beller and Hout 2006). However, researchers tend to believe – or at least draw conclusions based on the assumption— that all these measures capture the same latent concept, called "socioeconomic standing" in this paper. However, empirical analysis shows widely different results for class mobility versus earnings/ income mobility.

While the US consistently ranks as the least mobile of advanced industrial countries in terms of earnings or income mobility, it emerges as relatively fluid when class mobility is analyzed (Erikson and Goldthorpe 1992, Bjorklund and Jantti 2000, Blanden 2013). Furthermore, while virtually all empirical analyses find a strong association between income/earnings mobility and cross-sectional inequality across countries, this is not the case for class mobility. Erikson and Goldthorpe (1992) correlate class mobility with cross-sectional inequality across 13 industrialized countries and found a very small variation in mobility is related to inequality. A more recent analysis of 11 European countries finds no association between mobility and inequality (Breen and Luijkx 2004). Other discrepancies in findings from class and income/earnings mobility are also important. For example, while educational attainment accounts for most –about 85 percent— of the intergenerational occupational status association, it accounts for only about half of the intergenerational association of total family income (Torche 2013). This again suggests that family income may be a more comprehensive measure of socioeconomic standing, which includes extra-occupational assets.

What can explain such divergent results? Different measures of economic standing will provide a dissimilar evaluation of intergenerational mobility to the extent that the distributions of these measures are not perfectly correlated and, crucially, to the extent that deviations across distributions are strongly correlated across generations (Bjorklund and Jantti 2000). Blanden (2013) shows that dimensions of income not explained by social class are transmitted across generations. The problem may be due to the fact that classes are highly aggregated groupings, which miss important variation in socioeconomic advantage. One solution would be to use more detailed occupations or "micro-classes" (Weeden and Grusky 2005, Jonsson et al. 2009) but the problem may still persist if deviations across distributions are strongly correlated across generations. This discrepancy is

provocative not because it proves one or another measure of standing "wrong" but because it highlights the need to evaluate which dimension of socioeconomic wellbeing each measure captures.

6. Non-linearities in the intergenerational economic association: Intergenerational elasticities and correlations are useful summary measures, but they may conceal interesting detail about intergenerational mobility at different points of the joint distribution. Researchers have used different techniques to relax the linearity assumption, including spline or locally-weighted regressions, higher-order terms, transition matrices across quintiles or other percentiles of the earnings distribution (Corak and Heisz 1999, Couch and Lillard 1998, Peters 1992), kernel density, and quantile regression approaches (Corak and Heisz 1999, Eide and Showalter 1999, Lillard 2001).

Spline or locally weighted regressions provide a flexible account of the conditional son's earnings mean across the distribution of parental earnings. For example, Corak and Heisz (1999) find that the intergenerational mobility in Canada is greater at the lower end that at the upper end of the earnings distribution by using locally-weighted regression.

Examination of non-linearities by means of these approaches has been used to examine the impact of credit constraints on mobility, a question with direct policy implications. As suggested by Becker and Tomes (1986) credit constraints are a severe deterrent to mobility, and they may be particularly severe for low income parents. This pattern would result in a concave intergenerational association curve (strong association among poor families, weaker association among better-off families). However, some empirical research in the US has found the opposite – a convex relationship (Behrman and Taubman 1990, Solon 1992),

Han and Mulligan (2001) account for such convexity by suggesting that higher-earning families are more likely to have high ability children and so may be more credit constrained if returns to human capital rise with ability (and if education is costly, of course). To the extent that the optimal level of investment is higher for high-ability parents, then the intergenerational association may be convex. Also, strongly egalitarian public educational systems could result in a convex intergenerational association. For example, Bratsberg et al. (2007) found that the intergenerational elasticity is close to linear in in the U.S. and U.K., but the pattern is convex in Denmark, Finland, and Norway, suggesting that the convexity in the Nordic countries is related to the strong public education systems that exist in these countries.

However, Grawe (2004) shows that non-linearities in the intergenerational association do not provide a conclusive test of the effect of credit constraints on mobility. He shows that earnings-ability correlations could lead to varying types of non-linearities depending on different assumptions; and that, in the absence of credit constraints, other factors may explain a nonlinear association.

A more direct approach to test the credit constraints hypothesis is to define groups that are more likely to be constrained explicitly. Mazumder (2005a) finds less mobility among families with low wealth (but not low income), which supports the hypothesis of credit constraints among the asset-poor. Mulligan (1997) split the sample by those who expect to receive an inheritance. He finds no significant difference in intergenerational mobility between the two groups and concludes that borrowing constraints do not appear to be an important determinant of intergenerational mobility. Gaviria (2002) defines the non-constrained as those who have actually reported receiving large financial transfers or whose parents have a high net worth. He finds some evidence that intergenerational mobility is in fact lower among borrowing-constrained families. Grawe (2004) tests the hypothesis that constraints depend on children's ability and proxies ability by means of children's earnings level conditional on parents' earnings using quantile regression. Constrained sons should be those whose earnings are high conditional on their father's earnings. Credit constraints should result in a stronger association among sons at higher conditional quartiles, particularly of low-earning fathers, but fails to find evidence supporting this hypothesis (a disadvantage of this approach is that earnings depend on investments as well as abilities and so are endogenous to the presence of credit constraints).

Transition matrices collapse parental and children's income into percentiles (usually quintiles or deciles) and examine the bivariate cross-classification. Transition matrices account for any change in dispersion across generations by dividing it in equally-sized groups in both generations, so they are unaffected by changes in inequality. A standard (and trivial) finding of transition matrix analysis is that there is much more persistence in the extremes ("corners") than in the middle percentiles— an artifact of ceiling and floor effects. Differences in corner persistence across countries or time can however be usefully examined for comparative purposes. For example, Jantti et al. (2006) use transition matrices to examine differences in the pattern of mobility between the US, UK, and Scandinavian countries, and find much lower upwards mobility out of the poorest quintile group in the U.S. than in Scandinavia. An additional interesting question is the extent of symmetricity in the transition

matrix flow: Is reproduction of poverty or rags-to-riches flows more prevalent than reproduction of wealth or riches-to rags movements?

In addition, transition matrices allow one to compare mobility rates of population subgroups across the full earnings distribution rather than just across the earnings distribution for that group. This is impossible with IGE estimation, as splitting the sample by group shows the degree of regression to the subgroup mean not the mean of the whole population. A striking example of this is the comparison of mobility for Blacks and Whites in the US: Blacks appear to be substantially more mobility, but given that they converge to a lower mean than whites, this means wider disparities between groups (Mazumder 2011).

Bhattacharya and Mazumder (2011) criticize the standard transition matrices approach for relying on arbitrary discretizations of the distribution, which are strongly affected by measurement error (O'Neill et al. 2007). Bhattacharya and Mazumder (2011) propose a new measure of upward mobility – the probability that a son's percentile rank in the earnings distribution of sons exceeds the father's percentile rank in the earnings distribution of fathers. In effect, this implies more weight is placed on small moves, as mobility is noted even if it does not involve the son's quintile (or other discrete measure) being different from the quintile of the father. They show that the distinction can matter in practice as the degree of upward mobility of blacks is found to more similar to that of whites when the new measure is used.

Quantile regression, in turn extends the traditional mobility analysis from prediction of a conditional mean to prediction of different percentiles of the adult children's conditional earnings. When diverse predicted percentiles are obtained, quantile regression provides an assessment of the dispersion of son's income around the central tendency at different levels of parental income. This is an important measure, which adds information to the average level of reproduction obtained from the elasticity. For example, several studies have found that the association is greater at the bottom of the son's conditional earnings distribution (e.g. the 10^{th} percentile) but it declines monotonically as children's conditional earnings percentile increases (Eide and Showalter 1999, Fertig 2003, Torche 2013). This amounts to a varying dispersion of son's earnings at different levels of parental earnings – specifically, a "fanning in" pattern of association, indicating that the dispersion in son's earnings is wider at lower than at higher levels of father's earnings. Or in other words, that children of wealthy parents are more likely to be homogeneously wealthy than children of poor parents are likely to be

homogeneously poor. As put by Jantti (personal communication) "perhaps the variation of the elasticity should be considered an index of mobility (in addition to the elasticity)".

7. Variation in mobility across countries: Becker and Tomes' (1986) framework suggests that parents make optimal financial investments in their children. If access to credit markets is perfect, then there won't be a direct relationship between parental income and investments – any intergenerational relationship will only emerge from the inheritance of endowments such as cognitive ability and household socialization. In this context, public policy could foster mobility in two ways: Investing in human capital development of disadvantaged children –weakening heritability— and financing higher education to ameliorate the effect of credit constraints (Naturally, this would be valid if public and private investments are substitute, rather than complement, in the production of human capital). Under this model, then, investment in public education, particularly at the lower levels of schooling, should promote mobility.

Solon (2004) offers a stylized version of the Becker-Tomes model, derived under the simplifying assumptions of steady state and equal variance in both generations. The intergenerational association coefficient is explained in terms of public and private investments in children. Intergenerational persistence is postulated to be a function of: Automatic heritability of human capital endowments such as cognitive ability (which increases the intergenerational association), productivity of investments in human capital (increases association), returns to education (increases the association), and progressivity of public investments in human capital (reduces the association). Based on this model, then, countries with lower returns to schooling and more progressive educational investments should feature higher levels of mobility.

Many studies have undertaken international comparisons of mobility and have provided some empirical evidence about these relationships. Several reviews exist that compare estimates of elasticity across advanced industrial countries using (relatively) similar methods and assumptions (Solon 2002, Jantti et al 2006, Corak 2006, Bjorklund and Jantti 2009, Blanden 2013). These studies consistently indicate that Scandinavian countries feature the highest levels of mobility, while the US, the UK and Italy have the stronger intergenerational association. These studies also explored the association between the intergenerational elasticity and several macro-level factors. Consistent with Solon's (2004) model –and with common sense—they have found a negative correlation between

elasticity and cross-sectional inequality, as popularized in the "Great Gastby" curve (Corak 2012) a negative correlation with returns to schooling, and a positive correlation with educational spending, particularly in primary education (Ichino et al. 2011). A particularly interesting analysis is offered by Mayer and Lopoo (2008), who use a fixed effects model to find weaker elasticities in US states that increase their per-children spending. These correlations do not, naturally, prove a causal relationship. As Galiani (2010) has argued, the association between mobility and macro-level factors is complex and depends on multiple factors.

8. Trends in intergenerational mobility in the US: The increase in economic and educational inequality over the last three decades suggests that the intergenerational elasticity should have declined in the US (although implications for the intergenerational correlation are less clear). However, the evidence is mixed and inconclusive, with findings from diverse datasets differing widely. Findings based on the PSID show an *increase* in mobility among men born in the 1950s and 1970s, although this trend usually fails to reach statistical significance, due to the small sample sizes (Fertig 2003, Mayer and Lopoo 2004, Hertz 2007, Lee and Solon 2009). In sharp contrast, analysis based on the NLS surveys show a *decline* in mobility between cohorts born in the late 1940s/early 1950s and those born in the early 1960s (Levine and Mazumder 2002, Bloome and Western 2011).

Analysts have also used Census data to address trends. Because the Census does not permit matching parents with adult children, this analysis uses a cohort of "synthetic parents", which is less than ideal. Analysis based on the census finds that the intergenerational income elasticity declined between 1950 and 1980 but then increased over the 1980s and 1990s (Aaronson and Mazumder 2008). Interestingly, they find that the increase in elasticity mirrors the recent surge in income inequality in the US, but that there is less similarity with trends in the intergenerational correlation. A similar finding is obtained by Harding et al (2005), who find a decline in the intergenerational correlation during the 1960s and stability from the 1970s to 1990s. However, as inequality increased, the income gap between men raised in advantage and disadvantage widened between 1970s and 1990s. Finally, analysis based on the GSS finds no significant trend over time for men (Levine and Mazumder 2002, Torche 2013). In sum, no clear answer emerges in terms of mobility trends in a context of growing inequality, which is largely due to data limitations.

9. Sibling Associations: Parent-children associations are not the only way to describe the extent of family influences. Sibling (usually brothers) correlations of socioeconomic attainment provide what has been claimed to be a broader measure of family persistence insofar as they include the myriad of family, community, and neighborhood factors shared by siblings when they are growing up. As a result, brothers earnings provide a better fit for own income than father's earnings does and brothers correlations are usually higher than parent-children correlations.

The consensus in the literature is that a variance components model is a better approach to estimating the sibling correlation (Bjorklund and Jantti 2009). Under this formulation, the correlation becomes the ratio of the variance of the family effect to the sum of the individual and family effect variances, i.e., the share of long-run income that is attributable to family background. Sibling correlation in earnings can be shown to equal $\rho=b^2+s$ where b is the intergenerational earnings elasticity and s is a measure of all variables shared by siblings that are unrelated to parental earnings (Solon 1999).

The consensus value of the correlation of log earnings between brothers in the U.S. of about 0.4 does not seem to have changed much since Solon (1999). For example, Mazumder (2008) reports brother correlations of almost 0.5 in the NLSY-79 and about 0.4 in the PSID. Bjorklund et al. (2002) compare sibling correlations across several countries and find estimates of just over 0.4 for the U.S. and, consistent with the findings for intergenerational elasticities, much lower estimates for Nordic countries (see also Raaum et al. 2006). These figures suggest that almost half of economic inequality in the US can be attributed to family and community influences. If we assume an intergenerational earnings elasticity of about 0.5 for the U.S. and a sibling correlation of 0.4, the formula presented above implies that about five-eights of the sibling correlation can be attributed to father's earnings, leaving a substantial role for other shared variables (Black and Devereux 2011).

Only a few studies have investigated the factors accounting for the sibling correlation in socioeconomic outcomes. Hauser et al. (1999) and Warren et al. (2002) show that the effects of family background on occupational status operate entirely through their effects on education and cognitive ability. Altonji and Dunn (2000) find evidence of linkages between siblings in unobserved preferences for work hours. Björklund et al. (2005) use administrative registry data from Sweden to examine earnings correlations among a variety of sibling types, and decompose the correlation into genetic and environmental components. Results vary across specification but they suggest that there

is a large genetic component – even the smallest estimates of the genetic component of earnings variation suggests that it accounts for about 20% of earnings inequality among men, and more than 10% among women. As to the influence of neighborhood, research consistently shows a very small role. Solon et al. (2000) find that neighborhood accounts for at most 1/5 of the factors family share. Using a large sample from Norwegian registry data Rauum et al. (2006) reach a similar conclusion: Neighborhood correlations in log earnings are low and they play a small role in brother correlations in earnings. By the same token, Oreopoulos (2003) finds neighborhood correlations that are very close to zero in Canada.

References

Aaronson, D., and B. Mazumder. 2008. "Intergenerational Economic Mobility in the United States, 1940 to 2000." *Journal of Human Resources* 43(1):1-72.

Altonji, J., and T. Dunn. 1991. "Relationships among the Family Incomes and Labor Market Outcomes of Relatives," *Research in Labor Economics* 12: 269–310.

Andrews, D. and A. Leigh. 2007. "More Inequality, Less Social Mobility" ANU CEPR Discussion Paper 566.

Angrist, J. and A. Krueger. 1992. "The Effect of Age at School Entry on Educational Attainment: An Application of Instrumental Variables with Moments from Two Samples." *Journal of the American Statistical Association* 87(418): 328-36.

Arellano, M. and C. Meghir. 1992. "Female Labour Supply and On-the-Job Search: An Empirical Model Estimated Using Complementary Data Sets." *The Review of Economic Studies* 59(3): 537-59.

Baker, M., and G. Solon (2003), "Earnings dynamics and inequality among Canadian men, 1976-1992" *Journal of Labor Economics* 21: 289-321.

Becker, G., and N. Tomes. 1979. "An Equilibrium Theory of the Distribution of Income and Intergenerational Mobility," *Journal of Political Economy* 87 (1979), 1153–1189.

Becker, G. and N. Tomes. 1986., "Human Capital and the Rise and Fall of Families," *Journal of Labor Economics* 4: S1–S39.

Behrman, J. and P. Taubman. 1985. "Intergenerational Earnings Mobility in the United States: Some Estimates and a Test of Becker's Intergenerational Endowments Model," *Review of Economics and Statistics,* 67, 144-51.

Beller, E. and M. Hout. 2006. "Intergenerational Social Mobility: The United States in Comparative Perspective" *The Future of Children* 16: 19-36.

Beller, E. 2009. "Bringing Intergenerational Social Mobility Research into the Twenty-first Century: Why mothers matter" *American Sociological Review* 74: 507-528.

Bhattacharya, D. and B. Mazumder. 2011. "A Nonparametric Analysis of Black- White Differences in Intergeneration al Income Mobility in the United States" *Quantitative Economics* 2: 335-379.

Bielby, W., R. Hauser, and D. Featherman. 1977. "Response Errors of Black and Nonblack Males in Models of the Intergenerational Transmission of Socioeconomic Status." *American Journal of Sociology* 82:1242-88.

Björklund, A. and M. Jäntti. 1997. "Intergenerational Income Mobility in Sweden Compared to the United States." *American Economic Review*, 87(5): 1009-18.

Björklund, A. and M. Jäntti. 2000. "Intergenerational mobility of socio-economic status in comparative perspective" *Nordic Journal of Political Economy* 26(1): 3–32.

Björklund, A., T. Eriksson, M. Jäntti, O. Raaum and E. Österbacka. 2002. "Brother correlations in earnings in Denmark, Finland, Norway and Sweden compared to the United States" *Journal of Population Economics* 15: 757-772.

Björklund, A. and M. Jäntti. 2009. "Intergenerational income mobility and the role of family background", in: W. Salverda, B. Nolan, and T. Smeeding, eds., *Handbook of Economic Inequality*. Oxford: Oxford University Press.

Black, S. and P. Devereux. 2011. "Recent Developments in Intergenerational Mobility" pages 1487-1541 in *Handbook of Labor Economics* Volume 4, Part B, Card, D. and O. Ashenfelter Eds.

Blanden, J. P. Gregg and L. Mcmillan. 2007. "Accounting for intergenerational income persistence: Noncognitive skills, ability and education" *The Economic Journal* 117: C43–C60.

Blanden, J. 2013. "Cross-country rankings in Intergenerational mobility: A comparison of approaches from Economics and sociology" *Journal of Economic Surveys* 27(1): 38–73.

Blau, P. and O.D. Duncan. 1967. *The American Occupational Structure*. New York: John Wiley and Sons.

Bloome, D. and B. *Western.* 2011. *"Cohort Change* and Racial Differences in Educational and Income Mobility." *Social Forces* 90(2): 375-395.

Bowles, S. and H. Gintis. 2002. "The inheritance of inequality" *Journal of Economic Perspectives* 16(3): 3-30.

Bratsberg, B. et al. 2007. ―Nonlinearities in intergenerational earnings mobility: Consequences for cross-country comparisons‖ *The Economic Journal* 17: C72-C92.

Breen, R. 1987. "Sources of Cross-National Variations in Mobility Regimes: English, French, and Swedish Data Reanalyzed" *Sociology* 21 (1): 75-90.

Breen, R. 2005. "A Weberian Approach to Class Analysis" Chapter 2 in E.O. Wright. ed. *Approaches to Class Analysis. Cambridge: Cambridge U. Press.*

Breen, R. and C. Whelan. 1996. *Social Class and Social Mobility in Ireland*. Dublin: Gill and McMillan.

Breen, R. and R. Luijkx. 2004. "Conclusions." Chapter 15 in *Social Mobility in Europe*, edited by R. Breen. Oxford, UK: Oxford University Press.

Chadwick, L. and G. Solon. 2002. "Intergenerational Income Mobility among Daughters," *American Economic Review* 92(1): 335– 344.

Corak, M., and A. Heisz. 1999. "The Intergenerational Earnings and Income Mobility of Canadian Men: Evidence from Longitudinal Income Tax Data," *Journal of Human Resources* 34(3): 504–533.

Couch, K., and D. Lillard. 1998. "Sample Selection Rules and the Intergenerational Correlation of Earnings," *Labour Economics* 5: 313–329.

Couch, K. and D. Lillard. 2004. "Non-linear patterns of intergenerational mobility in Germany and the United States" Chapter 8 in Corak, M. ed. *Generational Mobility in North America and Europe*. Cambridge: Cambridge U. Press.

Eide, E. and M. Showalter. 1999. "Factors affecting the transmission of earnings across generations: A quantile regression approach" *Journal of Human Resources* 34: 253-267.

Erikson, R. J. Goldthorpe and L. Portocarero. 1979. "Intergenerational Class Mobility in Three Western European Societies" *British Journal of Sociology* 30 (4):415-441.

Erikson, R. and J. Goldthorpe. 1987a. "Commonality and Variation in Social Fluidity in Industrial Nations. Part I: A Model for Evaluating the FJH Hypothesis" *European Sociological Review* 3 (2): 54-77.

Erikson, R. and J. Goldthorpe. 1987b. "Commonality and Variation in Social Fluidity in Industrial Nations. Part II: The Model of Core Social Fluidity Applied" *European Sociological Review* 3 (2): 145-166.

Erikson, R. and J. Goldthorpe. 1992. *The Constant Flux: A Study of Class Mobility in Industrial Societies* Oxford: Clarendon Press.

Ermisch, J., M. Francesconi, and T. Siedler. 2006. "Intergenerational Mobility and Marital Sorting." *Economic Journal* 116:659–79.

Featherman, D. and R. Hauser. 1978. *Opportunity and Change* NY: Academic Press.

Fertig**,** A. 2003. "Trends in Intergenerational Earnings Mobility in the U.S.," *Journal of Income Distribution*, 12: 108-130.

Friedman, M., 1957. *A Theory of the Consumption Function*. Princeton University Press, Princeton.

Galiani, S. 2010. "Social mobility: What is it and why does it matter" Working Document 101, Centro de Estudios Distributivos, Laborales y Sociales.

Gaviria, A. 2002. "Intergenerational Mobility, Sibling Inequality and Borrowing Constraints," *Economics of Education Review* 2: 331–340.

Goldberger, A. 1989. "Economic and Mechanical Models of Intergenerational Transmission." *American Economic Review* 79 (3): 504-513.

Goldthorpe, J. 2000. *On Sociology: Numbers, Narratives and the Integration of Research and Theory*. Oxford: Oxford University Press.

Goodman, L. and M. Hout. 1998. "Statistical Methods and Graphical Displays for Analyzing How the Association Between Two Qualitative Variables Differs Among Countries, Among Groups or Over Time: A Modified Regression-Type Approach." *Sociological Methodology* 28, pp. 175-230.

Grawe, N. 2006. "Lifecycle bias in estimates of intergenerational earnings persistence". *Labour Economics* 13:551–570.

Grawe, N. 2004. "Intergenerational Mobility for Whom? The Experience of High- and Low-Earnings Sons in International Perspective‖ chapter 4 in Corak M, ed. *Generational Income Mobility in North America and Europe*. Cambridge: Cambridge University Press.

Grusky, D. and T. DiPrete. 1990. "Recent Trends in the Process of Stratification." *Demography* 27: 617-37.

Grusky, D., and K. Weeden. 2006. "Does the Sociological Approach to Studying Social Mobility Have a Future?" Chap. 4 in *Mobility and Inequality*, edited by S. Morgan, D. Grusky, and G. Fields. Stanford, Calif.: Stanford University Press.

Grusky, D., and K. Weeden. 2008. “Are There Social Classes? A Framework for Testing Sociology’s Favorite Concept.” Chap. 2 in *Social Class: How Does It Work?* edited by A. Lareau and D. Conley. New York: Russell Sage.

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

Hauser, R. 1978. “A Structural Model of the Mobility Table” *Social Forces* 56 (3): 919-953.

Hauser, R. 2010. “Intergenerational Economic Mobility in the United States: Measures, Differentials, and Trends”, Working Paper 98–12 University of Wisconsin-Madison Center for Demography and Ecology.

Hauser, R. J. Koffel, H. Travis and P. Dickinson. 1975a. “Temporal Changes in Occupational Mobility: Evidence for Men in the United States” *American Sociological Review* 40 (3): 279-297.

Hauser, P. Dickinson, R H. Travis and J. Koffel. 1975b. “Structural Changes in Occupational Mobility among Men in the United States” *American Sociological Review* 40 (5): 585-598.

Hauser, R. and J. Warren. 1997. “Socioeconomic Indexes for Occupations: A Review, Update and Critique” in A. Raftery ed. *Sociological Methodology* Vol. 27. San Francisco, Jossey-Bass.

Hauser, R., J. Sheridan, and J.R. Warren. 1999. "Socioeconomic achievements of siblings in the life course: New findings from the Wisconsin Longitudinal Study" *Research on Aging* 21:338-378.

Hauser, R., J.R. Warren, M. H. Huang, and W. Carter. 2000. "Occupational Status, Education, and Social Mobility in the Meritocracy." Pp. 179-229 in *Meritocracy and Economic Inequality*, edited by K. Arrow, S. Bowles, and S. Durlauf. Princeton: Princeton University Press.

Hodge, R. 1966. “Occupational mobility as a probability process”. *Demography* 3: 19–34.

Hout, M. 1983. *Mobility Tables*. Beverly Hills CA: Sage.

Hout, M. 1988. “More Universalism, Less Structural Mobility: The American Occupational Structure in the 1980s” *American Journal of Sociology* 93(6): 1358-1400.

Hout, M. 1989. *Following in Father’s Footsteps*. Cambridge, Mass: Harvard U. Press.

Hout, M. and R. Hauser. 1992. "Symmetry and Hierarchy in Social Mobility: A Methodological Analysis of the CASMIN Model of Class Mobility". *European Sociological Review* 8 (3): 239-265.

Hout, M. and T. DiPrete. 2006. “What have we learned: RC28’s contribution to knowledge about social stratification” *Research in Social Stratification and Mobility* 24: 1-20.

Ichino, A., L. Karabarbounis, and E. Moretti. 2011. “The political economy of intergenerational income mobility” *Economic Inquiry* 49(1): 47-69.

Ishida, H., W. Muller and J. Ridge. 1995. “Class Origin, Class Destination, and Education: A Cross-National Study of Ten Industrial Nations” *American Journal of Sociology* 101(1): 145-93.

Jantti, M. et al. 2006. “American exceptionalism in a new light: A comparison of intergenerational earnings mobility in the Nordic countries, the United Kingdom and the United States” Discussion Paper 1938, IZA, Bonn, January 2006.

Jenkins, S. 1987. "Snapshots versus Movies: 'Lifecycle Biases' and the Estimation of Intergenerational Earnings Inheritance," *European Economic Review* 31: 1149–1158.

Jonsson, J., D. Grusky, M. Di Carlo, R. Pollak, and M. Brinton. 2009. "Microclass Mobility: Social Reproduction in Four Countries" *American Journal of Sociology* 114(4): 977–1036

Lee, C. and G. Solon. 2009. "Trends in Intergenerational Income Mobility" *The Review of Economics and Statistics* 91(4): 766–772.

Levine, D., and B. Mazumder. 2002. "Choosing the Right Parents: Changes in the Intergenerational Transmission of Inequality between 1980 and the Early 1990s." Federal Reserve Bank of Chicago Working Paper 2002-08.

Mayer, S. and L. Lopoo. 2004. "What do trends in the intergenerational economic

mobility of sons and daughters in the United States mean" in Corak, M. ed. *Generational Income Mobility in North America and Europe.* Cambridge: Cambridge University Press, 2004.

Mayer, S., and L. Lopoo. 2005. "Has the Intergenerational Transmission of Economic Status Changed?" *Journal of Human Resources* 40 (1): 169–85.

Mayer, S. and L. Lopoo. 2008. "Government spending and intergenerational mobility" *Journal of Public Economics* 92: 139-158.

Mazumder, B. 2005a. "Fortunate sons: New estimates of intergenerational mobility in the United States using Social Security data" *Review of Economics and Statistics* 87(2): 235-55.

Mazumder, B. 2005b. "The apple falls closer to the tree than we thought: New and revised estimates of the intergenerational inheritance of earnings" in Bowles, S., Gintis, H. and Osborne-Groves M. eds. *Unequal Chances.* New York: Russell Sage.

Mazumder, B. 2008. "Sibling similarities and economic inequality in the US" *Journal of Population Economics* 21: 685-701.

Mulligan, C. 1997. *Parental Priorities and Economic Inequality* (Chicago: University of Chicago Press.

Mulligan, C. 1999. "Galton versus the Human Capital Approach to Inheritance" *Journal of Political Economy* 107(6): S184-S224.

Oreopoulos, P. 2003. "The long-run consequences of growing up in a poor neighborhood" *Quarterly Journal of Economics* 118:1533-1575.

Peters, E. 1992, "Patterns of Intergenerational Mobility in Income and Earnings" *Review of Economics and Statistics* 74: 456–466.

Raaum, O., K. Salvanes and E. Sorensen. 2006. "The neighborhood is not what it used to be" *Economic Journal* 116: 200-22.

Sewell, W. and R. Hauser. 1975. *Education, Occupation,* and *Earnings: Achievement in the Early Career.* New York: Academic Press.

Sewell, W., A. Haller and A. Portes. 1969. "The educational and early occupational attainment process". *American Sociological Review* 34(1): 82-92.

Solon, G. 1992 “Intergenerational Income Mobility in the United States,” *American Economic Review* 82: 393–408

Solon, G. 1999. “Intergenerational Mobility in the Labor Market,” in Orley C. Ashenfalter and D. Card (Eds.), *Handbook of Labor Economics,* Vol. 3A, Amsterdam: Elsevier North Holland.

Solon, G. 2002. "Cross-Country Differences in Intergenerational Earnings Mobility." *The Journal of Economic Perspectives*, 16(3): 59-66.

Solon, G. 2004. "A Model of Intergenerational Mobility Variation over Time and Place" Corak, M. ed. *Generational Income Mobility in North America and Europe,* pp. 38-47 Cambridge: Cambridge University Press.

Solon, G., M. Corcoran, R. Gordon, and D. Laren. 1991. “A Longitudinal Analysis of Sibling Correlations in Economic Status,” *Journal of Human Resources* 26 (3): 509–534.

Solon, G., M. Page, and G. Duncan. 2000. “Correlations between neighboring children in their subsequent educational attainment” *Review of Economics and Statistics* 82/3: 383-92.

Sorensen, A. 1994. “Women, Family and Class.” *Annual Review of Sociology* 20:27–47.

Torche, F. 2011. "Is a College Degree Still the Great Equalizer? Intergenerational Mobility across Levels of Schooling in the US" *American Journal of Sociology 117(3): 763-807.*

Torche, F. 2013. “Education and the intergenerational transmission of advantage in the US” paper presented at the Spring meeting of the RC28 International Sociological Association, Trento Italy.

Warren, J.R., J. Sheridan, and R. Hauser. 1998. "Choosing a Measure of Occupational Standing: How Useful Are Composite Measures in Analyses of Gender Inequality in Occupational Attainment?" *Sociological Methods and Research* 27:3-76.

Warren, J.R., R. Hauser, and J. Sheridan. 2002. "Occupational Stratification across the Life Course: Evidence from the Wisconsin Longitudinal Study" *American Sociological Review* 67:323-346.

Weeden, K. and D. Grusky. 2005. “The case for a new class map” *American Journal of Sociology* 111(1): 141–212.

Xie, Y. 1992. “The Log-Multiplicative Layer Effect Model for Comparing Mobility Tables” *American Sociological Review*, 57 (3): 380-395.

Zimmerman, D. 1992. “Regression toward Mediocrity in Economic Stature” *American Economic Review* 82: 409–429.