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INTERGENERATIONAL MOBILITY

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ABSTRACT

This essay reviews the theory and empirics of intergenerational mobility. Our review draws on models and empirical analyses of classic and more recent work from both economics and sociology. We summarize models and the surrounding empirical evidence of two key sets of mechanisms: family factors (income, education, credit constraints, household composition, and genes) and social factors (schools, neighborhood sorting, racial segregation, and peer and role model effects). We then discuss and evaluate current methods used to measure intergenerational mobility, including linear regressions and Markov chains. Theoretical models imply nonlinear relationships between parent and child status that are often ignored in practice and offer potentially different interpretations of the evidence of heterogeneity in mobility across locations, groups, and time. We conclude that the next generation of studies would benefit from a closer integration of theory with empirics.

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I. Introduction

Intergenerational mobility refers to the relationship between the socioeconomic status of parents and that of children. It lies at the heart of equality of opportunity (Roemer (1998)). In this article, we survey basic ideas largely from the vantage point of the United States.

Studies of intergenerational mobility, whether theoretical or empirical, involve the construction of a stochastic process with conditional probabilities

$$f\left(Y_{io} \middle| Y_{ip}\right) \tag{1}$$

where Y_{io} is an outcome of offspring o of family dynasty i and Y_{ip} is an outcome of parent p. The main outcome of interest among economists has generally been income while sociologists have traditionally focused on occupation.

Theories of intergenerational mobility reason from mechanisms that link parental and offspring status to produce (1). The measurement of intergenerational mobility involves constructing statistics derived from (1). We begin by surveying theories on the mechanisms determining mobility to help guide how to measure it and critically interpret the growing body of empirical evidence.

II. Mechanisms

Formal models of intergenerational mobility have explored a range of mechanisms underlying (1) that explain why the status of parents affects that of children. These mechanisms may be divided into family and social factors.

A. Family models

Family factors that affect child socioeconomic status include financial investments, family attributes (education, household composition), and genetics.

Becker and Tomes (1979) and Loury (1981) are classic analyses that emphasize the role of parental income and wealth in determining human capital investments in children. The key idea in these papers is that parents are limited in their ability to borrow in order to finance investment in their children. As a result, investments in children are limited by parental resources, inducing a functional relationship between the incomes of parents and children. The effects of borrowing constraints on the statistical relationship between parent and offspring income has been explored by Han and Mulligan (2001).

Much evidence exists on the importance of family resources for child educational outcomes, which is the key relationship in family investment models. Among recent studies that utilize quasi-experimental variation, Dahl and Lochner (2012) find a $1,000 increase in family income induced by changes to the Earned Income Tax Credit schedule

raised child math and reading achievement scores by 0.04 standard deviations. Akee et al. (2010, 2018) find evidence suggesting unconditional cash transfers increase educational attainment and socioemotional skills among the poor.

Recent work in social science has emphasized that labor market success depends on a broad vector of cognitive skills and personality traits (Heckman et al. (2006)). These skills are influenced by parental characteristics as well as investments. Becker et al. (2018) modify the classic family investment models to allow parental education and investments to be complementary inputs, which means that the marginal impact of each dollar of investment in a child increases in parental education (Cunha and Heckman (2007)). When this is so, heterogeneity in parental education can increase intergenerational persistence as parental education both effects the level of investments (since parental income depends on it) and their efficacy. The skills literature has also emphasized the timing of investments during childhood and adolescence and the ways that investments interact between ages. Carneiro et al. (2021) find that, conditional on a fixed level of level of permanent income, parental income received in early or later childhood produce relatively large gains in child outcomes, consistent with evidence from dynamic complementarities of investments and credit constraints. See Heckman and Mosso (2014) for further discussion.

Differences in household composition exacerbate gaps in resources across socioeconomic classes. McLanahan (2004) and Cherlin (2014) document the destabilization of two-parent married households in the United States while Eika et al. (2019) measure the contribution of educational assortative mating toward household income inequality across the developed world.

The models we have described treat the genotypes of individuals as latent variables. The idea that genetics can explain persistence is an old and controversial one, appearing, for example in Sorokin (1927). Black et al. (2020) is a recent empirical study that uses adoption data to see whether environment or genotype matters more for children; they find that genotype plays a greater predictive role in education persistence than wealth persistence. However, there is no consensus on the overall magnitude of genetics' role in intergenerational mobility. The reason is that there exist deep identification problems in distinguishing the effects of genes versus family and social inputs. Goldberger (1979) is the classic critique of the use of twins studies to measure nature versus nurture. General identification problems involving individual versus social influences are surveyed in Blume et al. (2011) and naturally arise for the problem of identifying genetic influences (see also Belsky et al. (2018)).

B. Social models

Social models of intergenerational mobility treat the empirical relationship between parent and child incomes as derivative from the ways that parental resources help determine the social environment in which children develop, in particular schools and neighborhoods. The key idea in these models is that schools and neighborhoods exhibit income segregation as parents seek to have more affluent neighbors. Why are these incentives

present? One reason involves local public finance of schools. A second reason involves social interactions. Disparities in crime rates, role models, and physical environment all matter for educational attainment; hence, the extent to which more affluent neighborhoods have fewer social problems, the greater the incentives to live in those neighborhoods. Family income predicts offspring income because it predicts the social milieu in which a child develops.

Since poorer parents have incentives to move to better neighborhoods and school districts, a core ingredient of social models is a mechanism for income segregation between the affluent and poor to persist as an equilibrium. Answers to this persistence involve housing prices, zoning restrictions, and some combination of discrimination and an aversion to isolation; Bénabou (1996a) is especially clear on the role of prices. Durlauf (1996a,b) develops the basic theory linking neighborhood formation, social determination of education and intergenerational mobility dynamics. Fogli and Guerrieri (2019) is the most successful demonstration of the empirical power of this approach; see also Durlauf and Seshadri (2018) for discussion of general evidence. The dynamic equity and efficiency effects of segregation are studied in Bénabou (1996b). Richer models of the political economy of neighborhood formation and schools such as Fernandez and Rogerson (1996,1997), and Epple and Romano (1998) need to be integrated into mobility models to improve empirical verisimilitude. Reardon and Bischoff (2011) document how increasing cross-sectional income inequality is associated with increasing income segregation, validating a key feature of these models.

One deep issue in studies of social influences is that social measures such as per capita income are treated as measures of social influences as opposed to measures which embed behaviorally relevant social influences (e.g., role model effects). The failure to distinguish the two has limited the ability to interpret social predictors as social mechanisms. Future research can benefit from treating social measures and social influences through a measurement system, cf. Schennach (2021). One area of progress involves understanding the relationship between neighborhood effects and school effects. Wodtke et al. (2020) find that there appears to be no interaction between the predictive power of neighborhood characteristics and school quality in student outcomes, in the sense that better schools do not mitigate adverse neighborhood effects.

Chetty and Hendren (2018a,b) are very influential recent studies of neighborhood effects on offspring income, exploiting rich IRS administrative data. Wodtke et al. (2016) is an especially important recent study that finds complementarity between neighborhood quality and parental investment, i.e. that parental income interacts positively with neighborhood quality. This is important as it suggests that, empirically, parental income is not compensating for neighborhood quality in predicting student outcomes.

There is much evidence of the mechanisms underlying neighborhood effects. Manduca and Sampson (2019) show how exposure to the triple harms of violence, incarceration and lead lower mobility. With respect to school spending, Jackson et al. (2016) exploit the timing of court-ordered school finance reforms to estimate wage-to-per pupil spending elasticity of 0.7. Johnson and Jackson (2019) extend this evidence to find dynamic

complementarity between public school expenditure and Head Start. This work differs from the previous generation's work on school spending and educational outcomes, which often found little relation, benefitting from quasi-experimental changes in spending. Broader conclusions follow from Raudenbush and Eschmann (2015) that school inequality between rich and poor substantially limits what education could do to overcome family disparities.

A number of policy levers attempt to engage in what Durlauf (1996c) called "associative redistribution," such as busing (Billings et al. (2014)), school attendance boundaries (Bjerre-Nielsen and Gandil (2020)), and public housing (Chyn (2018)) and provide quasi-experimental evidence on how neighborhoods matter. Chetty et al.'s (2016) re-analysis of the Moving to Opportunity experiment finds that moves to higher quality neighborhoods induced by housing vouchers increase child income for children who move at early ages. In practice, however, these policies may be ineffective at scale due to behavioral responses of neighbors. Social interaction models of neighborhood segregation developed by Schelling (1971) predict "tipping points"—specific thresholds of the share of a minority group in a neighborhood that cause the majority group to precipitiously exit the neighborhood—a phenomenon that is borne out in the data (Card et al. (2008), Caetano and Maheshri (2013)).

The Schelling model demonstrates the importance of considering how demographic attributes generate social stratification in ethnically diverse countries like the United States. Surprisingly, there is no formal work that fully integrates race as well as income into social intergenerational mobility models. It is understood, since Massey and Denton (1993), that racial segregation of schools is not an epiphenomenon of income segregation. Aliprantis et al. (2021) is a recent study that indicates how factors outside of income explain segregation patterns. The consideration of residential segregation by race leads to complex questions of intergroup and intragroup influences, i.e. discrimination and social capital. Loury (1977) early argued that intergenerational mobility of African Americans could be permanently impeded by the absence of social capital due to the history of discrimination.

Occupational mobility models in sociology, of which the Wisconsin Status Attainment Model (Sewell et al. (1969), Sewell and Hauser (1975)) is the most prominent, have a different structure from those in economics as they do not follow from the logic of specifying preferences, constraints, beliefs and the markets, institutions, and the like that determine outcomes. Rather the models consider the factors that jointly determine educational outcomes. In this framework, ability, socioeconomic status, and social influences have direct effects as well as effects mediated by educational and occupational aspirations. Social influences appear via peer effects and the effects of teachers and other authority figures on aspirations. As such the model is predicated on a rich collection of microfoundations for correlations between parents and children. Integration with the choice base logic of economics is a natural next research direction.

III. Measurement

A. Empirical models

Much contemporary social science research has focused on the measurement of intergenerational persistence. This work largely involves linear regressions for income dynamics and Markov chain methods for occupations. There is a small literature on Markov chain and nonlinear dynamic models for income.

Most income mobility studies focus on linear regression specifications of (1) that link offspring income Y_{io} to parental income Y_{ip} via

$$Y_{io} = \alpha + \beta Y_{ip} + \varepsilon_{io} \tag{2}$$

When income is expressed in logarithms, β is known at the intergenerational elasticity (IGE) of income; estimates range from 0.3. (Chetty et al. (2014)) to 0.4 (Lee and Solon (2009)) to 0.6 (Mazumder (2005)) in the current literature. Much debate surrounds the proper way of estimating the IGE; see, e.g., Mitnik and Grusky (2020) on whether the logarithm of average income during adulthood is appropriate, and how to interpret cases where zero income is reported.

From the perspective of theories of intergenerational mobility, model (2) is a very special case. Each of the theories we have described suggests that, generically, the relationship between parental and offspring outcomes is nonlinear and depends not just on income but other variables X_i,

$$Y_{io} = f\left(Y_{ip}, X_i, \varepsilon_{io}\right). \tag{3}$$

For the special case $f\left(Y_{ip}\right) + \varepsilon_{io}$, (3) becomes a nonlinear family investment income transmission model and can capture both credit constraints and the types of preferences and production functions that produce nonlinear returns to investments; as shown by Solon (2004), (2) derives from the family investment model only under special assumptions. If $X_i = H_{ip}$, parental education, then one captures the Becker et al. (2018) model of parental education/investment interactions. If $X_i = S_{in}$, social measurements for the neighborhood in which a child grows up (per capita school expenditures, educational and occupation distribution among adults, crime, etc.), one has the social models of Durlauf, Bénabou, and Fogli and Guerrieri. From the vantage point of the general theory, (2) is an approximation to a deeper structural model and so estimates of β will vary according to the nature of the approximation.

The move to nonlinear models has important implications for how one thinks about mobility. Linear models cannot generate poverty traps or affluence traps. In contrast, family investment models can produce both if there are parental income thresholds that must be exceeded for children to, for example, attain higher education. Social models can

generate multiple equilibria of educational attainment of children within a generation, due to social interdependences, as well as traps as families are segregated across generations. Bernard and Durlauf (1996) show how linear statistical models can hide the presence of such phenomena even when present in the data.

Surprisingly there is relatively little empirical worked based on (3) versus (2). Further, the evidence of nonlinearity is in fact mixed; see the survey by Jäntti and Jenkins (2015). One reason may be that nonlinear analyses have not targeted the sorts of nonlinearities defined by theory. Han and Mulligan (2001) find nonlinearities consistent with credit constraints for lower incomes and Durlauf et al. (2017) find nonlinearities consistent with certain steady state models, suggesting the possibility of both poverty traps and affluence traps. Both examples engage in theoretically motivated searches for nonlinearity.

Occupational mobility studies have a venerable history in sociology; Blau and Duncan (1967), Duncan et al. (1972), and Featherman and Hauser (1977) and Featherman and Hauser (1978) are four remarkable book length treatments that define the modern approach to intra and intergenerational mobility. Rich evidence on persistence has long been documented. Occupational mobility analysis raises interest measurement questions on whether occupations should aggregate to produce social classes such as white collar, blue collar, and manual. Jonsson et al. (2009) argue that much is missed from this aggregation, and that occupations themselves should be treated as "microclasses" in mobility studies. Much work on mobility has attempted to employ occupational attributes to produce measures of occupational prestige or status; Hauser and Warren (1997) discuss conceptual issues.

B. Heterogeneity

In the past two decades, the empirical literature has uncovered large degrees of heterogeneity in mobility across geographies, demographic groups, and time.

Cross-country studies of intergenerational mobility have revealed a positive association between levels of immobility and levels of cross-sectional inequality (Corak (2013)). This has been dubbed the "Great Gatsby Curve" and has been the subject of much discussion; see Durlauf et al. (2021) for an overview. Each of the theoretical models of mobility we have described can generate a causal relationship between greater inequality and lower mobility within a given country. For example, if one links the Bischoff and Reardon findings that income inequality begets income segregation with Durlauf's models of socially-determined intergenerational mobility, an intertemporal Gatsby curve for the United States is produced; see Durlauf and Seshadri (2018).

Another literature has documented substantial spatial heterogeneity in IGEs across neighborhoods within countries; see Chetty et al. (2014) for an analysis of the United States. These studies involve indexing the (α, β) parameters of (2) by n denoting different neighborhoods. While variance in β_n is commonly interpreted as neighborhood effects in intergenerational mobility, the social models we discussed emphasize that the index

n also captures family background due to neighborhood sorting. Cholli et al. (2021) consider variants of (3) to assess the relative importance of family and social factors in generating β_n heterogeneity.

Finally, intergenerational mobility models have addressed issues of racial inequality. Duncan (1962) is a classic study of occupational mobility, demonstrating how upper white collar African American parents were unable to lock in white collar occupations for their children, while whites were. Hout (1984) shows how these disparities have attenuated. Bhattacharya and Mazumder (2011) and Chetty et al. (2020) show how relative income status mobility differs dramatically by race with much less upward mobility among blacks than whites. Collins and Wanamaker (2021) show these differences have been present for nearly 150 years.

Group differences in mobility suggest how the conventional measure β in linear models is flawed. Consider the Duncan finding on Black-white occupational mobility. His work found, in essence, that Black parental occupation did not predict offspring occupation. By the standard that mobility is highest when predictability is lowest, African Americans were very mobile. But this treats upward and downward mobility symmetrically, which makes little normative sense. Put differently, the intercept in (2) matters, and if it is lower for Blacks than for whites, this generates group-level immobility. Dardanoni (1993) discusses links between statistical measures and measures that account for social welfare. In his treatment of ranking Markov matrices, he notes the importance of distinguishing between exchange mobility, where individuals move across a fixed distribution of income or occupational levels in the population, and structural mobility, where individuals' status changes due to changes in the population distribution. Fields and Ok (1996) use an axiomatic approach to derive a scalar index of income mobility that is decomposable along these two dimensions; Cowell and Flachaire (2018) extend this by developing classes of mobility indices that can accommodate cardinal and relative measures of individual status such as income levels or ordinal ranks.

The structural/exchange distinction is a longstanding one in sociology (cf. Berger and Snell (1957)) and relates to concerns about the differences between in characterizing mobility in steady state economies versus those in transition. Increased accessibility to historical datasets has spawned a growing literature that explores this heterogeneity in mobility over time. Song et al. (2020) and Karlson and Landersø (2021) document how historical income and educational mobility were sensitive to industrialization and schooling policies affecting the rural United States and Denmark. A separate time dimension concerns the number of generations. While the vast majority of studies are limited to two generations of data, Song (2020) demonstrates how an integrated demography-mobility model can explain long-run mobility within multigenerational family dynasties.

IV. Conclusion

The advent of rich data sources has produced a 21st century explosion of empirical studies on intergenerational mobility. Administrative data have led to new mobility measurements and quasi-experimental methods have helped identify distinct roles for family and social factors. Many theoretical advances in the study of mobility occurred in the final decades of the 20th century. So it is surprising that a disconnect remains between theory and empirics. Phenomena such as poverty and affluence traps are typically not properties of the empirical models estimated. Empirical studies typically reify observable controls as mechanisms. We believe future progress requires a closer integration of theory and empirics. One key value to this integration will be the development theoretically rigorous decompositions of intergenerational persistence into different factors; a pioneering early example of empirical work of this type is Bowles and Gintis (2002). This integration will also permit multidimensional analyses of mobility that study the coevolution of education, occupation and income, one which fully combines the complementary ideas in the economic and sociological approaches.

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