

## CHAPTER 13

# Demography of Social Stratification

ARTHUR SAKAMOTO  
AND  
DANIEL A. POWERS

## INTRODUCTION

Issues pertaining to social stratification are increasingly considered in demographic research. In recent studies of morbidity and mortality, for example, education, income, and occupation typically have substantially large net effects (e.g., Cambois, Robine, and Hayward 2001; Duleep 1989; Gortmaker and Wise 1997; Johnson, Sorlie, and Backlund 1999; Mare 1990; Rogers 1992; Ross and Mirowsky 1999; Ross and Wu 1995).<sup>1</sup> Similarly, studies of fertility frequently refer to education and other variables pertaining to social class (e.g., Li and Choe 1997; Kohler, Behrman, and Watkins 2001; Powers and Hsueh 1997)—or at least to socioeconomic considerations involved in labor force participation, child-care costs, and economic opportunity costs (e.g., Blau and Robins 1989; Borg 1989). Socioeconomic motives and consequences are also important issues in demographic research on immigration and migration (e.g., Boyle et al. 2001; Oropesa and Landale 2000; Reed 2001).

A recent presidential address to the Population Association of America focused provocatively on socioeconomic inequality and concomitant social problems (Massey 1996). The address was published in *Demography* along with the commentaries of noted experts in the demography of social stratification (Danziger 1996; Farley 1996; Hout,

<sup>1</sup> Needless to say, life expectancy and health tend to be better for persons with higher socioeconomic status. An unusual exception to this general pattern, however, is evident for the military deaths among the North Vietnamese during the American military involvement in Vietnam between 1965 and 1975 (Merli 2000).

Arum, and Voss 1996). A recent editor of *Demography* is a specialist in the study of social stratification, as was another recent editor.<sup>2</sup> Papers on social stratification topics are now commonly published in *Demography*, including studies on income inequality (e.g., Chevan and Stokes 2000; Deaton and Paxson 1997; Karoly and Burtless 1995), economic and social mobility (e.g., Duncan, Boisjoly, and Smeeding 1996; Duleep and Regets 1997; Gittleman and Joyce 1999), poverty (e.g., Bauman 1999; Guo and Harris 2000; Iceland 1997, 2003), educational attainment (e.g., Hannum 2002; Hirschman 2001; Pribesh and Downey 1999), occupational attainment (e.g., Grusky and DiPrete 1990; Hannum and Xie 1998), and occupational gender segregation (e.g., Weeden 1998; Grusky and Charles 1998).

Increasing attention to the demography of social stratification is evident in the articles published in *Demography*, *Population Studies*, and *International Migration Review* during the past few decades. In these journals from 1964 to 1978, only six articles were published that included in their titles "social mobility," "poverty," "stratification" or "inequality." In the subsequent 15 years, from 1979 to 1993, these journals published 26 articles that included those terms in their titles. In the seven years from 1994 through 2000, 36 such articles were published by these journals. Thus, these results show that during the last seven-year period, six times as many articles were published on the demography of social stratification as were published during the 15-year period from 1964 to 1978.

Given this increased interest, a review and assessment of the current state of the demography of social stratification is needed. In the following section we discuss the definition and scope of this field and consider its linkages with other areas. We then review major research strands in the demography of social stratification and highlight some notable contributions. We conclude by pointing out some topics for future research.

## SUBSTANTIVE AND THEORETICAL ISSUES

### Definition and Scope

Although topics relating to social stratification seem to have always been accepted as pertinent to modern demography, formal statements of its scope usually do not refer explicitly to socioeconomic inequalities as a specific aspect of population composition. Shryock and Siegel (1976: 1) define demography in its "broader sense" to include the study of the "social characteristics and economic characteristics" of populations but do not mention social inequality or stratification per se. Hauser and Duncan (1959: 31) do recognize "social mobility" as a fundamental population process, but they use that term very loosely to refer to the change in any status variable (e.g., "from 'single' to 'married' with respect to marital status"). While Hauser and Duncan's definition of the scope of demography is clearly meant to be broad enough to include the study of socioeconomic inequalities, the latter are nonetheless not explicitly referred to or identified.

In recent years, demographic research has shown greater overlap with related disciplines. More elaborate theoretical arguments have been developed, and increasingly

<sup>2</sup> We refer to Daniel T. Lichter and Robert D. Mare, respectively.

complex data and statistical models have been used (Crimmins 1993). As mentioned above, demographic research now routinely considers topics and variables that pertain to social stratification. At this stage, there is an obvious need to clearly define the scope of the demography of social stratification. Providing a definition of this field is expedient not only for theoretical clarity, but also because the vast number of studies on the subject of social inequality requires that we delineate our consideration of this literature.

The core of demography is the study of the size and territorial distribution of populations that depend on the components of the demographic equation: fertility, mortality, and migration. Associated with this core is the study of population composition, which refers to the characteristics of people that are related to fertility, mortality, and migration. Population composition is typically thought to include sex and age structure, racial and ethnic characteristics, patterns of health and morbidity, marital characteristics, family structure, the distributions of nativity and citizenship statuses, educational attainments, and labor force characteristics, but social inequalities can also be explicitly included as a relevant feature of population composition. Demography can thus be defined as the scientific study of the core demographic components (i.e., fertility, mortality, and migration) and of related aspects of population composition.

Social stratification can be defined as the study of socioeconomic inequality and mobility. As noted by Otis Dudley Duncan, one of the pioneers of the demography of social stratification, inequality can be defined as “the dispersion of the distribution over a population of any of the rewards and status distinctions conferred by a society on its members—such as income, wealth, level of living, leisure, prestige, recognition, power, authority, skill, information, civil liberties, welfare, or life chances” (Duncan 1969: 361). Understanding and investigating the sources of the dispersion of these scarce social and economic resources is an important task for the field of social stratification.

Although Duncan preferred the term *opportunity*, mobility can be defined as “the probability of finding one’s self at a high, medium, or low position on any of the scales of status or reward just mentioned” (Duncan 1969: 361). As is commonly distinguished, *intragenerational mobility* refers to changes in one’s status position during one’s lifetime, while *intergenerational mobility* refers to differences in status positions between the generations of a family. With regard to the latter, the associations between parents’ and offspring’s statuses are the most highly investigated (e.g., Blau and Duncan 1967; Featherman and Hauser 1978; Hauser and Featherman 1977), although there have been a few interesting studies of relationships between offspring and grandparents’ generations (Warren and Hauser 1997; Alba, Lutz, and Vesselinov 2001; Borjas 2001).<sup>3</sup> Whatever the reference points used, however, the study of mobility in terms of the attainments and changes in socioeconomic status is a central concern for the field of social stratification.<sup>4</sup>

The demography of social stratification may thus be defined as the study of how fertility, mortality, migration, and related aspects of population composition affect and

<sup>3</sup> As noted by Mare (2001: 479), “the association between the socioeconomic characteristics of parents and offspring is just one out of a large number of possible socioeconomic associations between pairs of kin, which include siblings, spouses, individuals and their parents-in-law, parents and parents-in-law, cousins, and grandparents and grandchildren.”

<sup>4</sup> In contrast to Duncan (1969), we do not focus primarily on intergenerational mobility. Furthermore, we use the term stratification more broadly than he does. Duncan (1969: 361) defines it as referring to a low level of intergenerational mobility.

are affected by inequality and mobility. That is, this field can be defined as the study of both the causes and consequences of demographic variables in terms of the degree of dispersion in the distributions of socioeconomic rewards as well as the attainments and changes in the positions of individuals and their kin in these distributions. Not only do social stratification processes often help to explain or to predict the sorts of outcomes in which demographers have traditionally been interested, but demographic factors can also have major consequences for social stratification.

### Methodological Orientation

While the foregoing provides a general definition of the demography of social stratification, perhaps equally important in delineating this field is its methodological orientation. First and foremost, demographic research typically places a high priority on objective measurement and empirical data analysis involving the scientific use of statistics or mathematics; the methodology for the demography of social stratification usually involves the quantitative analysis of empirical data. Many of the classic demographic studies of social stratification (e.g., Blau and Duncan 1967; Featherman and Hauser 1978) are noted for their methodological rigor, whereas other studies that are more theoretical in orientation (or less rigorous methodologically) are less likely to be considered demographic research, even though they may be concerned with similar substantive issues (e.g., Lipset and Bendix 1964).

The empirical and quantitative nature of demographic analysis represents an exceedingly important approach for the study of social stratification. Social inequality and mobility are topics that often elicit or relate to fundamental political beliefs, social values, moral principles, philosophical views, and even emotional responses. Demographic research is important for the study of social stratification because some disciplined, scientific empiricism is needed to help elucidate the relevant empirical facts that might otherwise become obscured by political passions and ideologies.<sup>5</sup>

The empiricism of demographic analysis also plays an important role in the study of social stratification because empiricism serves as a countervailing force against the tendencies of many explanations of inequality to emphasize unobserved variables. For example, in explaining various aspects of inequality, economists often refer to processes in which individuals are assumed to “maximize utility” and employers are said to pay hourly wages according to “marginal revenue products,” although typically these concepts are not measured directly (e.g., Mansfield 1979). Marxist sociological discussions emphasize “exploitation” (e.g., Wright 2000), yet their data analyses are devoid of any actual empirical measure of it. In short, many theories of social stratification often involve unobservable variables, and the empiricism of demographic analysis plays an important countervailing role in clarifying what is known about the actual empirical facts pertaining to social stratification.

In addition to the priority placed on the study of empirical data, demographic analysis often investigates entry and exit processes or other mobility processes that may be time-dependent. This analytical perspective derives from the demographic equation

<sup>5</sup> Perhaps this point is indirectly evident in Duncan's (1969: 363) comment about the interpretation of regression coefficients in a status attainment model: “Analysts who are intolerant of ambiguity may join the ideologists, for whom questions have clear and decisive answers.”

## Demography of Social Stratification

387

in which fertility, mortality, and migration depend on exposure time and age. The study of entry and exit processes is also central to the mechanics of the life table, which is perhaps the most classic of demographic tools. Although this characteristic is not an absolutely necessary feature of the demography of social stratification, analyses of entry, exit, or other mobility and transition processes are common in this field. Indeed, the study of social mobility per se is sometimes considered virtually synonymous with the demography of social stratification.

In sum, we define the demography of social stratification as the study of how fertility, mortality, migration, and related features of population composition affect and are affected by inequality and mobility. In terms of methodology, the demography of social stratification usually involves the quantitative analysis of empirical data and frequently investigates entry, exit, or other mobility processes. This field is concerned not only with how social stratification variables affect the core demographic components (i.e., fertility, mortality, and migration) but also how these processes and their associated aspects of population composition may in turn have consequences for social inequality and mobility.

## Relation to Other Demographic Topics

Given this definition, portions of each of the chapters for Part I and Part II of this volume are relevant to the demography of social stratification. For example, as discussed by Parker Frisbie (chapter 9), socioeconomic variables have important effects on infant mortality. Rogelio Saenz reviews socioeconomic differentials between racial and ethnic groups (chapter 6). Teresa Sullivan's discusses underemployment and unemployment, which are inherently socioeconomic in nature, in chapter 7, "Labor Free." In addition, social stratification issues may also arise in the intersection between demography and other social sciences (i.e., Part III of this volume).

This chapter focuses primarily on studies that investigate the effects of demographic variables on stratification outcomes (i.e., inequality and mobility). The earlier chapters of this volume should be consulted for discussions of the effects of socioeconomic differentials, inequality, and mobility on the core demographic components of fertility, mortality, and migration.<sup>6</sup> In our review, we do not devote extensive consideration to gender, marriage and the family, or race and ethnicity because there are separate chapters on these aspects of population composition.

## Demography and Mobility

An enduring concern in the study of mobility is the degree to which it is explained or dependent on demographic and ascriptive factors such as age, race, ethnicity, gender, social class, or other family background characteristics.<sup>7</sup> This interest in part derives from sociological theories that postulate an increase in universalism in modern societies

<sup>6</sup> See also Kasarda and Billy (1985) for an excellent summary of the literature on the relationship between social mobility and fertility.

<sup>7</sup> According to Ganzeboom, Treiman, and Ultee (1991: 283–284), the empirical analysis of this issue was promoted by the "second generation" of cross-national research on social stratification.

(e.g., Parsons 1970; Treiman 1970). The norm of universalism dictates that mobility and inequality should depend primarily on achieved factors (e.g., education, training, work experience, technical skills) rather than ascriptive characteristics per se. According to this modernization theory, basing social stratification on achieved factors promotes more rational and efficient social organizations and economic production.

Given this theoretical background, demographic studies of social mobility have frequently been concerned with monitoring temporal trends in social stratification. For example, although Herrnstein and Murray (1994) argue that the net effect of cognitive skills on socioeconomic outcomes has increased in recent decades, Hauser and Huang (1997) find no evidence for this trend in their analysis of a simple measure of verbal ability.<sup>8</sup> In studies of occupational mobility, a long-standing objective of researchers over the decades has been to assess the current trend in the level of intergenerational transmission of occupational status (Blau and Duncan 1967; Featherman and Hauser 1978; Hout 1988; DiPrete and Grusky 1990; Rytina 2000).

Monitoring trends in the net effects of achieved versus ascribed characteristics has also been of major interest in this literature. An illustration of this concern is provided by Sakamoto and associates (1998, 1999, 2000), who find increased net effects of education and decreased net effects of being a racial or ethnic minority on the income and occupational attainment of American men during the latter half of the 20th century. In a somewhat related study, when comparing the intergenerational occupational mobility of African American men before and after the civil rights legislation of the 1960s, Hout (1984) finds a substantial increase in the importance of class of origin during the latter period.

An additional research concern frequently observed in the literature is how much social mobility is structural versus circulation mobility. The basic idea is that structural mobility refers to that which is "forced" due to changes in the distribution of occupations (either intragenerationally or intergenerationally) as reflected by the differences in the marginal distributions of the mobility table. Structural mobility is generally assumed to reflect technological change and economic development. On the other hand, circulation (or "exchange") mobility refers to that which is said to more directly reflect the degree of openness or inherent social fluidity of a society. Circulation mobility is usually defined as that which is net of structural mobility.

### Demography and Inequality

*Empty places* is a popular phrase used by Marxists to emphasize the institutional nature of socioeconomic inequality (Wright 1979: 20). Similarly, among non-Marxist sociologists, "the distinctive approach by sociology to the study of inequality is probably the idea that social structure is somehow relevant for the creation of inequality. . . . this idea is shared by most sociological stratification researchers" (Sørensen 1996: 1334). In short, a central concern of many sociological studies of inequality has been understanding its institutional nature.

<sup>8</sup> In a thorough analysis of data from the Wisconsin Longitudinal Survey, Hauser et al. (2000: 223–225) find that measured mental ability is only one variable among several that have at least equal or greater effects on the occupational attainment of adults in the early 1990s.

While we do not doubt the theoretical significance of the institutional perspective on inequality, an analysis of why some empty places (i.e., jobs) pay higher earnings than others cannot provide a complete accounting of the degree of inequality across units within a population. For example, some people may have two jobs while others may have none so that the degree of earnings inequality among individuals in the population would be much greater than the degree of earnings inequality among the empty places. Or, among families, if spouses' earnings are correlated, then the degree of inequality across families would be much greater than if persons tended to marry spouses whose earnings were uncorrelated with their own. Investigating inequality only among persons with jobs also ignores, as Mare (2001: 478) observes, "the stratification of the large non-working part of the population, including (1) children and teenagers; (2) 'working-age' persons who do not hold jobs because they are homekeepers, caregivers, students, disabled, incarcerated, independently affluent, or simply unable to find work; and (3) retired persons who are past the conventional working age." In sum, although organizations and social institutions certainly do influence the degree of inequality between jobs, the demography of inequality is still important because it analyzes the degree of inequality across units in a population.

Furthermore, the distribution of various population characteristics may influence the degree of inequality across jobs as well. Wages are not permanently fixed across all jobs but instead are often affected by the characteristics of the incumbents of the empty places. The distribution or supply of well-paid jobs may also be affected by population characteristics and processes. As Mare (2001: 485) describes, when a change in the distribution of personal characteristics in the labor force "affects the relative numbers of workers trained for various positions, the relative wages of these skill groups may change and, in turn, change employers' demands for workers of varying types and the resulting job and wage distributions."<sup>9</sup> Thus, demography affects the observed degree of inequality across workers.

## METHODS AND MEASURES

Implicit in the study of attainment and mobility, just as in many areas of demographic research, is *change*. Fundamental demographic concepts and statistical methods have been instrumental in several major lines of inquiry relating to change as applied to social stratification. This section focuses on the demographic underpinnings of some aspects of the methodology for the study of social mobility and attainment.

At the individual level, socioeconomic attainment represents a process of change or a *transition* from one social status—or social origin—to another destination status such as current job.<sup>10</sup> At the aggregate level, interest often focuses on changes in the

<sup>9</sup> Mare (2001: 485) also argues that intragenerational mobility increases the "transitory" component of the variance in earnings so that "inequality in earnings at any time is greater in markets where workers make frequent moves than in markets with limited labor mobility."

<sup>10</sup> Of course, individuals may end up in the roughly the same social status they started out in. When considering a strictly quantitative dimension of social status, such as a socioeconomic index that varies over all occupations or earnings measured in constant units with infinite precision, the probability that an individual's destination status equals his or her origin status is infinitesimally small. With less detailed measures, such as broad occupational categories, such small changes may be undetectable, and individuals can be considered immobile.

occupational distribution induced by structural change in the past. Such change would include the growth and decline in certain types of jobs over time, the expansion and contraction of certain sectors of the economy, and gross flows of new labor force entrants as a result of differential fertility and migration. Additional sources of change in the occupational distribution include institutional changes in occupational barriers to entry, licensing practices, and educational institutions and policies that affect the supply of high-skilled labor. Also important is the alteration of normative patterns of labor market processes that may inhibit the movement of groups out of jobs in which they have been traditionally overrepresented into jobs in which they have been traditionally underrepresented.

### Change Processes

Change processes can be formulated in many ways. In their now classic study of status attainment, Blau and Duncan (1967: 165) propose and estimate a path model using the OCG-I data set. This model was extended by Sewell, Haller, and Ohlendorf (1970) in their formulation of the so-called Wisconsin Model, which includes social-psychological variables. In these and later status attainment studies (e.g., Jencks, Crouse, and Mueser 1983), a central objective is to uncover the pathways to attainment and to estimate the relative impact of social origins on social destinations as mediated by intervening variables such as education, aspirations, and first job.

Other approaches (e.g., Spilerman 1976) focus more exclusively on the labor market career per se and take the first job as the starting point in an ongoing sequence of socioeconomic changes. Individual career lines, job trajectories, and yearly wage rates are indicators of the attainment process over the life course of individuals. In this sense, job mobility and changes in earnings can be viewed as natural extensions of the status attainment model of Blau and Duncan (1967). This approach focuses on the determinants of individual change over the life cycle (i.e., intragenerational mobility) and employs a methodology that is closely related to the demographic methods used in the study of vital rates.

The investigation of intergenerational processes typically considers intergenerational occupational mobility by examining the social origins of a current sample of workers. Such analyses hinge on the cross-classification of the occupational distribution of a current sample of sons by the occupations of their fathers when respondents were adolescents. The square contingency table formed by arraying father's and son's occupational categories in this manner provides the data for the statistical analysis of social mobility.

### Methods for Individual Change

The process of attainment entails a temporal component in which individuals' values on quantitative dimensions of stratification change over time. When such change in a continuous variable results in a change in a qualitative dimension, then, in a nominalist sense, a *transition* occurs from one social status (or qualitative dimension) to another. The study of change can be viewed as a study of transitions. A fundamental concept in

the statistical analysis of change is the transition probability, which has close ties with several demographic methods, including life tables and population projections. To study change at the individual level, it is necessary to first define the set of social statuses that can be occupied at any point in time, or the state space  $Y_t$ . The probability that an individual in state  $i$  changes to state  $j$  ( $i, j \in Y_t$ ) in the time interval of from  $t$  to  $t + \Delta t$  (where  $t > 0$  and  $\Delta t > 0$ ) is the transition probability  $p_{ij}$ . The limit of this conditional probability as  $\Delta t \rightarrow 0$  is the transition rate  $r_{ij}(t)$  at time  $t$ . Other quantities of interest are derived from the transition rate. For example, the proportion “surviving” to time  $t$ , or remaining in the origin state until that time, is given by the survival function,  $\exp \{ - \int_0^t r(u) du \}$ , which can be derived from the usual life table methods by setting the radix  $l(0) = 1$ .<sup>11</sup> With data that have been aggregated by summing the individual transitions occurring over a set of time intervals, these rates can be defined empirically as the ratio of the number of  $i$  to  $j$  transitions divided by person-units of exposure to the risk of that transition in a particular time interval.<sup>12</sup>

Researchers typically focus on a subset of possible transitions such as upward moves, changes in earnings, or job shifts of various kinds. There are several notable examples of earlier empirical research along these lines. Lipset and Bendix (1952a, 1952b) examine employer change and occupational change and find variation in job change behavior by occupation and age. Palmer (1954) examines job change patterns in several mutually exclusive categories comprised of employer, industry, and occupation, and other shift types. Spilerman and Miller (1973) investigate variation in the quality of position left and position entered. Sørensen (1974) finds differential socioeconomic effects of voluntary versus involuntary job shifts. Tuma (1976) shows that the rate of job mobility decreases as job rewards increase, increases with levels of personal resources including education, social background, and place of origin, but decreases as duration in the job increases.

Recent work focuses on the linkages between states in  $Y_t$ . For example,  $Y_t^A$  may represent a fertility transition such as the birth of first child and  $Y_t^B$  may represent an employment transition (e.g., leaving or entering a job). Blossfeld (1986, 1994) outlines a strategy for analyzing interdependent processes such as these in which the researcher considers one focal process among the set of interdependent processes as the *dependent* one. Subsequent change in a dependent process is viewed as a function of current status, the past, as well as other exogenous variables in what is termed a *semi-Markov* process.<sup>13</sup> That is, transitions are independent of previous history but depend on the length of time spent in a previous state. Time dependence in transition rates can be specified parametrically by making assumptions about the profile of the rate over time and allowing the shape of the rate to be a function of one or more parameters that may themselves be functions of observed variables.<sup>14</sup>

<sup>11</sup> Namboodiri and Suchindran (1987) provide a concise treatment of the life table from a Markov perspective.

<sup>12</sup> In demography, this method is routinely applied to assess the impact of measured covariates on rates. For example, a common technique is to treat the counts as Poisson variates and fit a generalized linear model with the log of the exposure as an offset—a term whose slope coefficient is fixed at unity or some other constant (e.g., Holford 1980; Laird and Oliver 1981).

<sup>13</sup> A Markov process is one in which an individual's future status depends only on his present status, independent of the previous history leading up to present status.

<sup>14</sup> Time dependence may be specified semiparametrically, in which case transition rates are assumed to be constant within time intervals but can change in a stepwise fashion over time. Tuma's (1976) finding of the

In their work on social change processes, Tuma and Hannan (1984) state that time itself can be viewed as a proxy for time-varying causal factors which are difficult to observe. This idea has been used by Blossfeld (1986) to study job shifts by postulating that unobserved job-specific labor force experience  $Z_{LFX}$  assumes a value of 0 at the beginning of each new job and increases linearly over the a person's job spell  $t$ . The equation to describe this situation usually incorporates a set of explanatory variables  $X$ , and can be written as:

$$r(t) = \exp\{X\beta + \gamma Z_{LFX}(t)\}. \quad (1)$$

In this case, the observed job duration  $t$  is viewed as a proxy for job-specific labor force experience resulting in the following Gompertz model:

$$r(t) = \exp(X\beta + \gamma t) = \exp(X\beta) \exp(\gamma t) \quad (2)$$

Thus,  $\gamma < 0$  would support the hypothesis that increasing the stock of job-specific labor-force experience leads to a monotonic decline in the job shift rate.<sup>15</sup> Other parametric forms would lead to alternative hypotheses about the rate of change in job shift rates. For example, using the logarithm of job-specific experience  $Z_{LFX}(t) = \log t$  would imply that increasing employment duration leads to a relatively smaller stock of job-specific labor force experience than would be implied by the model above, resulting in a more gradual decline in the job shift rate as the duration of the employment spell increases.

Both of these models assume that job shift rates change monotonically over the length of the employment spell. It is more realistic—and consistent with existing theory and empirical research—to envision employment as the result of matching employees to jobs (Mincer and Jovanovic 1981), so that employment may involve an initial adjustment period in which mismatches are likely to be resolved. This results in increasing job shift rates early in an employment spell and declining job shift rates later on. As noted by Blossfeld and Rohwer (1995), this empirical relationship would be quite plausible on theoretical grounds and could result from the interplay of two contradictory forces—increasing job-specific investments on the one hand and decreasing need to resolve employment mismatches on the other. To accommodate both of these scenarios requires a more flexible model that allows for increasing initial rates of job shift followed by declining rates as employment durations increase.

### Demographic Studies of Social Mobility

Cross-classification, or cross-tabulation, is one of the oldest and most widely used statistical tools available to social scientists. Prior to the upsurge in regression and regressionlike methods, cross-tabulation was *the* major analytical method used in sociology. Classic studies of social mobility rely on cross-classifications of occupational

existence of significant duration dependence in job mobility rates is taken as evidence against a stationary Markov process for job mobility and evidence in favor of a semi-Markov view that incorporates stationary person-specific characteristics on the one hand and time-dependence in job-shift rates on the other.

<sup>15</sup> The Gompertz model and its modification by Makeham are widely used in demography to describe the force of mortality at later ages.

categories (e.g., Glass 1954). Intergenerational mobility is typically studied using a cross-classification based on as few as 3 and as many as 17 categories of father's and son's occupation, corresponding to table rows and columns respectively. The resulting square contingency table forms the basis for a statistical analysis of social mobility in which the joint frequencies  $f_{ij}$  in the  $i$ th row and  $j$ th column are the observed outcomes of a mobility process and denote the number of sons in the  $j$ th occupational class category with social origin category (father's occupational class)  $i$ . Hauser (1978: 921) states that models for mobility are useful in informing "us where in the social structure opportunities for movement or barriers to movement are greater or less, and in so doing provide clues about stratification processes which are not less important, if different in kind, from those uncovered by multivariate causal models."

It is tempting to view the marginal distribution of fathers' occupations in a father-son mobility table as an occupational distribution at an earlier time. A great deal of early mobility research takes this approach. The basic techniques for analyzing changing occupational distributions are identical to those used for projecting population growth as a first-order Markov process. Using this perspective, some investigators equate differences in the marginal distribution of occupations of fathers and sons to trends or change in the occupational distribution of the workforce (Rogoff 1953; Kahl 1957). Kahl (1957) uses the marginal distributions of occupations in different historical periods approximately a generation apart, along with additional data on occupation-specific fertility and migration rates, to decompose total intergenerational social mobility into distinct components attributable to differential reproduction, immigration, and technological sources. Matras (1961) follows in this tradition but considers different assumptions about mobility and fertility rates in analyzing generation-to-generation change in occupational distributions as well as mobility patterns.

As Duncan (1966) points out, however, this approach is attractive in its elegance and innovativeness, but it ignores the fact that social surveys begin with a sample of sons and ask about the occupations of their fathers at the time when sons were age 16.<sup>16</sup> Fathers with no sons are not represented in the marginal distributions of mobility tables, whereas fathers with more than one son are overrepresented. Because major studies of social mobility (e.g., those based on the OCG-I and OCG-II data sets) are based on large-scale surveys that interview men ages 20 to 64 in the current year, it is possible that a father and his son are both represented in the same table. Moreover, sons in the sample have fathers of different ages and these fathers are likely to have started their careers at different times, under different structural conditions, and hence the information corresponds to different points in the careers of fathers. As Duncan (1966: 59) states "the transformations that occur via a *succession of cohorts* cannot, for basic demographic reasons, be equated to the product of a *procession of 'generations.'*" Therefore, the mobility table is probably best viewed as a distribution of the current occupations of a sample of men. As such, it should be viewed not as information about mobility, but as information about the dependence of sons' statuses on fathers' statuses (Duncan 1966; Mukherjee 1954).

<sup>16</sup> A notable exception to this is Rogoff's (1953) study in which data are obtained from marriage license applications eliciting men's current occupation as well as the current occupation of the respondent's father.

### Social Mobility as a Probability Process

Despite the aforementioned limitations, early studies of social mobility consider as a basis for analysis the matrix of transition probabilities, or outflow percentages, implicit in the father-son occupational mobility table. This forms the starting point for a mathematical analysis of social mobility that has many close parallels with mathematical population models. Prais (1955a) and Glass (1954) carried out early work on social mobility in Great Britain using methods based on Markov chains. In a similar vein, studies by Matras (1961, 1967) provide insights into the interrelationships between differential fertility, intergenerational mobility, and change in the distribution of occupations using Markov chain theory.<sup>17</sup> In this tradition, transition probabilities, outflow proportions, or mobility rates, denoted by  $p_{ij}$ , represent the conditional probability of moving from origin state  $i$  to destination state  $j$ . The set of transition probabilities forms the transition matrix, or mobility rate matrix,  $\mathbf{M} = p_{ij}$ .<sup>18</sup> If  $\mathbf{M}$  is stable over time, the theory of Markov chains can be applied to yield an occupational distribution at a later time, in the same spirit that a Leslie matrix is used for population projection in stable population theory (Leslie 1945; Keyfitz 1977). An important question is whether the marginal distribution of occupations of sons could have been generated from the occupational distribution of fathers, as  $\mathbf{a}_0\mathbf{M} = \mathbf{a}_1$ , or projected out to the  $t$ th generation as  $\mathbf{a}_0\mathbf{M}^t = \mathbf{a}_t$ , where  $\mathbf{a}_0$  is the row vector of proportions in the respective occupational origin categories and  $\mathbf{a}_t$  is the distribution in the  $t$ th generation.

Apart from the aforementioned limitations inherent in the Markov approach to social mobility, Hodge (1966), Prais (1955b), and others also argue that Markov models will seldom fit social mobility data due to the phenomenon of clustering on the main diagonal. That is, a son's broad occupational category will tend to be more similar to a father's broad occupational category owing to *status inheritance*. This phenomenon is also exhibited in intragenerational mobility matrices, which typically encompass several measurement points.<sup>19</sup> Although a first-order Markov chain cannot describe the tendency of clustering on the main diagonal, the data may obey some other stochastic process. In their research on intragenerational mobility, Blumen, Kogan, and McCarthy (1955) view this tendency as a particular form of unobserved heterogeneity and propose a "mover-stayer" model, in which a latent class of stayers never leave their origin status and a latent class of movers move according to a Markov chain.<sup>20</sup> White (1970) extends this idea to intergenerational mobility. Goodman (1965) considers a simplified version of the mover-stayer model that "blocks out" the diagonal entries and adjusts the marginal distributions accordingly.<sup>21</sup> Goodman's work can be viewed as the beginning of a contemporary literature on the statistical analysis of mobility tables.

<sup>17</sup> Recent work by Mare (1997) uses generalizations of these methods to examine the process by which a socioeconomically differentiated population reproduces itself.

<sup>18</sup> These are conceptually identical to the  $p_{ij}$ 's we defined earlier. By definition the transition probabilities sum to 1 over rows,  $\sum_j p_{ij} = 1$ . The empirical counterparts are outflow proportions (or row proportions)  $p_{ij} = f_{ij}/f_i$ , where  $f_{ij}$  denotes the joint frequency in the  $i$ th row and  $j$ th column and  $f_i = \sum_j f_{ij}$  denotes marginal frequency in the  $i$ th row. By contrast, the cell proportions in the table are  $f_{ij}/N$ , where  $N$  is the sample size.

<sup>19</sup> In fact, it is rare to find intergenerational mobility tables that go back more than one generation, making application of these models problematic.

<sup>20</sup> Formally, for a continuous-time process this means that the distribution of  $t$  is defective, implying that a proportion of the population never experience a transition.

<sup>21</sup> This is equivalent to fitting a parameter to each diagonal entry in a table or for a subset of diagonal cells.

While space limitations prevent us from elaborating subsequent developments in the mathematical modeling of social mobility, suffice it to say that this earlier tradition spawned a great deal of later work on life-course and career mobility and dynamic models in general. It also gave rise to a new focus on structural or statistical models of social mobility. By the mid 1970s, researchers focused less on the study of mobility as a stochastic process and more on structural models of social mobility.

### Statistical Models for Mobility Tables

Models for mobility tables express the expected frequencies in terms of the parameters describing the marginal and joint distributions. Letting  $R$  denote the row variable (father's occupation) with row indices  $i, \dots, K$  and  $C$  denote the column variable (son's occupation) with column indices  $j, \dots, K$ , yields a model for the expected frequency in the  $i$ th column and  $j$ th row  $F_{ij}$  as:

$$F_{ij} = \tau\tau_i^R\tau_j^C\tau_{ij}^{RC} \quad (3)$$

As Hauser (1979) points out, each observed frequency in a father-son mobility table has two components—the effects of prevalence and the effects of interaction. Prevalence effects involve the tendency for the joint frequencies in certain diagonal cells to be large because the corresponding marginal frequencies are large. For example, using three occupational “class” categories corresponding to upper-, middle-, and lower-class jobs, we would expect to find many middle-class sons with middle-class fathers simply because there are more middle-class jobs. Interaction concerns the varying tendencies for categories to interact or occur jointly. For example, we would expect to find that relatively more men “inherit” the broad occupational position of their fathers than end up very far from their social origins. In Equation 3, prevalence effects are accounted for by the parameters governing the marginal distributions, or the  $\tau_i^R$  and  $\tau_j^C$  parameters. Interaction effects are captured by the  $\tau_{ij}^{RC}$  parameters. Taking logs, we can write Equation 3 as a loglinear model:

$$\log F_{ij} = \mu + \mu_i^R + \mu_j^C + \mu_{ij}^{RC}. \quad (4)$$

We will describe several models that are constrained versions of this model.

When all  $\tau_{ij}^{RC} = 1$  or  $\mu_{ij}^{RC} = 0$  we have the *model of independence or perfect mobility*. This model constrains all row-specific and column-specific proportions to be equal to the respective marginal proportions—a property referred to as marginal homogeneity. If proportions are not homogeneous across rows or columns, then there is dependence between son's and father's occupational class. As outlined earlier, this model will rarely fit mobility data due to a failure to account for status inheritance. However, Goodman (1965) considers the situation where perfect mobility holds, except for those who are in the same occupational category as their fathers, resulting in a model for quasi-perfect mobility or quasi-independence.

The *model of quasi-independence* is obtained if  $R$  and  $C$  are independent of each other in the off-diagonal cells. That is, the expected frequencies in the  $i$ th row and  $j$ th column are given by  $F_{ij} = f_i \cdot f_{\cdot j} / N$ , where  $f_i$  and  $f_{\cdot j}$  denote the marginal frequencies for the row and column variables respectively. Independence also implies that the odds

ratio for any  $2 \times 2$  subtable is equal to 1. Because odds ratios are invariant under transformations of the marginal distributions, and are byproducts of the estimation of loglinear models, they are highly useful for studying comparative mobility. Goodman (1968) makes extensive use of odds ratios to gain information about the association in selected regions of a mobility table. Hauser (1979) uses the nonredundant odds ratios obtained from a saturated model to delineate areas in a social mobility table with similar levels of association.<sup>22</sup> The result is what is referred to as the *topological model*. The interaction parameters from the topological model can be used to quantify the association between any two occupational origins and any two occupational destinations.

The *model of symmetry* and the *model of quasi-symmetry* have also been widely used. Symmetric association patterns may also provide a good fit to the observed data in square tables. In terms of model parameters, we constrain interaction terms to be the same on both sides of the main diagonal  $\tau_{ij}^{RC} = \tau_{ji}^{RC}$ . This model can be decomposed into two components: marginal homogeneity and symmetric interactions. Fitting the diagonal cells as a special case, so that in addition to the constraint above we also allow additional  $\tau_{ij}^{RC}$  parameters for  $(i = j)$ , results in a model of quasi-symmetry. Similar to the quasi-independence model, this model allows for marginal heterogeneity.

Sobel, Hout, and Duncan (1985) show that when quasi-symmetry holds, it is possible to obtain estimates that describe structural mobility derived from differences in father's and son's occupational distributions. As was mentioned above, estimating structural and circulation mobility has been a long-standing concern in the analysis of social mobility. Previous approaches were problematic due to the fact that the distribution of a son's social origins does not correspond directly to the occupational distribution in the past and due to an inadequate theoretical conceptualization of structural mobility based on the difference between total and exchange mobility. Sobel, Hout, and Duncan (1985) equate structural mobility with marginal heterogeneity and further assume that this effect operates uniformly on all social origin categories. They define exchange mobility as mobility resulting from equal flows between pairs of cells in a mobility table, implying symmetry.

*Association models* represent an alternative approach to modeling interaction effects in mobility tables. In this case, we incorporate information on the ordering of occupational categories to construct row and column scores. For a  $K \times K$  table, the row and column scores can be constructed as  $i = 1, \dots, K$  and  $j = 1, \dots, K$ , respectively.<sup>23</sup> This results in the uniform association model which can be written as:

$$\log F_{ij} = \mu + \mu_i^R + \mu_j^C + \beta_{ij}. \quad (5)$$

The odds ratios involving adjacent rows and columns are invariant and equal to  $\exp(\beta)$ . This result can be used to construct odds ratios for arbitrary pairs ( $i$  and  $i'$  for row and  $j$  and  $j'$  for column) as  $\exp\{\beta(i - i')(j - j')\}$ .

Goodman (1979, 1981) proposes two kinds of association models—the row-and-column-effects association Model I and the row-and-column-effects association Model II (referred to as the *RC model*). Model I estimates row and column scores from the data and is of the form

<sup>22</sup> A saturated model has a single parameter per cell and thus fits the data perfectly.

<sup>23</sup> Here we use integer scoring. The particular values used are inconsequential as long as they are uniformly spaced. Other scoring methods may be more reasonable, such as using midpoints or weighted means to linearize categories based on interval measures.

**Demography of Social Stratification**

$$\log F_{ij} = \mu + \mu_i^R + \mu_j^C + j\phi_i + i\varphi_j. \tag{6}$$

This model specifies the association between father’s and son’s occupation as the sum of the two interaction terms involving a row score  $\phi$  (or row effect) and a column score  $\varphi$  (or column effect). It is a generalization of the uniform association model insofar as the association parameters vary uniformly (linearly) by row and column. Whereas this model depends on a correct ordering of the occupational categories, Goodman’s *RC* model makes no assumptions regarding the correct ordering of categories and can be written as a log-multiplicative model, in which the two-way interaction is characterized by a multiplicative term involving unknown row and column scores:

$$\log F_{ij} = \mu + \mu_i^R + \mu_j^C + \phi_i\varphi_j. \tag{7}$$

The estimated scores not only reveal the ordering of categories but also show the relative differences in occupational categories (e.g., Clogg 1982).

Association models are particularly attractive from the standpoint of parsimony and have advantages that carry over to the analysis of more complicated tables. Xie (1992) proposes a log-multiplicative layer effect model to handle the three-way interaction present in a three-country mobility table with country dimension or layer *L*. His proposed model is:

$$F_{ijk} = \tau\tau_i^R\tau_j^C\tau_k^L\tau_{ik}^{RL}\tau_{jk}^{CL} \exp(\psi_{ij}\phi_k) \tag{8}$$

where the parameters  $\psi_{ij}$  and  $\phi_k$  can be viewed as latent scales for ordinal variables, with the  $\psi$  parameters describing origin-destination association and the  $\phi$  parameters describing the country-specific deviations in the association.

**Studies of Heterogeneous Populations**

Although intergenerational occupational mobility has been a key topic in the demography of social stratification, other aspects of the study of mobility continue to attract increased attention. Among them are demographic studies of socioeconomic outcomes for populations characterized by heterogeneity. Demographers have had a long-standing interest in problems of unobserved heterogeneity, especially with regard to the study of mortality (e.g., Vaupal, Manton, and Stallard 1979; Vaupal and Yashin 1985). Unobserved heterogeneity denotes a collection of unknown factors that contribute—along with known factors—to an individual’s risk of some outcome of interest.

Known risk factors are readily incorporated into the transition rate models that were discussed earlier. Suppose, however, that we now wish to account for unobserved heterogeneity. To consider this issue, the following proportional hazard model may be specified:

$$r(t) = r_0(t) \exp(X'\beta)v \tag{9}$$

where  $v$  is unobserved heterogeneity, or frailty, that acts multiplicatively to raise or lower an individual’s risk (assuming an average frailty of 1). We commonly account for frailty by assuming a distribution for  $v$  and averaging (or integrating) it out of the expression for a likelihood conditional on  $v$ , and then maximizing the resulting marginal

likelihood with respect to  $\beta$  and ancillary parameters describing the distribution of  $\nu$ .

There are, however, several limitations to this approach. As discussed by Heckman and Singer (1984), a misspecification arises in regard to the baseline hazard  $r_0(t)$  or because the distribution of the unobserved heterogeneity could lead to serious biases. Heckman and Singer (1984) demonstrate how these problems arise in several models and propose a nonparametric approach for handling the distribution of  $\nu$ . The literature remains unclear about the extent to which it is possible to compare models that control for unobserved heterogeneity against alternative models without unobserved heterogeneity (Hoem 1990; Trussel and Rodríguez 1990). Trussel and Rodríguez (1990) show that an identification problem exists in the sense that a model specification with unobserved heterogeneity can be observationally equivalent to a model specified without unobserved heterogeneity even though the two models appear to be conceptually distinct.

Rather than viewing unobserved heterogeneity as a process that occurs at the individual level, a more fruitful approach may be to control for the shared unmeasured factors that are common to paired, clustered, or repeatedly measured observations. In this context, a generalization of the preceding model is a natural way to accommodate unobserved heterogeneity due to common unmeasured sources of variation. These sources may derive from observations sharing a common family, neighborhood, community, or other aggregation.

### Sibling Studies

Sibling data have special relevance for research on social stratification and mobility because of the opportunity to control for sources of variability that cannot otherwise be captured. As noted by Griliches (1979), the correlation between sibling characteristics is likely the result of many factors, including shared genetic traits (i.e., heredity), shared home environments (i.e., cultural, physical, and financial resources), shared communities, friends, and schools. Some of these factors may be measurable. However, many are not or are measured imperfectly and would be represented as disturbances, residuals, or unobserved family-specific traits in models of socioeconomic outcomes.

Unobserved components of socioeconomic outcomes should be positively correlated across siblings. Of course, siblings differ on important dimensions and the extent of sibling differences will likely depend on the difference in age as a result of changes that may have occurred in the age interval that separates them. For example, changes in socioeconomic circumstances and family structure may have varying impacts on older and younger siblings which can lead to differences in outcomes. Outcomes can be influenced by the sibling-specific context of parent-child relationships and by the unique nature of peer group interactions. While there is a possibility of countervailing influences leading to differences in outcomes among siblings, most researchers in this tradition would argue that siblings share a set of generalized unmeasured traits that can be captured by a single variable. Accounting for this effect should help to eliminate potential biases in the effects of key variables such as education on socioeconomic outcomes.

The structural equation approach is ideal for analyses involving sibling pairs, though a more general approach that allows for family clusters of any size might be preferable in other contexts. One model that closely resembles the preceding multiplicative frailty

model considers a socioeconomic outcome  $Y$  as a function of years of schooling  $E$  for the  $j$ th sibling in the  $i$ th family.

$$Y_{ij} = \alpha + \beta E_{ij} + v_i + \varepsilon_{ij}. \quad (10)$$

This is a multilevel regression model, where  $v$  is either a normally distributed random variable (random effect) or a fixed effect that varies over families. Our estimate of  $\beta$  will be unbiased as long as siblings have the same level of  $v$ . Griliches (1979: S40) refers to this as “the rationale, the promise, and the limitation of the siblings method.” That is, if the components of  $v$  (the collection of unobserved family traits) are in fact “family-level” traits, then  $\beta$  will be unbiased. Otherwise, if  $v$  also represents some combination of individual- and family-level traits, it is not clear that the estimator of  $\beta$  is unbiased *in either the random-effects or fixed-effects model*. Other potential sources of bias include regressors correlated with  $v$  or  $u$  (i.e., endogeneity of  $E$ ). In spite of these limitations, sibling data permit a richer set of analytical questions to be addressed, as evident from studies by Jencks et al. (1972, 1979), Olneck (1977), Hauser (1988), Hauser and Mossel (1985), Hauser and Sewell (1986), and Hauser and Wong (1989).

It is also worth noting that models such as that shown in Equation 10 can be cast as random coefficients models, which allow for family-specific effects of education. Such models provide estimates of additional components of variation, beyond the usual residual variance in the classic regression model. Although sibling data have the potential to shed light on estimates of covariates affecting socioeconomic outcomes, they are not a panacea for understanding family effects except in certain circumstances with specific kinds of models.<sup>24</sup> Nevertheless, sibling models have been instrumental in focusing attention on the role of families in the stratification process.<sup>25</sup>

Sibling models are especially relevant for the study of the effects of education. It is well known that investments in schooling have major and important direct effects on socioeconomic success. But socioeconomic outcomes are also affected by family background factors and personal characteristics. Therefore, the observed association between socioeconomic outcomes and schooling may not be entirely a causal effect. Models based on sibling data (specifically, sibling pairs) allow the researcher to decompose the cross-sibling variance into between-family and within-family components. As noted by Hauser (1988: 1402), “if fraternal differences in schooling lead to differences in adult success, we can be more confident that the association of schooling with success is not merely an artifact of school success running in families that are also economically successful.”

In general, studies using sibling data do not find much upward bias in conventional estimates of the effects of schooling on socioeconomic outcomes (Hauser and Sewell 1986; Altonji and Dunn 1996; Ashenfelter and Zimmerman 1997). This conclusion is especially apparent after correcting for measurement error in the schooling data

<sup>24</sup> For example, when sibling data are used with a gamma distributed random effect in a proportional hazard model, the estimated variance in frailty has a *substantive* interpretation in terms of a relative risk (e.g., Guo and Rodríguez 1992; Guo 1993; Powers 2001.)

<sup>25</sup> This latter concern is underscored by Mare (2001, p. 480), who states “it is families rather than individuals that provide demographic continuity of social stratification from one generation to the next. . . . the stratification scholar should bear in mind that socioeconomic reproduction combines intergenerational social mobility with demographic reproduction, including differential fertility, fertility timing, mortality, assortative mating and family stability.”

(Ashenfelter and Rouse 2000: 96). The basic finding that the direct effect of schooling is not appreciably reduced by an unobserved family factor is largely evident even in studies that are restricted to siblings who are identical or fraternal twins (Ashenfelter and Krueger 1994; Ashenfelter and Rouse 1998; Ashenfelter and Rouse 2000; Miller, Mulvey, and Martin 1995). Thus, the direct effect of schooling on socioeconomic outcomes is probably not a spurious artifact deriving from a common association with being from a family with higher socioeconomic standing.

### ADDITIONAL DEMOGRAPHIC RESEARCH ON MOBILITY

#### **Some Major Findings Regarding Social Mobility in the U.S.**

In the extant literature, the common if not perennial fear among students of American social mobility is that it is on the decline.<sup>26</sup> For the most part, however, this conclusion has not been evident in the major modern studies of intergenerational occupational mobility for the U.S. Featherman and Hauser's (1978) meticulous study of the OCG-I and OCG-II data sets finds increased mobility and reduced ascription between 1962 and 1973 for a variety of models of various socioeconomic outcomes. Those authors state they have "detected two complementary trends: declining status ascription and increasing universalistic status allocation. . . . If anything, the weight of the evidence of change suggests that the acquisition of schooling, jobs, and earnings has become less constrained by social background" (Featherman and Hauser 1978: 481).

Another important study (Hout 1988) investigates intergenerational occupational mobility from 1972 to 1985. This analysis combines features of association models as well as an earlier model of (Sobel, Hout, and Duncan 1985) that incorporates parameters for structural mobility. An additional innovation is that Hout's (1988) model also includes occupation-specific measures of status, autonomy, and training. In doing so, he allows for various sources of heterogeneity within broad occupational categories. Especially relevant is the role of education and training, and Hout finds that origin-destination association varies by educational level. In particular, the origin-destination association is nil among the college educated.<sup>27</sup> Thus, as the proportion of college-educated workers increases, an increase in circulation mobility is evident. Although structural mobility decreased during this time period, circulation mobility increased. As Hout observes (1988: 1358), "the more college graduates in the work force, the weaker the association between origin status and destination status for the population as a whole. Overall mobility remains unchanged because a decline in structural mobility offsets the increased openness of the class structure."

DiPrete and Grusky (1990), using data for approximately the same period as Hout (1988), reach similar conclusions, although their methodology differs. They find little evidence of an increase in the effect of ascription on occupational attainment, although

<sup>26</sup> A decline in social mobility is also hypothesized by Herrnstein and Murray (1994), although in their view this decline is generated primarily as a consequence of the increasing stratification of cognitive skills.

<sup>27</sup> As Hout (1988) notes, the finding that college education erases the origin-destination association may help to explain the paradox of higher-than-average attainment (i.e., beyond what would be predicted by social origins) of certain ethnic minorities in the U.S. such as Asian Americans and Eastern Europeans, as these groups have a higher than average proportion of college graduates.

some of their results suggest a slowdown in the growth of universalistic practices. Overall, however, the findings of DiPrete and Grusky seem generally consistent with those of Hout, showing considerable social fluidity during the latter 1970s and the 1980s despite some slowdown in structural mobility. DiPrete and Grusky (1990) argue that part of the continued universalism during this period is political, deriving from the enforcement of equal-opportunity employment legislation.

Hauser et al. (2000) provide results for occupational attainment during the early 1990s using the Wisconsin Longitudinal Survey. This thorough and informative test of a status attainment model that includes a variety of social background variables indicates the continuing importance of schooling as key determinant of occupational attainment, even after controlling for a mental ability test score. The direct effects of social background variables (net of schooling) are small or negligible, yielding no obvious evidence of a direct increase in the role of ascription in occupational attainment during the early 1990s.

### **Some Major Findings From Cross-National Studies of Social Mobility**

A great deal of the research on social mobility has been cross-national. Hout (2003) succinctly summarizes much of our current knowledge derived from this research. Several important empirical generalizations emerge from his review. Of particular significance is what has come to be known as the Treiman constant: "occupations are ranked in the same order in most nations and over time" (Hout 2003: 2). In other words, in terms of average levels of prestige and socioeconomic rewards, occupations tend to be ordered similarly across most nations and across time within nations. This result was first reported and analyzed in Treiman (1977) and was subsequently extended by Ganzeboom and Treiman (1996). The Treiman constant is important because it implies that occupation is a major dimension of social inequality that may be directly compared across nations and across time periods for the purpose of studying patterns of social mobility. This finding thus underlies comparative studies of social mobility.

The latter topic is sufficiently complex to have generated a variety of debates and viewpoints over the years. However, a general consensus seems to be emerging recently regarding several basic conclusions. The first is that there is a great deal of variation in levels and patterns of structural mobility across nations and across time periods (Erikson and Goldthorpe 1992). These variations in structural mobility (which are also sometimes referred to as variations in absolute mobility rates) reflect the generally historical and idiosyncratic features of the economic development and class structures of different nations. As stated by Goldthorpe (2000: 232) "most mobility researchers came to accept the view, either implicitly if not explicitly, that variation in absolute rates cannot in fact usefully be regarded as systematic, and that explanations of such variation, whether over time or cross-nationally, will need to be provided far more in specific historical, than in general theoretical terms."

A second major conclusion from this literature is that relative mobility rates—which may be construed as indicative of circulation mobility—show a great deal of similarity across industrial nations, particularly in regard to the fundamental pattern of association between origins and destinations. In other words, industrial nations do not differ much in terms of their levels of inherent social fluidity or degrees of openness.

Although differences do exist between countries, they are small compared to the cross-national similarities. In fact, "such variations in pattern as do occur are not of any major quantitative importance" (Goldthorpe 2000: 234). Hout (2003: 7–8) states that this conclusion generally applies both to "vertical" and "class" models of mobility.

Although somewhat less well conceptualized and studied, another basic conclusion from comparative studies is that education plays a critical role in the status attainment process in industrialized nations. As stated by Hout (2003: 9) "education is the main factor in both upward mobility and the reproduction of status from generation to generation." For the U.S., this conclusion is evident in numerous studies such as Blau and Duncan (1967), Featherman and Hauser (1978), Jencks et al. (1979), and DiPrete and Grusky (1990). Studies of status attainment in other industrialized nations, however, also report similar findings (Hope 1985; Hout 1989; Ishida 1993; Treiman and Ganzeboom 1990). Because of the important role of education in determining occupational attainment, upward mobility is facilitated to the extent that persons from lower-status origins obtain high levels of education while status reproduction results when persons obtain levels of education that are consistent with their class origins (Bielby 1981: 6–10; Hout 2003: 9–12).

An additional important conclusion from comparative studies of social stratification is the persistence of class differentials in educational attainment in most industrialized nations. "Class differentials in educational attainment, considered net of all effects of expansion per se, have tended to display a high degree of stability: that is, while all children of all class backgrounds have alike participated in the process of expansion, the association between class origins and the relative chances of children staying on in education, taking more academic courses, or entering higher education has, in most societies, been rather little altered" (Goldthorpe 2000: 182). The main source of this finding is Shavit and Blossfeld (1993), who investigate educational attainment in 13 countries including Czechoslovakia, Germany, Hungary, Israel, Italy, Japan, Netherlands, Poland, Sweden, Switzerland, Taiwan, United Kingdom, and the U.S. Previous studies have also reported similar findings for France (Garnier and Raffalovitch 1984) and the Philippines (Smith and Cheung 1986). The stability in class differentials in educational attainments seems somewhat surprising given the considerable cross-national variation in educational systems and the general increase in average levels of educational attainment across cohorts in all industrialized nations. However, this finding is consistent with (if not implied by) the previous two general conclusions about the cross-national similarity in relative mobility rates and the important role of education in status attainment in industrialized nations.<sup>28</sup>

Other major conclusions from comparative studies of social stratification pertain to gender. The first in this regard is that, when measured in terms of years of schooling completed, gender differentials in educational attainment have notably declined throughout industrialized nations since World War II (Shavit and Blossfeld 1993; Breen and Goldthorpe 1997). Indeed, in some nations, recent cohorts of women actually attend schooling for more years than do men. As mentioned by Hout (2003: 12), this trend may derive from "rising returns to market work among women, the educational

<sup>28</sup> The two countries where class differentials in educational attainment do appear to be significantly attenuated are the Netherlands and Sweden (De Graaf and Ganzeboom 1993; Jonsson 1993), and these two countries are also characterized by somewhat higher levels of circulation mobility (Ganzeboom and De Graaf 1984; Erikson and Goldthorpe 1987).

and occupational aspirations of post-feminist women, the family resources of smaller families, and the interests of privileged parents who have daughters but not sons.”

Another general result from comparative studies of social stratification is that “occupational distributions are gendered” (Hout 2003: 3). In other words, throughout industrialized nations there are significant gender differentials in occupational attainment. In particular, women are typically much more likely to be employed in lower-level white-collar occupations. The most systematic cross-national study of this phenomenon is Charles and Grusky (1995). Although this study finds notable gender segregation in the occupational distributions of each of the countries considered, nations nonetheless differ significantly in terms of their specific patterns and in the changes of these patterns over time. Future research on this topic may need to investigate more thoroughly the role of gender differentials in educational type and specialty that continue to persist in many nations (despite declines in gender differentials in total years of schooling completed).

In sum, comparative studies have yielded an impressive body of knowledge about cross-national commonalities in the basic facts and processes involved in social stratification. In our review, we have been careful to limit these generalizations to those pertaining to industrialized nations because almost all of these studies are based exclusively on data from such countries.<sup>29</sup> The extent to which these generalizations may also be applicable to developing nations thus remains a topic for future research. The main impediment to extending these studies to developing nations has been the availability of appropriate data.

## DEMOGRAPHIC RESEARCH ON THE LEVEL OF INEQUALITY

### Demographic Factors Affecting the Level of Poverty

One of the fundamental indicators of inequality in a population is its level of poverty, which is typically measured as the proportion of households whose income falls below some specified poverty threshold (i.e., the poverty rate).<sup>30</sup> Because poverty thresholds vary by household size (and, to a lesser extent, composition), Bumpass and Sweet (1981) note that processes of family formation and change can have direct effects on the incidence of poverty. These demographic factors may also have indirect effects via consequent reductions in labor supply or earnings capacities. Households may thus leave or enter poverty as the result of such demographic changes as marital dissolution, aging, retirement, death, childbirth, remarriage, the departure of children from the household, and the formation of new households.

The particular demographic issue that has been prominent in the poverty literature is the extent to which changes in family structure over the past few decades have contributed to the rate of poverty in the U.S. Earlier qualitative and ethnographic

<sup>29</sup> The one major exception here is Treiman (1977), who also uses data for developing nations. The Treiman constant is thus the one generalization that may be said to pertain to both developed and developing nations.

<sup>30</sup> Despite Sen's (1976) seminal contribution to the methodology of poverty indices, most empirical research seems to be based on the simple proportion of the poor in the total population (perhaps because Sen's [1976] index may be more unreliable than a proportion when the incomes of the poor are reported with significant error).

research by sociologists often interpreted family structure as being adaptive to poverty (e.g., Rainwater 1968; Schulz 1969; Stack 1974). According to this “situational view” of poverty, nonmarital fertility and increased proportions of female-headed households are seen as being in part a consequence of low wages, unemployment, and economic inequality rather than the primary causes of them (Valentine 1968). By contrast, the “culture of poverty” view maintains that poverty is substantially promoted and increased by the rejection of middle-class social values and normative behaviors (Banfield 1968). The resulting high rates of female-headed households and high school dropouts are predicted to be fundamental and important sources of increased poverty rates (Lewis 1966).

Bane’s demographic study (1986) is one of the first to systematically investigate the effect of family structure on poverty rates. Her analysis is based on the U.S. Census Bureau definition of poverty, which is an absolute measure (i.e., it is invariant with respect to changes in average standards of living or household income in society). Using standardization methods and demographic data from 1960 to 1983, she finds that “the poverty rate in 1979 would have been about 16 percent lower than it was had family composition remained as it was in 1959” (Bane 1986: 214). For the black population separately, the corresponding figure is 22% (Bane 1986: 215). Bane interprets her results as lending some support to the “situational view” because “most poverty, even that of female-headed families, occurs because of income or job changes” (Bane 1986: 231). For African Americans, Bane (1986: 231) concludes that “although there has indeed been a dramatic and shocking increase in female-headed households among blacks and an equally dramatic feminization of black poverty, one cannot conclude that much of the poverty could have been avoided had families stayed together.”

Another important study is Danziger and Gottschalk (1995), which also uses the U.S. Census Bureau definition of poverty. Unlike Bane (1986), however, Danziger and Gottschalk seek to evaluate simultaneously the effects of economic changes as well as demographic changes. To do this, they develop a decomposition that incorporates changes in mean household income, household income inequality, and race-specific family structure. Consistent with Bane’s (1986) general conclusion, they find that changes in family structure (in particular, the increase in female-headed households) had a moderate effect on increasing poverty from 1973 to 1991. Danziger and Gottschalk’s (1995: 102) results for this period also indicate, however, that economic factors had larger effects than did family structure, including the increase in mean household income (which reduced poverty) and the increase in household income inequality (which increased poverty). Economic factors, particularly the increase in mean household income, had the overwhelmingly largest impact on reducing poverty during the earlier period from 1949 to 1969 (during which time family structure did not change significantly).

An update and extension of Danziger and Gottschalk’s (1995) analysis is provided by Iceland (2003), who uses both the U.S. Census Bureau definition as well as a relative measure of poverty for the period from 1949 to 1999. With regard to his results for the U.S. Census Bureau definition, Iceland also finds (as did Danziger and Gottschalk) that economic factors—particularly increases in mean household income—overwhelmingly had the dominant impact on reducing poverty from 1949 to 1969. However, in the subsequent period, from 1969 to 1990, Iceland’s (2003: 512–513) results indicate that changes in family structure played a significant role, especially for African Americans. Even so, the total impact of economic factors was still larger than was the effect of

family structure for this period. During the last period in their analysis, from 1990 to 1999, the poverty rate did not change much, and economic factors clearly had the greatest impact—while the distribution of family structure remained relatively constant.

An important contribution of Iceland (2003) is to extend the analysis to a relative definition, according to which the poverty threshold increases as the average standard of living increases in society.<sup>31</sup> Although absolute poverty (i.e., the U.S. Census Bureau definition) declined dramatically from 1949 to 1969, Iceland (2003: 507) finds that relative poverty was reduced only slightly. During the subsequent two periods, from 1969 to 1990 and 1990 to 1999, relative poverty actually increased—in marked contrast to the declines in absolute poverty. Whereas according to the official (i.e., absolute) definition, the poverty rate declined from 13.9% in 1969 to 11.8% in 1999, by Iceland's relative measure, the poverty rate substantially increased from 20.6% in 1969 to 26.1% in 1999.

Iceland's (2003: 509–512) decomposition results generally show that increases in mean household income have much less impact on reducing relative poverty than on reducing absolute poverty and that the former is more highly affected by changes in household income inequality. This result is not surprising given that the thresholds for relative poverty are defined as a percentage of the median household income. In addition, the decomposition results indicate that the impact of family structure for the period from 1969 to 1990 was slightly larger for relative poverty than for absolute poverty, especially in the case of African Americans.<sup>32</sup> From 1990 to 1999, however, family structure again had a negligible impact in the case of relative poverty.

In sum, the studies reviewed in this section used decomposition methods to analyze the impact of changes in family structure on the trend in the poverty rate in the U.S. All of these studies indicate that changes in family structure—and in particular, the increase in female-headed households—have increased poverty at least to some degree before 1990. This conclusion is probably somewhat more applicable to African Americans and to results that are based on a relative measure of poverty. Since 1990, however, changes in family structure have been minor and have not had a significant impact on the poverty rate.

At the same time, these studies seem to agree that although changes in family structure have sometimes played a significant role, economic factors have been the primary factors associated with the trend in poverty in the U.S. In the case of an absolute measure, the trend in poverty is more affected by changes in mean household income. In the case of a relative measure, the trend in poverty is more affected by changes in household income inequality. In reaching these general conclusions, however, we point out that these studies have not investigated whether changes in family structure may have had “indirect effects” on the poverty rate by affecting trends in mean household income and household income inequality. This may be a fruitful issue to explore in future research.

<sup>31</sup> In particular, Iceland (2003: 503) defines the poverty threshold as being one-half of the median household income after accounting for differences in household size.

<sup>32</sup> In a related study, Smith (1988) argues that the effect of family structure on poverty among blacks was slightly more substantial during this time period than had been concluded by Bane (1986). These somewhat different conclusions probably in part reflect their different measures of poverty because Smith (1988) uses a type of relative measure.

Before concluding this section, we point out that the social and economic disadvantages of female-headed families are also evident in other industrialized nations (Garfinkel and McLanahan 1994; Lichter 1997). Data for the early 1990s indicate significantly higher relative poverty rates for female-headed households in Canada, France, Germany, and the United Kingdom (Garfinkel and McLanahan 1994: 209). As discussed by McLanahan and Sandefur (1994), female-headed households tend to be inevitably disadvantaged (as compared to two-parent families) in terms of parenting, economic resources, and social ties to the community. Family structure therefore probably plays a significant role in influencing the level of poverty in other nations as well.

Nonetheless, comparative studies also indicate clearly that the impact of female-headed households on the level of poverty is highly variable and conditional on the role of government programs (Smeeding, Torrey, and Rein 1988). For example, the relative poverty rates of female-headed families in Sweden and the Netherlands are quite low, and these countries are notable for the effectiveness of their welfare programs (Garfinkel and McLanahan 1994). In other European countries as well, government benefits are far more effective (than is the case in the U.S.) in mitigating the adverse economic disadvantages faced by female-headed households (Garfinkel and McLanahan 1994; Rainwater 1995). To be sure, such programs are more costly but they do indicate that poverty among female-headed families can be reduced substantially without increasing appreciably the incidence of female-headed households (Bergmann 1996; Garfinkel and McLanahan 1994).

### **Inequality in the Distribution of Family Income**

In addition to its relationship with the poverty rate, household income inequality is an important issue in itself. With regard to couple-headed families, Treas (1987: 265) notes that income inequality can be viewed as a function of income inequality among husbands plus income inequality among wives plus the covariance between the incomes of husbands and wives.<sup>33</sup> Thus, income inequality among couple-headed families would increase if wealthier men tended to be married to wealthier women but would decrease if wealthier men tended to be married to poorer women. The pattern of assortative mating can thus have a direct impact on the level of income inequality among couple-headed families.

Treas's (1987) review of the literature from the 1960s and 1970s finds that most studies report that the earnings of wives tend to reduce family income inequality. These results seem to derive primarily from (at least for whites) the higher labor force participation among the wives of husbands who have lower incomes. That is, the wives of wealthier white husbands were less likely to have an income through work in the paid labor force. In short, due to the reduced labor force participation and hence lower earnings of the wives of wealthier husbands, the correlation between the incomes of white spouses during this time period appears to be negative, which reduces the level of family income inequality (Cancian, Danziger, and Gottschalk 1993: 210).<sup>34</sup>

<sup>33</sup> The same basic function could also be applied to gay and lesbian couples.

<sup>34</sup> The negative correlation is evident only when nonworking wives' earnings are set equal to zero; the correlation between spouses' earnings among couples where both spouses work was actually slightly positive even during this time period (Cancian, Danziger, and Gottschalk 1993: 210).

During the late 1970s and the 1980s, the labor force participation of women continued to increase. Partly as a result of this increase, the correlation between the earnings of spouses became positive (Cancian, Danziger, and Gottschalk 1993: 210). Although this positive correlation should increase the level of family inequality, the effect was counterbalanced by a reduction in the inequality of earnings among women. That is, the variation in the earnings among women declined significantly as more women worked more hours in the paid labor force. The reduction in inequality in the earnings of women is greater than the effect of the increase in the correlation between the earnings of spouses. The overall result is that during the 1970s, 1980s, and early 1990s, women's earnings reduced family income inequality (Cancian and Reed 1999).

Perhaps the most thorough and informative analysis of this issue is provided by Cancian and Reed (1999). This study develops a decomposition approach that factors in the proportion of households consisting of single persons or single parents. In addition, Cancian and Reed clarify the importance of stipulating the "counterfactual" when assessing the impact of women's earnings on the level of family income inequality. For example, comparison of the observed level of family income inequality and the level that would be obtained if all wives had zero earnings yields a different result than comparison of the observed level of family income inequality and that which would be obtained if the earnings of wives were reduced only slightly. For 1994, the former comparison increases family income inequality while in the latter case inequality is reduced (Cancian and Reed 1999: 180). However, when comparing the level of family income inequality in 1967 with that in 1994, Cancian and Reed conclude that the increase in the latter period would have been substantially greater if wives' earnings in 1994 were the same as they had been in 1967 (i.e., if the mean and variance of the distribution of wives' earnings did not change over this time period). Thus, "the growth in family income inequality cannot be attributed primarily to changes in wives' earnings. Changes in husbands' earnings are substantially more important in explaining recent trends" (Cancian and Reed 1999: 184).

Although this conclusion is important, so is the caveat mentioned by Treas (1987: 275) that "working women trade off time for money. Women perform many valued services around the home (e.g., housekeeping, meal preparation, child care, entertaining, emotional support). When the wife goes to work, the family must either forego some of these services, find another family member to provide them, or spend money to purchase them in the marketplace." This loss in the value of home production is not reflected in the statistics on income distribution analyzed in the studies discussed above. On an hourly basis, however, working-class wives earn appreciably less than do upper middle-class wives, so the former group must work longer hours in order to obtain earnings that are equivalent to those of middle-class wives; working-class families may thus be forgoing more home production. For this reason, we agree with Treas's (1987: 275) speculation that the equalizing effect of women's earnings on the distribution of full income among households may be overstated. Future research on this topic should address this issue.

An additional issue worth pursuing is the effect of women's earnings on men's earnings. This topic was mentioned by Dooley and Gottschalk (1985: 31) in their analysis of the increasing earnings inequality among men. In particular, the increased labor force participation of women may increase the level of market competition experienced by men and perhaps drive down the wages of less educated men through

the sort of occupational queuing process described by Reder (1955).<sup>35</sup> The consequence is that, as more highly educated women work more and increase their labor market opportunities, the inequality in the earnings of men may increase. As we have seen, this inequality is an important source of the level of poverty and the recent increase in family income inequality. Thus, to the extent that such an effect is evident, the equalizing effect of women's earnings on the distribution of family income may be overstated.

Regarding international studies, we are aware of only two publications that have focused on the effects of wives' earnings on inequality in the distribution of family income. The United Kingdom was investigated by Layard and Zabalza (1979), and Gronau (1982) considered the case of Israel. Using data for the 1970s, when the labor force participation and earnings of married women were relatively low in these countries, both of these studies found that the earnings of wives significantly reduced inequality in the distribution of family income.<sup>36</sup> These results are consistent with the basic conclusion for the U.S. during this period (Treas 1987).

In addition to the issue of assortative mating, we also note some recent research on the effect of population growth on household income inequality. While the debate on the relationship between population growth and economic development is well known (e.g., Ahlburg 1998), the relationship between population growth and economic inequality has received little consideration.<sup>37</sup> It is worth noting, however, that Nielsen (1994) and Nielsen and Alderson (1995) consistently find large positive effects of the natural rate of population increase on household income inequality using data for 88 nations from 1952 to 1988. This result is evident in regression models that control for a variety of independent variables and use different specifications. It is thus a robust finding that merits further consideration.

## RESEARCH DIRECTIONS

Much of the research on the demography of social stratification has involved highly detailed descriptive analysis. Although much has been learned from this work in the past few decades, we believe that, at this stage of its development, the field would benefit from increasing the scope and breadth of its analytical models. An important task in this regard is to integrate more varied elements of demography and stratification in order to develop richer (albeit increasingly more complex) models of the processes that generate patterns of mobility and inequality. Although valuable insights and results have been obtained from the usual approach, which predicts a dependent variable outcome as a function of a set of exogenous variables, the field would currently benefit from additional work that attempts to incorporate additional factors that may sometimes be

<sup>35</sup> This hypothesis is reminiscent of the so-called "Easterlin effect," according to which the average labor market outcomes for larger cohorts are worsened due to the greater level of competition. Pampel and Peters (1995) provide a review of studies that investigate the Easterlin effect.

<sup>36</sup> Winegarden's (1987) analysis of household income inequality during the early 1970s does not include data on the earnings of husbands and wives and does not consider the effect of assortative mating. However, his econometric model and results do suggest the possibility that, for developing countries with very low levels of female labor force participation (i.e., even lower than the levels for developed nations during the 1970's), small increases in the labor force participation of women may in itself increase household income inequality.

<sup>37</sup> In one relevant study, Boulier (1982) argues that there is no causal effect of income equality on fertility decline.

endogenous. This broader scope would yield results that are more realistic and hence more relevant to the concerns of both explanatory social science and informed public policy deliberations.

In this regard, an exemplary study is Mare's (1997) investigation of the impact of differential fertility (by race and education) on the level of educational attainment in the American population and on the racial differential in educational attainment. Mare (1997) develops a multigroup projection model which is then used in simulations based on a variety of possible assumptions about patterns of intergenerational social mobility, mortality, and the level and timing of fertility. Among his results, Mare finds that differential fertility by educational attainment has not been substantial enough to have had much impact on the overall level of educational attainment, particularly given the high level of intergenerational educational mobility that characterized much of the 20th century. Similarly, fertility differences both within and between the races have not been substantial enough to have had much of an effect on educational inequality between whites and African Americans. These important conclusions are evident in his simulations, which become feasible only after specifying a model that incorporates a variety of variables pertaining to demography and social stratification.

Another interesting study is Lerman's (1996) analysis of the effects of family structure on poverty and income inequality. The other studies on these topics reviewed above were based largely on decomposition methods that do not explicitly consider interaction or endogenous effects. By contrast, Lerman provides a richer analysis by incorporating the effects of changes in family structure on fertility, the composition of extended families, and the earnings of men and women (rather than treating the latter as being given by their observed values), which in turn have consequences for poverty and household income inequality.<sup>38</sup> After taking into account these endogenous effects, Lerman (1996) argues that the total impact of family structure on poverty and household income inequality is significantly greater than that typically found in earlier studies based on decomposition methods. While we do not necessarily espouse this conclusion or agree with all of the details of his analysis, Lerman's (1996) more enriched approach nevertheless illustrates an important avenue for future research.

However, increasing the scope and breadth of the demography of social stratification should extend beyond simply applying more complex methods. An additional and complementary concern should be with understanding and developing cumulative knowledge about the commonalities in cross-national patterns of mobility and inequality. If increasing the complexity of analytical models means paying more attention to the details of a social process in a particular setting, the goal of understanding common patterns in cross-national research implies assessing the degree to which generic similarities may characterize the process under varied societal contexts. This latter objective of developing cumulative knowledge about generic processes is common to any scientific enterprise.

An important example of this type of research is that of Erikson and Goldthorpe (1992), who, as mentioned above, clarified the pattern underlying intergenerational class mobility throughout industrial societies. This pattern derives from particular features of the class structure, including its socioeconomic hierarchy, sectoral divisions,

<sup>38</sup> Earlier, we also raised the issue of how increases in female labor force participation may also affect men's earnings and thus generate an additional feedback mechanism affecting the level of household income inequality.

cleavages of inheritance, and social affinities (Erikson and Goldthorpe 1987: 64–69). The finding of their research—that these features of the class structure generate a similar pattern of circulation mobility throughout the industrialized world—“ranks as a major discovery” (Treiman and Ganzeboom 2002: 194). It also suggests important substantive and theoretical issues about the linkages between inequality and mobility that merit further investigation (Goldthorpe 2000: 232–258).

Prior to the publication of Erikson and Goldthorpe (1992), numerous influential studies of various substantive and methodological aspects of social mobility were available (some of which were reviewed above). In fact, in reaching their conclusions, Erikson and Goldthorpe build on dozens of prior studies and data collection projects that had been conducted by colleagues in various industrialized countries.<sup>39</sup> Thus, Erikson and Goldthorpe’s conclusions were made possible only because of a general concern in the research community for developing cumulative knowledge about social mobility.

Shavit and Blossfeld (1993) provide another major achievement in building cumulative knowledge about cross-national commonalities in the demography of social stratification. As was discussed earlier, these investigators detail the differentials in educational attainment by class origins in 13 industrialized nations and find that they share a great deal of stability and commonality. Inspired by the seminal analysis of Mare (1981), Shavit and Blossfeld’s conclusions are another example of a collective research endeavor, and they have already led to new theoretical work that has important implications for understanding cross-national commonalities in educational inequality (Breen and Goldthorpe 1997; Goldthorpe 2000).

In closing, we have suggested that the demography of social stratification should increasingly venture beyond conventional descriptive approaches and attempt to broaden the scope of its analytical methods. Previous work in the field has been highly informative, but it has reached a sufficiently mature stage of development that would benefit from developing more complex models that integrate related processes and explicitly include endogenous variables. At the same time, however, the field should continue to pursue cross-national research in order to promote the complementary objective of building cumulative knowledge about general commonalities in the demographic processes pertaining to mobility and inequality.

## REFERENCES

- Ahlburg, D. A. 1998. Julian Simon and the population growth debate. *Population and Development Review* 24: 317–327.
- Alba, R., A. Lutz, and E. Vasselinov. 2001. How enduring were the inequalities among European immigrant groups in the United States? *Demography* 38: 349–356.
- Altonji, J., and T. Dunn. 1996. The effects of family characteristics on the return to education. *Review of Economics and Statistics* 78: 692–704.
- Ashenfelter, O., and A. Krueger. 1994. Estimating the returns to schooling using a new sample of twins. *American Economic Review* 84: 1157–1173.
- Ashenfelter, O., and C. Rouse. 1998. Income, schooling, and ability: Evidence from a new sample of twins. *Quarterly Journal of Economics* 113: 253–284.

<sup>39</sup> Hout (2003: 8) affirms that “finding a common pattern of social fluidity has been a collective endeavor.”

## Demography of Social Stratification

411

- Ashenfelter, O., and C. Rouse. 2000. Schooling, intelligence, and income in America. In *Meritocracy and economic inequality*. Edited by K. Arrow, S. Bowles, and S. Durlauf, 89–117. Princeton, N.J.: Princeton University Press.
- Ashenfelter, O., and D. Zimmerman. 1997. Estimates of the returns to schooling from sibling data: Fathers, sons, and brothers. *Review of Economics and Statistics* 79: 1–9.
- Bane, M. J. 1986. Household composition and poverty. In *Fighting poverty: What works and what doesn't*. Edited by S. Danziger and D. H. Weinberg, 209–231. Cambridge, Mass.: Harvard University Press.
- Banfield, E. 1968. *The unheavenly city*. Boston: Little and Brown.
- Bauman, K. J. 1999. Shifting family definitions: The effect of cohabitation and other nonfamily household relationships on measures of poverty. *Demography* 36: 315–325.
- Bergmann, B. R. 1996. *Saving our children from poverty: What the United States can learn from France*. New York: Russell Sage Foundation.
- Bielby, W. T. 1981. Models of status attainment. *Research in Social Stratification and Mobility* 1: 3–26.
- Blau, D. M., and P. K. Robins. 1989. Fertility, employment, and child-care costs. *Demography* 26: 287–299.
- Blau, P., and O. D. Duncan. 1967. *The American occupational structure*. New York: Wiley.
- Blossfeld, H.-P. 1986. Career opportunities in the Federal Republic of Germany: A dynamic approach to the study of life-course, cohort, and period effects. *European Sociological Review* 2: 208–225.
- Blossfeld, H.-P. 1994. Causal modeling in event history analysis. Paper presented at the 1994 Meetings of the XIII World Congress of Sociology, Bielefeld, Germany. University of Bremen, Germany.
- Blossfeld, H.-P., and G. Rohwer. 1995. *Techniques of event history modeling: New approaches to causal analysis*. Mahwah, N.J.: Lawrence Erlbaum Associates.
- Blumen, I., M. Kogan, and P. J. McCarthy. 1955. *The industrial mobility of labor as a probability process*. Ithaca, N.Y.: Cornell University Press.
- Borg, M. O. 1989. The income-fertility relationship: Effect of the net price of a child. *Demography* 26: 301–310.
- Borjas, G. J. 2001. Long-run convergence of ethnic skill differentials, revisited. *Demography* 38: 357–361.
- Boulier, B. L. 1982. Income redistribution and fertility decline: A skeptical view. *Population and Development Review* 8: 159–173.
- Boyle, P., T. J. Cooke, K. Halfacree, and D. Smith. 2001. A cross-national comparison of the impact of family migration on women's employment status. *Demography* 38: 201–213.
- Breen, R., and J. H. Goldthorpe. 1997. Explaining educational differentials: Towards a formal rational action theory. *Rationality and Society* 9: 275–305.
- Bumpass, L. L., and J. Sweet. 1981. A demographic perspective on the poverty population. Institute for Research on Poverty Discussion Paper No. 669–81. Madison: University of Wisconsin.
- Cambois, E., J.-M. Robine, and M. Hayward. 2001. Social inequalities in disability-free life expectancy in the French male population, 1980–1991. *Demography* 38: 513–524.
- Cancian, M., S. Danziger, and P. Gottschalk. 1993. Working wives and the distribution of family income. In *Uneven tides: Rising inequality in America*. Edited by S. Danziger and P. Gottschalk, 195–221. New York: Russell Sage Foundation.
- Cancian, M., and D. Reed. 1999. The impact of wives' earnings on income inequality: Issues and estimates. *Demography* 36: 173–184.
- Charles, M., and D. B. Grusky. 1995. Models for describing the underlying structure of sex segregation. *American Journal of Sociology* 100: 931–971.
- Chevan, A., and R. Stokes. 2000. Growth in family income inequality, 1970–1990: Industrial restructuring and demographic change. *Demography* 37: 365–380.
- Clogg, C. C. 1982. Using association models in sociological research: Some examples. *American Journal of Sociology* 88: 114–134.
- Crimmins, E. M. 1993. Demography: The past 30 years, the present, and the future. *Demography* 30: 579–591.
- Danziger, S. 1996. Comment on "The age of extremes: Concentrated affluence and poverty in the twenty-first century." *Demography* 33: 413–416.
- Danziger, S., and P. Gottschalk. 1995. *America unequal*. Cambridge, Mass.: Harvard University Press.
- Deaton, A. S., and C. H. Paxson. 1997. The effects of economic and population growth on national saving and inequality. *Demography* 34: 97–114.
- De Graaf, P. M., and H. B. Ganzeboom. 1993. Family background and educational attainment in the Netherlands for the 1891–1960 birth cohorts. In *Persistent inequality*. Edited by Y. Shavit and H.-P. Blossfeld, 75–100. Boulder, Colo.: Westview Press.
- DiPrete, T. A., and D. B. Grusky. 1990. Structure and trend in the process of stratification for American men and women. *American Journal of Sociology* 96: 107–143.

- Dooley, M., and P. Gottschalk. 1985. The increasing proportion of men with low earnings in the United States. *Demography* 22: 25–34.
- Duleep, H. O. 1989. Measuring socioeconomic mortality differentials over time. *Demography* 26: 345–351.
- Duleep, H. O., and M. C. Regets. 1997. Measuring immigrant wage growth using matched CPS files. *Demography* 34: 239–249.
- Duncan, G. J., J. Boisjoly, and T. Smeeding. 1996. Economic mobility of young workers in the 1970s and 1980s. *Demography* 33: 497–509.
- Duncan, O. D. 1966. Methodological issues in the study of social mobility. In *Social structure and social mobility*. Edited by N. Smelser and S. M. Lipset, 51–91. Chicago: Aldine.
- Duncan, O. D. 1969. Inequality and opportunity. *Population Index* 35: 361–366.
- Erikson, R., and J. H. Goldthorpe. 1987. Commonality and variation in social fluidity in industrial nations. II. The model of core social fluidity applied. *European Sociological Review* 3: 145–166.
- Erikson, R., and J. H. Goldthorpe. 1992. *The constant flux: A study of class mobility in industrial societies*. New York: Clarendon Press.
- Farley, R. 1996. The age of extremes: A revisionist perspective. *Demography* 33: 417–430.
- Featherman, D. L., and R. M. Hauser. 1978. *Opportunity and change*. New York: Academic Press.
- Ganzeboom, H. B., and P. De Graaf. 1984. Intergenerational occupational mobility in the Netherlands in 1954 and 1977: A loglinear analysis. In *Social stratification and mobility in the Netherlands*. Edited by B. F. Bakker, J. Dronkers, and H. B. Ganzeboom, 36–61. Amsterdam: SISWO Press.
- Ganzeboom, H. B., and D. J. Treiman. 1996. Internationally comparable measures of occupational status for the 1988 International Standard Classification of Occupations. *Social Science Research* 25: 201–239.
- Ganzeboom, H. B., D. J. Treiman, and W. C. Ultee. 1991. Comparative intergenerational stratification research: Three generations and beyond. *Annual Review of Sociology* 17: 277–302.
- Garfinkel, I., and S. McLanahan. 1994. Single-mother families, economic insecurity, and government policy. In *Confronting poverty: Prescriptions for change*. Edited by S. H. Danziger, G. D. Sandefur, and D. H. Weinberg, 205–225. Cambridge, Mass.: Harvard University Press.
- Garnier, M. A., and L. E. Raffalovich. 1984. The evolution of equality of educational opportunities in France. *Sociology of Education* 57: 1–11.
- Gittleman, M., and M. Joyce. 1999. Have family income mobility patterns changed? *Demography* 36: 299–314.
- Glass, D. V. 1954. *Social mobility in Britain*. London: Routledge and Paul.
- Goldthorpe, J. H. 2000. *On sociology: Numbers, narratives, and the integration of research and theory*. New York: Oxford University Press.
- Goodman, L. A. 1965. On the statistical analysis of mobility tables. *American Journal of Sociology* 70: 564–585.
- Goodman, L. A. 1968. The analysis of cross-classified data: Independence, quasi-independence, and interaction in contingency tables with or without missing entries. *Journal of the American Statistical Association* 63: 1091–1131.
- Goodman, L. A. 1979. Simple models for the analysis of association in cross-classifications having ordered categories. *Journal of the American Statistical Association* 74: 537–552.
- Goodman, L. A. 1981. Three elementary views of log-linear models for the analysis of cross-classifications having ordered categories. In *Sociological methodology 1981*. Edited by S. Leinhardt, 193–239. San Francisco: Jossey-Bass.
- Gortmaker, S. L., and P. H. Wise. 1997. The first injustice: Socioeconomic disparities, health services technology, and infant mortality. *Annual Review of Sociology* 23: 147–170.
- Griliches, Z. 1979. Sibling models and data in economics: Beginnings of a survey. *Journal of Political Economy* 87: S37–S64.
- Gronau, R. 1982. Inequality of family income: Do wives' earnings matter? *Population and Development Review* 8: S119–S136.
- Grusky, D. B., and M. Charles. 1998. The past, present, and future of sex segregation methodology. *Demography* 35: 497–504.
- Grusky, D. B., and T. A. DiPrete. 1990. Recent trends in the process of stratification. *Demography* 27: 617–637.
- Guo, G. 1993. Use of sibling data to estimate family mortality effects in Guatemala. *Demography* 30: 15–32.
- Guo, G., and K. M. Harris. 2000. The mechanisms mediating the effects of poverty on children's intellectual development. *Demography* 37: 431–447.
- Guo, G., and G. Rodríguez. 1992. Estimating a multivariate proportional hazards model for clustered data using the EM algorithm, with an application to child survival in Guatemala. *Journal of the American Statistical Association* 87: 969–976.

- Hannum, E. 2002. Educational stratification by ethnicity in China: Enrollment and attainment in the early reform years. *Demography* 39: 95–117.
- Hannum, E., and Xie, Y. 1998. Ethnic stratification in Northwest China: Occupational differences between Han Chinese and national minorities in Xinjiang, 1982–1990. *Demography* 35: 323–333.
- Hauser, P. M., and O. D. Duncan. 1959. The nature of demography. In *The study of population*. Edited by P. M. Hauser and O. D. Duncan, 29–44. Chicago: University of Chicago Press.
- Hauser, R. M. 1978. A structural model of the mobility table. *Social Forces* 56: 919–953.
- Hauser, R. M. 1979. Some exploratory methods for modeling mobility tables and other cross-classified data. In *Sociological methodology*. Edited by K. F. Schuessler, 413–458. San Francisco: Jossey-Bass.
- Hauser, R. M. 1988. A note on two models of sibling resemblance. *American Journal of Sociology* 93: 1401–1423.
- Hauser, R. M., and D. L. Featherman. 1977. *The process of stratification: Trends and analyses*. New York: Academic Press.
- Hauser, R. M., and M.-H. Huang. 1997. Verbal ability and socioeconomic success: A trend analysis. *Social Science Research* 26: 331–376.
- Hauser, R. M., and P. A. Mossel. 1985. Fraternal resemblance in educational attainment and occupational status. *American Journal of Sociology* 91: 650–671.
- Hauser, R. M., and W. H. Sewell. 1986. Family effects in simple models of education, occupational status, and earnings: Findings from the Wisconsin and Kalamazoo studies. *Journal of Labor Economics* 4: S83–S115.
- Hauser, R. M., J. R. Warren, M.-H. Huang, and W. Y. Carter. 2000. Occupational status, education, and social mobility in the meritocracy. In *Meritocracy and economic inequality*. Edited by K. Arrow, S. Bowles, and S. Durlauf. Princeton, N.J.: Princeton University Press.
- Hauser, R. M., and R. S. Wong. 1989. Sibling resemblance and intersibling effects in educational attainment. *Sociology of Education* 62: 149–171.
- Heckman, J. J., and B. Singer. 1984. A method for minimizing the impact of distributional assumptions in econometric models for duration data. *Econometrica* 52: 271–320.
- Herrnstein, R. J., and C. Murray. 1994. *The bell curve*. New York: Free Press.
- Hirschman, C. 2001. The educational enrollment of immigrant youth: A test of the segmented-assimilation hypothesis. *Demography* 38: 317–336.
- Hodge, R. W. 1966. Occupational mobility as a probability process. *Demography* 3: 19–34.
- Hoem, J. M. 1990. Limitations of a heterogeneity technique: Selectivity issues in conjugal union disruption at parity zero in contemporary Sweden. In *Convergent issues in genetics and demography*. Edited by J. Adams, 133–153. New York: Oxford University Press.
- Holford, T. R. 1980. The analysis of rate of survivorship using log-linear models. *Biometrics* 36: 299–305.
- Hope, K. 1985. *As others see us: Schooling and social mobility in Scotland and the United States*. Cambridge: Cambridge University Press.
- Hout, M. 1984. Occupational mobility of black men: 1962 to 1973. *American Sociological Review* 49: 308–322.
- Hout, M. 1988. More universalism, less structural mobility: The American occupational structure in the 1980s. *American Journal of Sociology* 93: 1358–1400.
- Hout, M. 1989. *Following in father's footsteps: Social mobility in Ireland*. Cambridge, Mass.: Harvard University Press.
- Hout, M. 2003. What we have learned: RC28's contributions to knowledge. Paper presented in March 2003 at the annual meeting of Research Committee #28 in Tokyo, Japan.
- Hout, M., R. Arum, and K. Voss. 1996. The political economy of inequality in the "Age of Extremes." *Demography* 33: 421–425.
- Iceland, J. 1997. Urban labor markets and individual transitions out of poverty. *Demography* 34: 429–441.
- Iceland, J. 2003. Why poverty remains high: The role of income growth, economic inequality, and changes in family structure, 1949–1999. *Demography* 40: 499–519.
- Ishida, H. 1993. *Social mobility in contemporary Japan*. Palo Alto, Calif.: Stanford University Press.
- Jencks, C., et al. 1972. *Inequality: A reassessment of the effect of family and schooling in America*. New York: Harper & Row.
- Jencks, C., et al. 1979. *Who gets ahead? The determinants of economic success in America*. New York: Basic Books.
- Jencks, C., J. Crouse, and P. Mueser. 1983. The Wisconsin model of status attainment: A national replication of improved measures of ability and aspiration. *Sociology of Education* 56: 3–19.
- Johnson, N. J., P. D. Sorlie, and E. Backlund. 1999. The impact of specific occupation on mortality in the U.S. National Longitudinal Mortality Survey. *Demography* 36: 355–367.

- Jonsson, J. O. 1993. Persisting inequalities in Sweden. In *Persistent inequality*. Edited by Y. Shavit and H.-P. Blossfeld, 101–132. Boulder, Colo.: Westview Press.
- Kahl, J. A. 1957. *The American class structure*. New York: Holt Rinehart and Winston.
- Karoly, L. A., and G. Burtless. 1995. Demographic change, rising earnings inequality, and the distribution of personal well-being, 1959–1989. *Demography* 32: 379–405.
- Kasarda, J. D., and J. O. G. Billy. 1985. Social mobility and fertility. *Annual Review of Sociology* 11: 305–328.
- Keyfitz, N. 1977. *Applied mathematical demography*. New York: Wiley.
- Kohler, H.-P., J. R. Behrman, and S. C. Watkins. 2001. The density of social networks and fertility decisions: Evidence from South Nyanza District, Kenya. *Demography* 38: 43–58.
- Laird, N., and D. Oliver. 1981. Covariance analysis of censored survival data using log-linear analysis techniques. *Journal of the American Statistical Association* 76: 231–240.
- Layard, R., and A. Zabalza. 1979. Family income distribution: Explanation and policy evaluation. *Journal of Political Economy* 87: S133–161.
- Lerman, R. I. 1996. The impact of the changing U.S. family structure on child poverty and income inequality. *Economics* 63: S119–S139.
- Leslie, P. H. 1945. On the use of matrices in certain population mathematics. *Biometrika* 33: 183–212.
- Lewis, O. 1966. *La vida: A Puerto Rican family in the culture of poverty*. New York: Random House.
- Li, L., and M. K. Choe. 1997. A mixture model for duration data: Analysis of second births in China. *Demography* 34: 189–197.
- Lichter, D. T. 1997. Poverty and inequality among children. *Annual Review of Sociology* 23: 121–145.
- Lipset, S., and R. Bendix. 1952a. Social mobility and occupational career patterns. I. Stability and job holding. *American Journal of Sociology* 57: 366–374.
- Lipset, S., and R. Bendix. 1952b. Social mobility and occupational career patterns. II. Social mobility. *American Journal of Sociology* 57: 494–504.
- Lipset, S., and R. Bendix. 1964. *Social mobility in industrial society*. Berkeley: University of California Press.
- Mansfield, E. 1979. *Microeconomics: Theory and applications*. New York: W. W. Norton.
- Mare, R. D. 1981. Change and stability in educational stratification. *American Sociological Review* 46: 72–87.
- Mare, R. D. 1990. Socio-economic careers and differentials among older men in the United States. In *Measurement analysis of mortality: A new approach*. Edited by J. Vallin, S. D'Souza, and A. Palloni, 362–387. Oxford: Clarendon.
- Mare, R. D. 1997. Differential fertility, intergenerational educational mobility, and racial inequality. *Social Science Research* 26: 263–291.
- Mare, R. D. 2001. Observations on the study of social mobility and inequality. In *Social stratification: Class, race and gender in sociological perspective*, Edited by D. B. Grusky. Boulder, Colo.: Westview Press.
- Massey, D. S. 1996. The age of extremes: Concentrated affluence and poverty in the twenty-first century. *Demography* 33: 395–412.
- Matras, J. 1961. Differential fertility, intergenerational occupational mobility, and change in the occupational distribution: Some elementary interrelationships. *Population Studies* 15: 187–197.
- Matras, J. 1967. Social mobility and social structure: Some insights from the linear model. *American Sociological Review* 32: 608–614.
- McLanahan, S., and G. Sandefur. 1994. *Growing up with a single parent: What hurts, what helps*. Cambridge, Mass.: Harvard University Press.
- Merli, M. G. 2000. Socioeconomic background and war mortality during vietnam's wars. *Demography* 37: 1–15.
- Miller, P., C. Mulvey, and N. Martin. 1995. What do twins studies reveal about the economic returns to education? A comparison of Australian and U.S. findings. *American Economic Review* 85: 586–599.
- Mincer, J., and B. Jovanovic. 1981. Labor mobility and wages. In *Studies in labor markets*. Edited by S. Rosen, 21–63. Chicago: University of Chicago Press.
- Mukherjee, R. 1954. A further note on the analysis of data on social mobility. In *Social mobility in Britain*. Edited by D. V. Glass, 242–259. London: Routledge & Kegan Paul.
- Namboodiri, K., and C. M. Suchindran. 1987. *Life table techniques and their applications*. New York: Academic Press.
- Nielsen, F. 1994. Income inequality and industrial development: Dualism revisited. *American Sociological Review* 59: 654–677.
- Nielsen, F., and A. S. Alderson. 1995. Income inequality, development, and dualism: Results from an unbalanced cross-national panel. *American Sociological Review* 60: 674–701.

## Demography of Social Stratification

415

- Olineck, M. R. 1977. On the use of sibling data to estimate the effects of family background, cognitive skills, and schooling: Results from the Kalamazoo Brothers Study. In *Kinometrics: Determinants of socioeconomic success within and between families*. Edited by P. Taubman, 125–162. Amsterdam: North-Holland.
- Oropesa, R. S., and N. S. Landale. 2000. From austerity to prosperity? Migration and child poverty among mainland and island Puerto Ricans. *Demography* 37: 323–338.
- Palmer, G. 1954. *Labor mobility in three cities*. New York: Social Science Research Council.
- Pampel, F. C., and H. E. Peters. 1995. The Easterlin effect. *Annual Review of Sociology* 21: 163–194.
- Parsons, T. 1970. Equality and inequality in modern society, or social stratification revisited. In *Social stratification: Research and theory for the 1970s*. Edited by E. O. Laumann, 13–72. Indianapolis: Bobbs-Merrill.
- Powers, D. A. 2001. Unobserved family effects on the risk of a first premarital birth. *Social Science Research* 30: 1–24.
- Powers, D. A. and J. C.-T. Hsueh. 1997. Sibling models of socioeconomic effects on the timing of first premarital birth. *Demography* 34: 493–511.
- Prais, S. J. 1955a. Measuring social mobility. *Journal of the Royal Statistical Society. Series A*. 118: 56–66.
- Prais, S. J. 1955b. The formal theory of social mobility. *Population Studies* 9: 72–81.
- Pribesh, S. and D. B. Downey. 1999. Why are residential and school moves associated with poor school performance? *Demography* 36: 521–534.
- Rainwater, L. 1968. *Behind ghetto walls: Black families in a federal slum*. Chicago: Aldine.
- Rainwater, L. 1995. Poverty and the income packaging of working parents: the United States in comparative perspective. *Children and Youth Service Review*. 17: 11–41.
- Reder, M. W. 1955. The theory of occupational wage differentials. *American Economic Review* 45: 833–852.
- Reed, D. 2001. Immigration and males' earnings inequality in the regions of the United States. *Demography* 38: 363–373.
- Rogers, R. 1992. Living and dying in the U.S.A.: Sociodemographic determinants of death among blacks and whites. *Demography* 29: 287–303.
- Rogoff, N. R. 1953. *Recent trends in social mobility*. Glencoe, Ill.: The Free Press.
- Ross, C. E. and J. Mirowsky. 1999. Refining the association between education and health: The effects of quantity, credential, and selectivity. *Demography* 36: 445–460.
- Ross, C. E., and C.-L. Wu. 1995. The links between education and health. *American Sociological Review* 60: 719–745.
- Rytina, S. 2000. Is occupational mobility declining in the U.S.? *Social Forces* 78: 1227–1276.
- Sakamoto, A., J. Liu, and J. M. Tzeng. 1998. The declining significance of race among Chinese and Japanese American men. *Research in Social Stratification and Mobility* 16: 225–246.
- Sakamoto, A., and J. M. Tzeng. 1999. A fifty-year perspective on the declining significance of race in the occupational attainment of white and black men. *Sociological Perspectives* 42: 157–179.
- Sakamoto, A., H.-H. Wu, and J. M. Tzeng. 2000. The declining significance of race among American men during the latter half of the twentieth century. *Demography* 37: 41–51.
- Schultz, D. A. 1969. *Coming up black*. New York: Prentice-Hall.
- Sen, A. 1976. Poverty: An ordinal approach to measurement. *Econometrica* 44: 219–213.
- Sewell, W., A. O. Haller, and G. W. Ohlendorf. 1970. The educational and early occupational status attainment process: A replication and revision. *American Sociological Review* 35: 1014–1027.
- Shavit, Y., and H.-P. Blossfeld. 1993. *Persistent inequality: Changing educational attainment in thirteen countries*. Boulder, Colo.: Westview Press.
- Shryock, H. S. and J. S. Siegel. 1976. *The methods and materials of demography, condensed ed.* New York: Academic Press.
- Smeeding, T., B. B. Torrey, and M. Rein. 1988. Patterns of income and poverty: The economic status of children and the elderly in eight countries. In *The vulnerable*. Edited by J. L. Palmer, T. Smeeding, and B. B. Torrey, 89–119. Washington, D.C.: Urban Institute.
- Smith, H. L. and P. P. Cheung. 1986. Trends in the effects of family background on educational attainment in the Philippines. *American Journal of Sociology* 91: 1387–1408.
- Smith, J. P. 1988. Poverty and the family. In *Divided opportunities: Minorities, poverty, and social policy*. Edited by G. D. Sandefur and M. Tienda 141–172. New York: Plenum.
- Sobel, M. E., M. Hout, and O. D. Duncan. 1985. Exchange, structure, and symmetry in occupational mobility. *American Journal of Sociology* 91: 359–372.

- Sørensen, A. B. 1974. A model for occupational careers. *American Journal of Sociology* 80: 44–57.
- Sørensen, A. B. 1996. The structural basis of social inequality. *American Journal of Sociology* 101: 1333–1365.
- Spilerman, S. 1976. Careers, labor market structure and socioeconomic achievement. *American Journal of Sociology* 83: 551–594.
- Spilerman, S., and R. E. Miller. 1973. The effect of negative tax payments on job turnover and job selection. In *The final report of the New Jersey graduated income tax experiment, Vol. 1*. Edited by H. W. Watts and A. Rees, 123–167. Madison, Wisc.: Institute for Research on Poverty.
- Stack, C. 1974. *All our kin*. New York: Harper & Row.
- Treas, J. 1987. The effect of women's labor force participation on the distribution of income in the United States. *Annual Review of Sociology* 13: 259–288.
- Treiman, D. J. 1970. Industrialization and social stratification. In *Social stratification: Research and theory for the 1970s*. Edited by E. O. Laumann, 207–234. Indianapolis: Bobbs-Merrill.
- Treiman, D. J. 1977. *Occupational prestige in comparative perspective*. New York: Academic Press.
- Treiman, D. J. and H. B. Ganzeboom. 1990. Cross-national comparative status attainment research. *Research in Social Stratification and Mobility* 9: 105–127.
- Treiman, D. J. and H. B. Ganzeboom. 2002. The fourth generation of comparative stratification research. In *International handbook of sociology*. Edited by S. R. Quah and A. Sales, 193–204. Thousand Oaks, Calif.: Sage Press.
- Trussel, J., and G. Rodríguez. 1990. Heterogeneity in demographic research. In *Convergent issues in genetics and demography*. Edited by J. Adams, 111–134. New York: Oxford University Press.
- Tuma, N. B. 1976. Rewards, resources, and the rate of mobility: A nonstationary multivariate stochastic model. *American Sociological Review* 41: 338–360.
- Tuma, N. B. and M. T. Hannan. 1984. *Social dynamics: Models and methods*. New York: Academic Press.
- Valentine, C. 1968. *Culture and poverty*. Chicago: University of Chicago Press.
- Vaupel, J. A., and A. I. Yashin. 1985. The deviant dynamics of death in heterogeneous populations. In *Sociological methodology 1985*. Edited by N. B. Tuma, 179–211. San Francisco, Jossey-Bass.
- Vaupel, J. A., K. G. Manton, and E. Stallard. 1979. The impact of heterogeneity in individual frailty on the dynamics of mortality. *Demography* 16: 439–454.
- Warren, J. R. and R. M. Hauser. 1997. Social stratification across three generations: New evidence from the Wisconsin Longitudinal Survey. *American Sociological Review* 62: 561–572.
- Weeden, K. A. 1998. Revisiting occupational sex segregation in the United States, 1910–1990: Results from a log-linear approach. *Demography* 35: 475–487.
- White, H. C. 1970. Stayers and movers. *American Journal of Sociology* 76: 307–324.
- Winegarden, C. R. 1987. Women's labour force participation and the distribution of household incomes: Evidence from cross-national data. *Economica* 54: 223–236.
- Wright, E. O. 1979. *Class structure and income determination*. New York: Academic Press.
- Wright, E. O. 2000. Class, exploitation, and economic rents: Reflections on Sorensen's "sounder basis." *American Journal of Sociology* 105: 1559–1571.
- Xie, Y. 1992. The log-multiplicative layer effect model for comparing tables. *American Sociological Review* 57: 380–395.