Social Mobility Trends and Educational Expansion

How Has Educational Expansion Shaped Social Mobility Trends in the United States?

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This contribution provides a long-term assessment of intergenerational social mobility trends in the United States across the 20th and early 21st centuries and assesses the determinants of those trends. In particular, we study how educational expansion has contributed to the observed changes in mobility opportunities for men across cohorts. Drawing on recently developed decomposition methods, we empirically identify the contribution of each of the multiple channels through which changing rates of educational participation shape mobility trends. We find that a modest but gradual increase in social class mobility can nearly exclusively be ascribed to an interaction known as the compositional effect, according to which the direct influence of social class backgrounds on social class destinations is lower among the growing number of individuals attaining higher levels of education. This dominant role of the compositional effect is also due to the fact that, despite pronounced changes in the distribution of education, class inequality in education has remained stable while class returns to education have shown no consistent trend. Our analyses also provide a cautionary tale about mistaking increasing levels of social class mobility for a general trend toward more fluidity in the United States. The impact of parental education on son's educational and class attainment has grown or remained stable, respectively. Here, the compositional effect pertaining to the direct association between parental education and son's class attainment counteracts a long-term trend of increasing inequality in educational attainment tied to parents' education.

Introduction

The empirical study of intergenerational class mobility is generally regarded as one of the workhorses of sociological stratification research (Ganzeboom, Treiman, and Ultee 1991; Hout and DiPrete 2006). After a paucity of research on

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US class mobility trends for about a quarter century, we have seen a recent resurgence of work in this area (e.g., Beller and Hout 2006a; Beller 2009; Mitnik, Cumberworth, and Grusky 2013; Long and Ferrie 2013). These renewed attempts at describing the broader historical patterns of progress toward an open society come at an interesting time—on the heels of the most significant economic downturn since the Great Depression (Grusky, Western, and Wimer 2011; Danziger 2013), when worries about decreasing levels of opportunity in the United States are widespread (e.g., Duncan and Murnane 2011; Corak 2013).

Nevertheless, reliable descriptions of long-term trends in class mobility are largely elusive for the US case (unlike for most European countries; see Breen 2004), and remain hotly debated (Xie and Killewald 2013; Hout and Guest 2013). We also still lack a full understanding of the determinants of long-term trends in social mobility. In particular, we do not know how social mobility trends have been shaped by one of the main mediators of intergenerational mobility, education, and by the fundamental shifts in its distribution, educational expansion. Given that the United States has lost ground and surrendered its former leadership role in educational participation to other countries over the past three decades (Goldin and Katz 2008; Garfinkel, Rainwater, and Smeeding 2010), this channel of social mobility is of profound interest in examinations of historical trends in the United States.

This contribution aims to establish cohort trends in social mobility over the entire 20th century for men and to provide an estimate of the degree to which changes in educational attainment and opportunity contributed to these trends. Earlier research, reviewed below, has yielded partial evidence on the question of whether educational expansion contributes to social mobility. We provide an empirical assessment of this question that joins prior evidence and expands on research that has directly estimated the relationship between educational expansion and social mobility for other countries (Breen 2010) and for an earlier historical period in the United States (Rauscher 2013). We test and ultimately confirm hypotheses developed in earlier work about the specific channels through which educational expansion impacts social mobility (Hout 1988).

We begin by reviewing existing theory and evidence that speak to the questions addressed here and also argue for the benefits of expanding our view beyond that of inequalities in opportunities tied to parental class. The empirical analysis begins with a description of educational expansion and changes in the class structure over the past seven decades. Our main analyses then focus on cohort changes in social class mobility and the role of education—first as a descriptive assessment and then in a decomposition analysis to dissect the contribution of different mechanisms through which educational expansion has shaped those mobility trends. We then apply these analyses to a different specification of individuals' social origins, namely their parents' educational status instead of their parents' social class.

Theoretical Background and Prior Evidence

Trends in Social Class Fluidity

As discussed in more detail in our Methods section, we study trends in social mobility that are more precisely termed trends in "social fluidity" or "exchange mobility"—that is, changes in the association of socio-economic origin and destination independent of shifts in the occupational structure. During the 1970s and 1980s, the particularly laborious field of sociological research on class mobility established a slow upward trend in this type of mobility in the United States over much of the 19th and 20th centuries (Featherman and Hauser 1978; Grusky 1986; Hout 1984, 1988; DiPrete and Grusky 1990). The validity of recent contrary findings by Long and Ferrie (2013) has been challenged based on data limitations and modeling idiosyncrasies, including those lending undue influence to occupational mobility in the farming sector (Xie and Killewald 2013; Hout and Guest 2013). The general tendency of increasing US social class fluidity among men thus remains a valid description of the trend during the century leading up to the 1980s—a finding that also coincides with evidence for most other Western industrialized countries during this period (Breen 2004).

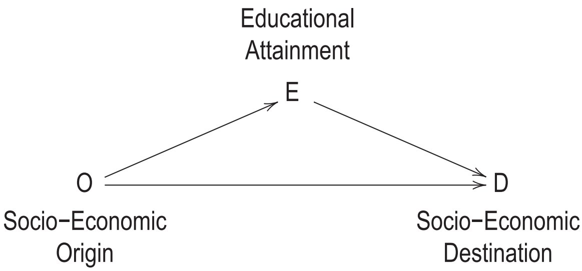
Recent research on trends since the mid-1980s has yielded some evidence that this trend toward increasing social class fluidity may have stalled or, in select dimensions of the class structure, even reversed. Although Beller (2009) finds a general pattern of stability in mobility chances, she shows variance in recent trends depending on whether and how maternal social class status is taken into account. Specifically, she finds a significant decline in social class fluidity for the cohort born 1965–1979, based on a specification of class background that includes a homemaker category for mothers that is further differentiated by educational status (Beller 2009, 521–23). Another recent contribution by Mitnik, Cumberworth, and Grusky (2013) analyzes period changes in social class fluidity and finds some evidence for an increase in the intergenerational association within the managerial/professional class.

The Effects of Educational Expansion

Partial Effects

The lack of reliable estimates of long-term social fluidity trends is mainly due to prior data limitations and changing occupational coding schemes (see the Data section). The comprehensive identification of factors that account for social fluidity trends, on the other hand, has been limited chiefly by conceptual and methodological problems. Figure 1 depicts the standard view of the socio-economic attainment process, in which socio-economic origin (e.g., parents' social class) exerts direct influences on socio-economic destination (e.g., children's social class) as well as indirect effects through offspring's educational attainment (Blau and Duncan 1967). The basic challenge we face in explaining trends in the total association between social origins and destinations, or social fluidity trends, is that each of these pathways—the direct transmission of socio-economic status across generations (OD association), the extent of socio-economic inequality in educational attainment (OE), and the socio-economic returns to educational degrees (ED)—may be subject to change over time. Furthermore, as we discuss below, interactions among the three variables may further complicate the assessment of overall fluidity trends, such as when the direct transmission of status differs by levels of educational attainment.

Figure 1. The mobility triad



Most of the above associations have been subject to extensive empirical study and—in the context of fundamental changes in the distribution of education—to much debate. Here, we briefly review some of the main theoretical approaches and findings on trends in selected parts of the mobility triad for the United States,[1] keeping in mind that they alone do not allow us to draw firm conclusions about the determinants of social fluidity trends. Also, while there are manifold theoretical propositions on the mechanisms behind each of the associations studied here, we limit our review to just the main theories concerned with temporal change in these associations. Finally, we focus on evidence involving measures of social class as indicators of socio-economic standing to inform our own analyses that draw on this conceptualization of social inequality and fluidity.

A theory devised explicitly to explain trends in educational inequality (OE) in the context of expanding educational participation is that of *Maximally Maintained Inequality* (Raftery and Hout 1993). MMI posits that massive educational expansion does not necessarily lower educational inequalities since privileged groups profit from it at higher rates. In this sense, MMI fits the aggregate pattern observed in the United States reasonably well, where massive educational expansion has had little effect on the level of social class inequality in educational attainment (Mare 1981, 1993; Hout, Raftery, and Bell 1993; Hout and Dohan 1996; Roksa et al. 2007). This is notably dissimilar to many European nations where class inequality in education has decreased with educational expansion (Breen and Jonsson 2005; Breen et al. 2009). In terms of the specific pattern of these trends, however, the US case (unlike some other countries; see Hout and DiPrete 2006) does not correspond well to theoretical predictions: MMI proposes that inequality at a given educational level decreases with expansion only when enrollment at that level is already saturated for the privileged classes. Inequality may then simply shift upward to the next educational level. The stability of educational inequality in the United States runs counter to both predictions. First, despite saturation of secondary education among upper classes in the United States, inequality at that level appears to have remained stable. Second, and related to the first point, educational expansion does not appear to have raised class inequality at the tertiary level. Arum, Gamoran, and Shavit (2007) have argued that the potential upward shift of inequality to the postsecondary level implied by MMI depends on the pace of educational expansion: in most countries, postsecondary education expanded faster than did eligibility for it, accommodating the growing pool of applicants without tightening social selection. The same may apply to the US case.

In predicting trends in educational returns (ED) caused by educational expansion, we may distinguish two competing theoretical approaches (cf. Bills 2003; Goldthorpe 2013).[2] Within human capital theory (Becker 1964; Mincer 1974), theories of skill-biased technological change (SBTC) posit that, for about the past three decades, growth in labor-market sectors requiring high technical skills has outpaced the supply of highly educated workers. If educational expansion does not keep pace with the rising demand for high skills, returns to education—in particular, to higher education—increase (Goldin and Katz 2008). On the other hand, signaling (Arrow 1973; Thurow 1975) and screening theories (Spence 1973) hold that education serves to sort individuals according to their productive capacity in the labor market. Unlike human capital theory, this approach thus views education as a positional or relative good (Hirsch 1976), with its value dependent on the overall distribution of educational degrees. Educational expansion would therefore be expected to inflate the value of degrees and result in decreased returns to education. Widely cited findings of increasing income returns to education (Goldin and Katz 2008; Autor, Katz, and Kearney 2008), and particularly to college degrees, correspond to the predictions of SBTC. However, here, we are concerned with trends in *social class* returns (rather than income returns) to education—which may differ to the degree that within-class income variation has changed over time (Weeden and Grusky 2012). While empirical evidence for the United States shows a general pattern of stability in occupational returns to education when they are measured in terms of occupational status (Grusky and DiPrete 1990; Hauser et al. 2000), we know of no direct evidence on recent trends in social class returns to education in the United States. Findings from many European countries, however, show decreasing social class returns (Breen and Luijkx 2004), which are more consistent with predictions from screening and signaling theories.[3]

Finally, on the question of trends in the direct intergenerational transmission of status (OD), the industrialism thesis (Treiman 1970) proposes that industrial development necessarily results in a shift from ascriptive to achievement forces in the attainment of socio-economic positions. In fact, the thesis offers predictions for all legs of the mobility triad: as a functional necessity, modernization weakens the link between social origins and educational attainment (OE) while strengthening the link between educational attainment and social destination (ED), resulting in an increasing mediating role of education in processes of social mobility and, conversely, a decreasing direct effect of social origins on destinations (OD). In this perspective, educational expansion is a necessary response to the functional needs of an increasingly meritocratic industrial society. Given the ample empirical counterevidence to the industrialism thesis (Hout and DiPrete 2006), coherent alternative narratives have been surprisingly slow to emerge (see MacLean and Grusky [2014] for one attempt). Overall, we find a lack of empirical evidence that tracks changes in the direct effects of social class origins on social class destinations, independent of educational attainment, for the United States (for recent evidence for the United Kingdom, see Breen and Karlson 2014). A few contributions that have taken a cross-national comparative approach to this topic have yielded conflicting evidence of similarity and differences in the overall role of education in processes of social class mobility across European countries (Ishida, Müller, and Ridge 1995; Breen and Luijkx 2004). In the next section, we turn our attention to the role of a more specific phenomenon in the direct transmission of social class status—namely, the way in which the direct OD association depends on the level of education attained.

The Compositional Effect

In an influential paper on trends in social class fluidity, Hout (1988) elaborated on an interaction effect that he had seen in some of his earlier mobility research (Hout 1984, 1400). A detailed analysis of intergenerational mobility based on 14 occupational categories led him to conclude that "[t]he effect of origins on destinations differs by level of education. The extreme case is college graduates. For them, current occupational status is independent of origin status. This finding provides a new answer to the old question about education's overcoming disadvantaged origins. A college degree can do it" (Hout 1988, 1391). This finding has come to be known as the *compositional effect* in the mobility literature (Breen and Jonsson 2007, 1778). It may result from more "universal" recruitment policies in the college graduate labor market compared to occupations that do not require such credentials (Hout 1988, 1381). In effect, a college degree may be a sufficiently powerful "signal for employers that leaves little leeway for social network effects" (Breen and Jonsson 2007, 1778), which may otherwise influence recruitment into occupations characterized by low asset specificity. Moreover, the prevalence of graduate employment in bureaucratic organizations that are exemplary for rationalized procedures and limited discretion in hiring decisions could further restrict "allocative inequality," that is, decrease the influence of ascriptive background attributes on rewards and career opportunities (Torche 2011).

Torche (2011) recently provided an overdue empirical update on the question of whether this compositional effect can also be observed for the decades since Hout's original analyses. The short answer is yes. A college degree continues to mitigate the direct effects of socio-economic origins on socio-economic destinations in the United States—whether those are measured in social class categories or using a range of other conceptualizations, such as occupational status, individual earnings, and family income.

Based on the compositional effect, educational expansion should lead to an increase in social fluidity, since more individuals move to an educational level, bachelor's attainment, for which social destinations are decoupled from social origins. This expectation holds in spite of an additional finding by Torche (2011) that a stronger OD association exists among those with a postgraduate degree than those with a bachelor's degree. While the expansion of postgraduate education may tend to dampen the overall mobility-inducing effects of expansion of the postsecondary education sector, the overall effect remains positive, since both the share and expansion of postgraduate degrees are smaller than they are for bachelor's degrees—a situation unlikely to change anytime soon.

The compositional effect has also been observed in other national contexts, including France, Germany, Great Britain, and Sweden (Vallet 2004a; Breen and Luijkx 2007; Breen and Jonsson 2007; Breen 2010). Also, some cross-national comparative work has interpreted the finding that nations with larger postsecondary sectors tend to also have higher rates of social class fluidity as indirect evidence for the compositional effect (Beller and Hout 2006b).

Hout's proposition on the importance of the compositional effect is quite bold. He notes: "I am tempted to ascribe *all the change* in inequality of occupational opportunity to the increase in college graduates in the labor force" (1988, 1384, emphasis added). In that work, he goes on to demonstrate the complexity involved in teasing out the relative contribution of the compositional effect next to changes in the other legs of the mobility triad (1384–1389). We attempt to do just that in this paper, ultimately testing whether Hout's quarter-century-old proclamation has empirical traction.

Joint Consideration

Above, we reviewed extensive research on separate aspects of the role of educational expansion in shaping social class fluidity. However, these theories and pieces of evidence are not easily pulled together into one coherent prediction and empirical test of the effects of educational expansion. Two recent contributions have made great progress along those lines.

Rauscher (2013) provides an innovative analysis using late 19th- and early 20th-century US Census data. She takes advantage of state-to-state variation in the introduction of compulsory schooling laws to identify the causal effects of educational expansion on social fluidity. Rauscher finds that the early phase of educational expansion (compulsory schooling) triggered a slight decrease in social class fluidity among those who, because of their age at the time, were required to attend only a few more years of education, but that it increased social mobility among those whose attendance was raised by the full extent defined in new compulsory schooling laws. The strengths of Rauscher's study lie in its identification of a causal effect of educational expansion on social fluidity—a quite unique addition to a literature focused on associational evidence—and in its examination of a highly interesting historical setting. However, this study—like much current research that draws causal inferences—does not empirically address the mechanisms through which these causal treatment effects occur.

Breen (2010), in contrast, has provided a new methodological approach and empirical (but non-causal) evidence on the mechanisms discussed here. Breen's decomposition method overcomes the described challenges of jointly taking into account the interdependence and possible interactions within the mobility triad and allows analysis of the relative importance of each distinct mechanism. Breen's empirical evidence, based on data from men in Sweden, the UK, and Germany, indicates a strikingly different pattern for each of these cases: social class fluidity trends have been positively influenced chiefly by educational equalization in Sweden, more by the compositional effect than by educational equalization in Germany, and solely by the compositional effect in the UK. Torche and Costa Ribeiro (2010) have applied the same methodology to Brazil, as a case of a late-industrializing country, and found that neither of these two mechanisms account for Brazilian fluidity trends, which instead have been driven by declining class returns to education and a weakening direct effect of class origins on class destination.

Our own analyses use Breen's approach to generate the same type of evidence for the United States. We describe the benefits of the decomposition method in detail below.

Alternative Views of Social Origin

Occupation-based measures of social class continue to be influential and frequently used in sociological research. The main argument for their use is that they are not simply convenient proxy measures of other dimensions of socio-economic standing, such as permanent income (Zimmerman 1992; Hauser and Warren 1997), but that they also capture a much more extensive range of socio-economic conditions central to individuals' lives, opportunities, and consumption patterns (Wright 1996; Lareau and Conley 2008). Unlike gradational measures of inequality, such as income or earnings, the class approach seeks to account for *categorical* differences between social groups. It focuses on the relationship between positions in the system of production to provide a theoretical explanation of unequally distributed outcomes (Wright 1979). Whether the relational content of inequality is captured by mechanisms of exploitation (Wright 1997; Sørensen 2000) or by the conflictual nature of employment relations (Erikson and Goldthorpe 1992), class analysis claims to provide not only an explanatory account but also a distinct description of the inequality space: Occupations that yield similar earnings may differ widely in terms of property ownership, authority, and other aspects of employment relations (Torche 2011). In addition, when used as a descriptor of social background, the extent to which any of these factors independently impact the ability of families to facilitate their offspring's success reveals inequalities in opportunity that unidimensional measures, such as income, fail to account for.

While sharing the insight that occupation-based measures can reveal a distinct and salient dimension of inequality and opportunity, recent sociological work debates the best level of aggregation for social class measures (Weeden and Grusky 2005, 2006; Jonsson et al. 2009). Weeden and Grusky have argued that "big classes are capturing a diminishing share of the total structure in the division of labor" and that "any evidence of a weakening in [big] class effects will have to be accompanied with a caveat that such weakening may simply be an artifact of applying a measurement tool that is conveying ever less information about the inequality space" (Weeden and Grusky 2012, 1755). Their empirical evidence for this claim is debatable.[4] While our data do not allow us to assess whether social fluidity trends are best conceptualized and measured in big, meso-, or micro-classes, it is worth noting that to date there is no empirical evidence of different social fluidity trends in the United States based on micro- and macro-class specifications (Jonsson et al. 2011, 163). Still, the suggestion that social classes have over time become a less valid way of measuring inequality and mobility taps into a common sentiment among parts of the public and among some scholars.

Beyond the theoretical defense of the class approach offered above, some of the empirical evidence we present may also challenge that view. In particular, if decreasing associations with social class measures are taken as an indication of their decreasing validity, some of our findings that document increasing associations may serve as counterevidence.

At the same time, we do not claim that social classes are the only measure of interest to capture social origins (Blau and Duncan 1967). We certainly appreciate the symmetry of an approach that draws on class measures to assess both social origins and social destinations; however, "maintaining the metaphor of social mobility" (Hauser et al. 2000, 192) should not keep us from considering other dimensions of social background that we know to have strong and independent associations with educational and occupational attainment. As Jencks and Tach (2006) remind us, "the best way to measure changes in equal opportunity is to track the effects of specific sources of intergenerational economic resemblance that offend our sense of justice" (24–25). The specific source of inequality in opportunity that we additionally take into account here is parental education.

As is the case for parental class, we may think of multiple mechanisms through which parents' educational status shapes their offspring's educational and occupational attainment. For instance, parents' educational success may provide informational advantages when it comes to navigating educational careers and labor-market entry (Baker and Stevenson 1986; Lareau 1989; Pfeffer 2008). Also, parents with higher levels of education may be able to provide more resourceful learning environments at home, with their own knowledge acquired through education serving as a resource itself. Additionally, parents' own educational status may serve as an anchor to define the minimum level of educational aspirations for their children (Breen and Goldthorpe 1997; Davies, Heinesen, and Holm 2002). Besides these theoretical reasons, we are particularly interested in the association between parents' education and their offspring's outcomes from an empirical perspective because (a) parental education typically has the highest independent influence among other dimensions of social background; and (b) it can be interpreted as a zero-order association between the main socio-economic background characteristics and attainment (since parental education precedes and predicts parental occupation, earnings, and income).

Empirical evidence on trends in the associations between parental education, offspring's own educational status, and social class in the United States is rather limited and is mostly concerned with the OE leg of the mobility triad—the link between parental and children's education, or educational fluidity. Most empirical research has indicated overall stability in the intergenerational association of education over the first three-quarters of the 20th century (Mare 1981, 1993; Hout, Raftery, and Bell 1993; Hout and Dohan 1996; Bloome and Western 2011). Trends since then have been less conclusively established. For instance, Roksa et al. (2007) observe increases in the influence of parental education on college entry during the 1980s and 1990s. Buchmann and DiPrete (2006) report gender-specific trends according to which the influence of parents' education has increased for the higher educational attainment of their same-sex offspring. In particular, they detect a growing influence of father's low educational status (high school attainment or less) on son's higher educational attainment. In contrast, Hout and Janus (2011) find overall stability in the effects of parental education, but their assessment of absolute educational mobility rates reveals decreasing rates of intergenerational upward mobility (i.e., children attaining more education than their parents) and increasing rates of educational downward mobility since the 1970s. And, finally, some findings indicate declining conditional effects of maternal education on higher educational attainment (Belley and Lochner 2007). Still, the more pessimistic conclusions about stable and potentially increasing educational inequality tied to parental education are also in line with international evidence: in most Western countries, we observe more stability in the educational attainment gaps that are tied to parental education than in those tied to parental class (Vallet 2004b; Pfeffer 2008; Shavit, Yaish, and Eval 2007; Breen et al. 2009). Evidence on cohort changes in the relationship between parental education and offspring's class attainment (ED association) in the United States is elusive. The same applies to evidence of a potential compositional effect tied to parental education. Notably, Torche's (2011) expansive analyses of the sensitivity of the compositional effect to different measures of socio-economic origins did not include parental education.

Method

First, we use log-linear and log-multiplicative models (Hout 1983; Powers and Xie 2000) to describe trends in each leg of the mobility triad. We test whether each association (OD, OE, ED) is constant across cohorts or whether we can parsimoniously describe a cohort trend drawing on the "log-multiplicative layer effects" or "uniform difference" (unidiff) model (Xie 1992; Erikson and Goldthorpe 1992). For the assessment of cohort trends in social class fluidity (OD), this model is

$$f_{ijl} = \mu \gamma_l^C \gamma_i^O \gamma_j^D \gamma_{li}^{CO} \gamma_{lj}^{CD} \exp(\Psi_{ij} \Phi_l), \quad (1)$$

where Φ_l describes the cohort-specific deviation in the association between class origin, O, and class destination, D (Ψ_{ij}). The model thus produces a single parameter (Φ_l) for each cohort that can be used to parsimoniously describe cohort trends in social fluidity (independent of the overall class distribution) while fitting a common pattern of association across all categories of O and D (Xie 1992, 382). A further, even more parsimonious model imposes linearity on the cohort trend in Φ_l, that is, a linear increase or decrease in social fluidity (Breen and Luijkx 2004).[5]

We draw on a decomposition method developed by Breen (2010) to compare observed trends in social fluidity to counterfactual trends derived from specific assumptions about the role of education (for a detailed description of the method, see appendix A). In particular, we assess how educational expansion has altered social mobility trends through the following three mechanisms: the compositional effect (OED), cohort changes in class inequality in education (COE), and cohort changes in the returns to education (CED). We begin with a baseline counterfactual mobility trend that constrains all meaningful interactions between origin, education, and destination to be constant across cohorts—resulting in a flat trend. We then investigate mobility trends based on counterfactual COD distributions that we derive from separately freeing up the parameters entailing the three mechanisms described above. We then assess how closely each of these counterfactual mobility trends approximates the observed mobility trend. This decomposition approach thus allows us to gain an insight into the relative importance of each mechanism through which educational expansion may contribute to social mobility trends.

All of our models are estimated using the program R (R Core Team 2013; Turner and Firth 2012).

Data and Measures

We draw on data from 29 repeated cross-sectional surveys from the General Social Survey (GSS) administered between 1972 and 2012. Our analytic samples (N = 14,588–14,608) consist of men age 30 to 64 in each year of data collection. We follow Breen (2010) in restricting our analyses to men and compare our results to his male-only evidence from other countries. The exclusion of women is lamentable but imposed by data limitations. Female labor-force participation was low in the earliest cohorts, yielding too few observations to reliably model their fluidity trend and, even less so, to account for the mechanisms underlying it. In appendix B, we discuss these data limitations in more detail but also provide suggestive baseline estimates for women that await more reliable modeling in future research.

We further restrict our analytic sample to respondents who had lived in the United States at age 16 to capture those most likely to be exposed to educational expansion in the United States (as opposed to those who have attained their basic education outside the United States).

Our analyses distinguish six birth cohorts, covering men born roughly before and during WWI (1883–1921), in the interbellum period (1922–1933), before and during WWII (1934–1945), post-WWII (1946–1957), during the Fordist growth phase of the 1950s and 1960s (1958–1969), and during the recession era of the 1970s and early 1980s (1970–1982).[6] We typically label our cohort members by the years they turned 30 to help focus on the time period in which they completed their educational and occupational attainment.

Men's educational attainment is measured as the highest degree attained in the following four categories: less than high school, high school, some college (including associate's degree), and bachelor's degree or higher. As a measure of social origin, we use the highest educational status of parents based on the same degree categories. Because our sample sizes do not allow us to distinguish between the attainment of a bachelor's degree and postgraduate degrees for our decomposition analysis, the results can be understood as a weighted average of the educational inequalities, returns to education, and most of all, the compositional effect (Torche 2011) associated with each of the two levels of postsecondary attainment.

Respondents' reports of their current occupation are the basis for the assessment of their social class destination. Drawing on the EGP class scheme (Erikson and Goldthorpe 1992), which has been widely used in quantitative research on social class, we distinguish six occupation-based social classes: higher-grade professionals and managers/higher service class (I), lower-grade professionals and managers/lower service class (II), routine non-manual workers (IIIab), the self-employed and farmers (IVabc), skilled manual workers and supervisors (VI + V), and unskilled manual workers (VIIab).[7]

We assess men's class origin by applying the same EGP class scheme to respondents' reports of their father's occupation when they were growing up. We use father's occupation as the measure of origin because information on mother's occupation is not available in earlier years. While this focus on male lineages again follows most prior research, we acknowledge that estimates of class mobility trends in the United States for the most recent cohorts vary depending on how mother's social class status is taken into account (Beller 2009). In stability analyses reported in Online supplement, we replicate some of those findings, but the study of the mechanisms behind these diverging trends through our decomposition approach is beyond the scope of this paper and the statistical power of our sample. Based on Beller's findings, we note that we may underestimate a recent decrease in social class mobility.

We impute missing values on our main measures of education, destination, and origin using the Stata mi command. The results reported here are stable to a wide range of different approaches to treating missing values, different specifications of our social class measure, and different sample constructions. These stability analyses are reported and discussed in more detail in Online supplement.

Changes in the Educational and Class Structure

We begin by describing cohort trends in the two societal features that are at the heart of this assessment: the educational structure and the class structure (see table 1).

In terms of shifts in the educational distribution, ample empirical research has of course already described the rapid pace of educational expansion during much of the 20th century and its tapering off during the past decades (Fischer and Hout 2008; Goldin and Katz 2008; Garfinkel, Rainwater, and Smeeding 2010). Our own data capture these trends well: the share of men with a postsecondary degree rose rapidly and linearly from 12.9 percent in the first cohort (who turned 30 before 1951) to 30.9 percent in the fourth cohort (who turned 30 between 1976 and 1987). Since then, however, the share of postsecondary degree holders has remained stable, as has the share of those with some college. These trends are mirrored at the lower level of the educational distribution, where high school dropout rates decreased sharply and linearly for the first four cohorts (from 44.9 to 11 percent) and then remained at that level for the last two cohorts. These trends, once again, underline the dramatic success in expanding education during most of the last century and the ebbing of that trend in recent decades. In the remainder of the manuscript, we therefore use the term "educational expansion" as a shorthand for these large-scale distributional shifts in education without meaning to imply a linear progress for all cohorts (see also Goldin and Katz 2008, 249).

The second panel of table 1 shows cohort changes in the class structure during the same period. Highly skilled white-collar positions (high service class)

Table 1. Cohort Trends in Education and Class Structure

	Year turned 30					
	Before 1951	1952–1963	1964–1975	1976–1987	1988–1999	2000–2012
Highest degree						
Less than HS	44.9%	35.8%	20.7%	11.0%	9.8%	10.5%
HS	41.8%	43.7%	50.1%	50.5%	53.6%	50.2%
Some college	0.4%	1.8%	4.2%	7.6%	8.5%	7.6%
BA and more	12.9%	18.7%	25.1%	30.9%	28.1%	31.6%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Destination class						
High service	16.4%	22.1%	25.6%	23.7%	23.3%	22.0%
Low service	11.2%	11.4%	13.4%	16.4%	15.9%	18.5%
Routine non-manual	8.7%	9.7%	7.3%	8.2%	7.8%	9.2%
Self-employed	14.3%	12.3%	10.7%	9.3%	8.1%	7.2%
Skilled manual	24.8%	20.5%	20.2%	20.2%	22.5%	21.8%
Unskilled manual	24.6%	24.0%	22.7%	22.2%	22.4%	21.4%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

expanded substantially for the first three cohorts of our sample (from 16.4 to 25.6 percent) but then slowly declined to 22 percent for the most recent cohort. On the other hand, the share of lower-grade professionals and managers (low service class) rose steadily from 11.2 percent in the oldest cohort to 18.5 percent in the youngest cohort. The working classes experienced a contraction that was comparatively modest in size and mainly due to the decreasing share of unskilled manual labor (from 24.6 to 21.4 percent). Routine non-manual labor shows no pronounced cohort trends. The share of self-employed (including farmers) has been cut in half (14.3 to 7.2 percent), mostly due to the rapid decline of small-farm holders. Given these changes in the class structure, it is important to emphasize that our analyses assess relative mobility rates ("exchange mobility"). These rates capture social fluidity levels that exclude mobility that directly follows from the structural shifts shown here ("absolute mobility").

Educational Expansion and Social Class Fluidity

Observed Trends

We begin by assessing cohort trends in each leg of the mobility triad. Table 2 reports the fit statistics for three different models of trends in men's social class fluidity (ODC), trends in educational inequality tied to parental class (OEC), and

Table 2. Parental Class: Fit Statistics for Observed Trends in Mobility Components

	G^2	df	p	Δ	BIC	*p* vs #.1	*p* vs #.2
ODC (trends in social class fluidity)							
1.1 Constant	150.1	125	0.0623	0.037	–1,049		
1.2 Linear UniDiFF	146.7	124	0.0804	0.036	–1,042	0.0652	
1.3 UniDiFF	146.3	120	0.0516	0.036	–1,004	0.5786	0.9825
OEC (trends in educational inequality tied to parental class)							
2.1 Constant	101.8	75	0.0214	0.027	–617		
2.2 Linear UniDiFF	100.8	74	0.0208	0.027	–609	0.3173	
2.3 UniDiFF	98.1	70	0.0150	0.027	–573	0.5934	0.6092
EDC (trends in class returns to education)							
3.1 Constant	105.4	75	0.0119	0.024	–614		
3.2 Linear UniDiFF	105.2	74	0.0101	0.024	–604	0.6547	
3.3 UniDiFF	94.1	70	0.0291	0.023	–577	0.0458	0.0255
UniDiff parameters	**Linear**	**C = 1**	**C = 2**	**C = 3**	**C = 4**	**C = 5**	**C = 6**
OD (1.2 & 1.3)	–0.030	1	0.946	0.913	0.889	0.843	0.864
OE (2.2 & 2.3)	0.021	1	0.884	1.024	0.979	1.030	1.030
ED (3.2 & 3.3)	–0.006	1	1.032	1.161	1.035	1.101	0.945

Note: Authors' calculations based on GSS (1972–2012); $N = 14{,}608$.

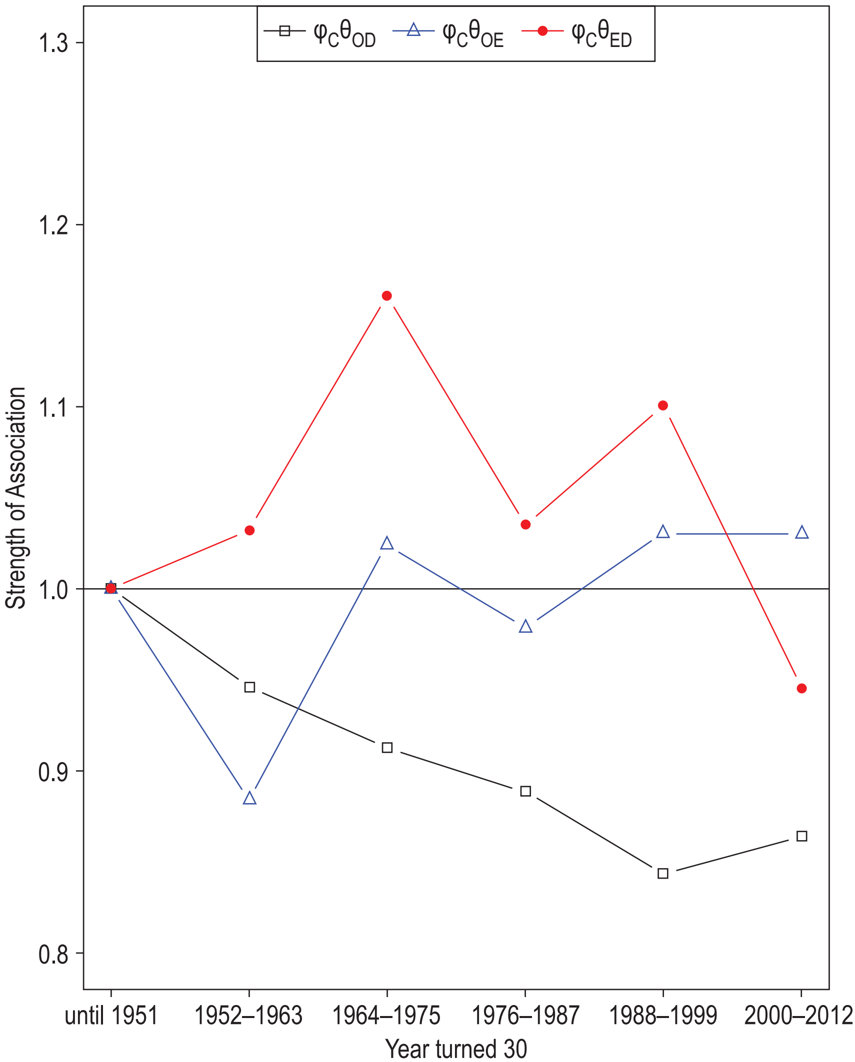
trends in class returns to education (EDC). In each case, the first model assumes the association to be constant across cohorts, the second model imposes a linear cohort trend in the strength of association (while holding the pattern of association constant), and the third model allows the strength of association to differ freely across cohorts.

For all three processes studied, the first model (no trend) generally yields a satisfactory model fit with non-significant deviations between predicted and observed frequencies at $p > 0.01$–0.06 and the share of misclassified cases (Δ) between 2.3 and 3.7 percent. It could be chosen as the preferred model when also considering its parsimony (BIC values 7–10 points lower compared to linear unidiff models). In general, this finding indicates that cohort trends in these associations are of relatively modest size, if present at all.

In fact, for the description of cohort trends in class inequality in education, we can accept the model of constant association as the best model. In contrast, for the analyses of both social fluidity and returns to education, we find some evidence for modest cohort differences. For trends in social class fluidity, the linear unidiff model provides an improvement in model fit over the constant association model ($p < .065$). The bottom panel of table 2 shows a negative linear unidiff parameter for social fluidity (–0.030), denoting a linearly decreasing association between class origin and class destination across cohorts. For trends in class returns to education, the unidiff model also provides a significant improvement in model fit over the constant association model ($p < .046$), although the cohort differences do not follow a clear pattern (bottom panel of table 2).

In plain terms, we find stability in class inequality in education, modest but continuous increases in social class fluidity, and relatively trendless fluctuation in class returns to education. Although not the preferred model in all cases, the unconstrained unidiff models yield parameter estimates that reinforce this conclusion. We display these unidiff parameters in figure 2 for further illustration.

Figure 2. Parental class: Observed trends in mobility components



Note: Displaying UniDiff parameters for trends in social class mobility ($\varphi_C\theta_{OD}$), class inequality in education ($\varphi_C\theta_{OE}$), and class returns to education ($\varphi_C\theta_{ED}$) in reference to the oldest cohort. Fit statistics and number of observations see table 2.

First, we can observe a linear decline in the association between class origin and destination (θ_{OD}) up to the youngest cohort. The uptick in the OD association for the youngest cohort can be interpreted as a tentative sign of a recent decline in fluidity (it is also more pronounced, though still not statistically significant, when we impose a lower age limit of 35 instead of 30; available from the authors). In particular, we point out that this suggestive evidence coincides with the findings by Mitnik, Cumberworth, and Grusky (2013), despite being based on a much different analytic approach.[8] Second, we observe overall stability in the association between class origin and education (θ_{OE}). The seemingly lower level of class inequality in educational attainment among the second oldest cohort could reflect the egalitarian effects of the GI bill (Bound and Turner 2002)—although this evidence is again at best suggestive at the backdrop of the overall fit statistics discussed above (no significant improvement of the unidiff model over the "no trend" model). And, third, we see largely directionless fluctuation across cohorts in the association between education and class destination (θ_{ED}).[9]

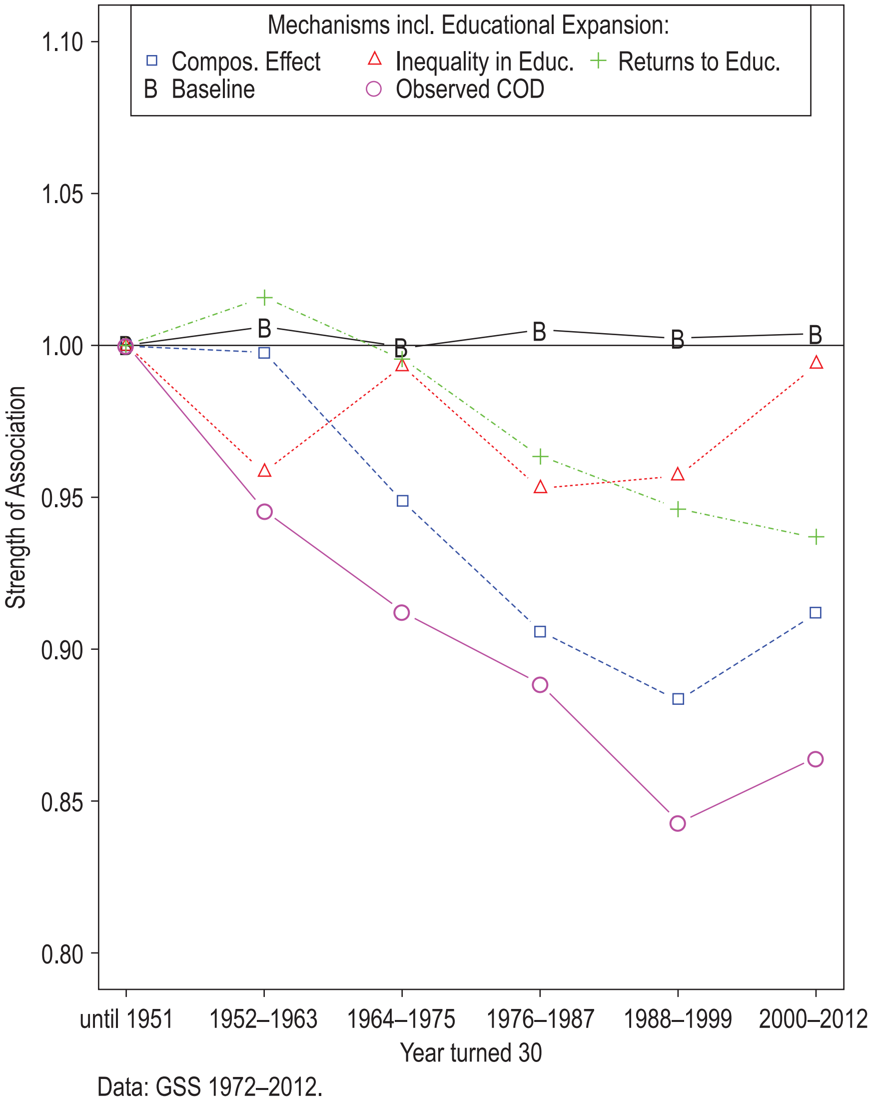
The evidence presented here is new and interesting in its own right, indicating that while men's social class fluidity increased modestly across birth cohorts over the past seven decades, class inequality in education and class returns to education did not vary consistently across cohorts. However, as explained above, these findings yield informative but insufficient evidence regarding the overall role of education and its expansion in explaining the increase in social class fluidity. To investigate how these three trends fit together, we therefore now turn to the decomposition analysis.

Decomposition Analysis

The aim of our decomposition analysis is to reveal the relative importance of each of the three mechanisms through which educational expansion may shape trends in social class fluidity. In essence, we are interested in how closely each counterfactual fluidity trend approximates the observed trend. Figure 3 displays the observed trend in social fluidity (*O*) that we already described above. The baseline fluidity trend (*B*), based on a counterfactual mobility table derived from a model that fixes all relevant parameters to be constant (see Appendix A), unsurprisingly is one of stability. Our main interest lies in the three lines between the baseline (*B*) and the observed mobility (*O*) trend. Each of these trend lines is based on a counterfactual mobility table that fits the effects of educational expansion in combination with one of the following: the compositional effect (□), changes in class inequality in education (△), and changes in returns to education (+), respectively. We assess the relative importance of these three mechanisms by observing how closely each corresponding counterfactual trend approximates the observed trend.

The result is quite clear: the counterfactual trend that best and quite closely approximates the observed trend is that produced by the model that accounts for the effect of educational expansion via the compositional effect (□). The flattening out of this counterfactual trend for the last three cohorts also corresponds well to the demonstrated slowdown in educational attainment among those cohorts. In contrast, class inequality in education and class returns to education,

Figure 3. Parental class: Counterfactual trends in social mobility



Note: Displaying UniDiff parameters from separate models fitted to counterfactual and observed cross-classifications of parental class, education, and class destination (see Appendix A).

which we found to be largely trendless, do not contribute to increases in social fluidity. Our graphical inspection thus leads us to conclude that the compositional effect alone accounts for the positive relationship between educational expansion and social fluidity rates - a conclusion very much in line with Hout's original hypothesis (1988). We can further quantify this effect using our decomposition results: based on the linear unidiff parameters, 90 percent of the observed trend in social class fluidity is tied to the effects of educational expansion via the compositional effect (linear unidiff parameter estimates for baseline = 0.000, compositional effect = –0.027, observed = –0.030).

A Complementary View: Inequalities tied to Parental Education

Observed Trends

We now turn our attention to a view of social fluidity that relies on a different indicator of socio-economic origin - parents' educational attainment. As discussed above, there are sound theoretical reasons to expand our assessment of trends in educational and class attainment opportunities in this direction. Also, from an empirical perspective, we are interested in describing an alternative dimension of attainment inequality that may have been subject to a different development over time than that based on father's occupational status.

Our empirical models, which mirror those presented above, now capture inequality in educational attainment and class attainment (measured in the same way as above) tied to parental education (OD and OE, respectively) and, as before, class returns to education (ED). Table 3 reports the fit statistics of our main models for each of these associations. We will not repeat our discussion of

Table 3. Parental Education: Fit Statistics for Observed Trends in Mobility Components

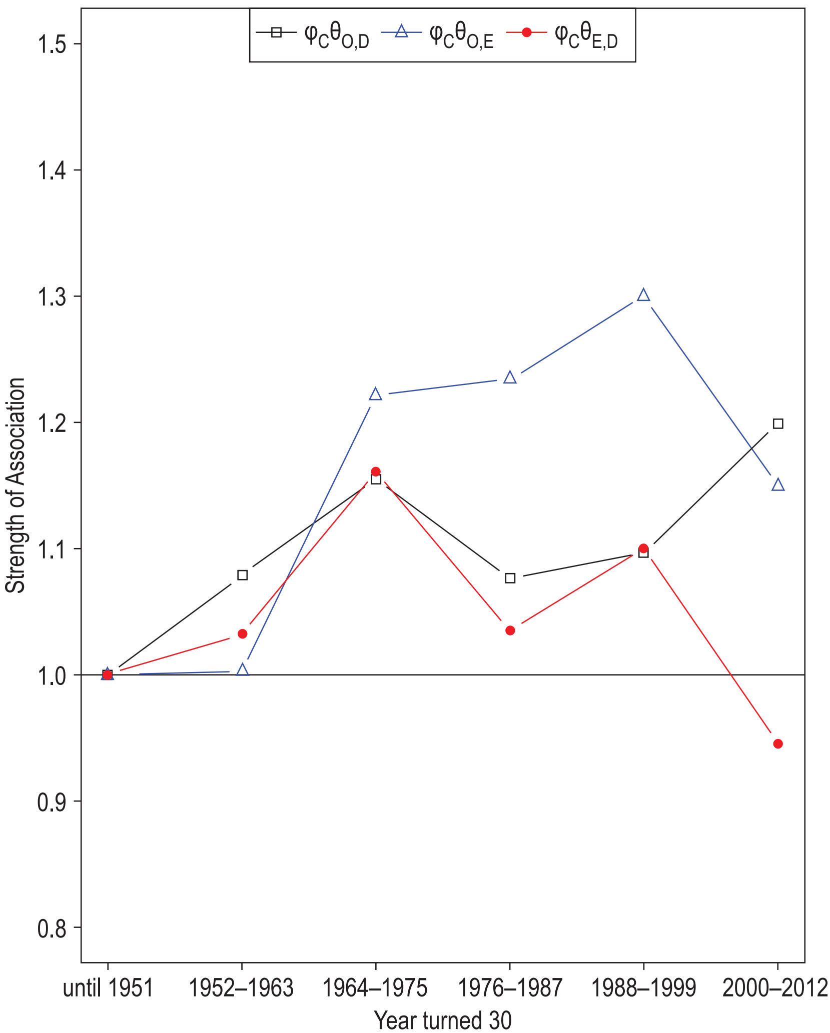
	G^2	df	p	Δ	BIC	*p* vs #.1	*p* vs #.2
ODC (trends in association between parental education and class destination)							
1.1 Constant	56.1	75	0.9496	0.018	–663		
1.2 Linear UniDiFF	55.8	74	0.9434	0.018	–654	0.5839	
1.3 UniDiFF	54.1	70	0.9204	0.018	–617	0.8492	0.7907
OEC (trends in educational inequality tied to parental education)							
2.1 Constant	70.5	45	0.0090	0.017	–361		
2.2 Linear UniDiFF	61.5	44	0.0414	0.014	–360	0.0027	
2.3 UniDiFF	53.1	40	0.0805	0.012	–330	0.0038	0.0780
EDC (trends in class returns to education)							
3.1 Constant	105.4	75	0.0119	0.024	–614		
3.2 Linear UniDiFF	105.2	74	0.0101	0.024	–604	0.6547	
3.3 UniDiFF	94.1	70	0.0291	0.023	–577	0.0458	0.0255
UniDiff parameters	**Linear**	**C = 1**	**C = 2**	**C = 3**	**C = 4**	**C = 5**	**C = 6**
OD (1.2 & 1.3)	0.014	1	1.079	1.155	1.077	1.097	1.199
OE (2.2 & 2.3)	0.060	1	1.003	1.222	1.234	1.300	1.149
ED (3.2 & 3.3)	–0.006	1	1.032	1.161	1.035	1.101	0.945

Note: Authors' calculations based on GSS (1972–2012); N = 14,588.

cohort trends in class returns to education, since the models estimated for this association are equivalent to those reported earlier.

These new analyses reveal trends that sharply differ from those described earlier. For our assessment of the association between parental education and class destination (OD), the constant association model provides a great fit upon which neither the linear unidiff nor the unidiff model may improve, suggesting that cohort trends in this association should be minimal. The unidiff estimates (bottom of table 3 and displayed in figure 4) yield a slightly different impression, namely, one of a generally increasing association. A conservative interpretation

Figure 4. Parental education: Observed trends in mobility components



Note: Displaying UniDiff parameters for trends in association between parental education and class destination ($\varphi_C\theta_{OD}$), inequality in education tied to parental education ($\varphi_C\theta_{OE}$), and class returns to education ($\varphi_C\theta_{ED}$) in reference to the oldest cohort. Fit statistics and number of observations see table 3.

of this evidence suggests that, unlike the influence of class origin, the influence of parental education on class destination has not declined, and may even have increased somewhat.

The statistical evidence on trends in inequality in educational attainment tied to parental education (i.e., educational mobility) is more clear-cut. Both the linear unidiff model and the unidiff model yield statistically significant improvements in model fit over the constant association model ($p < .003$ and $p < .004$, respectively), and figure 4 reveals a pronounced upward trend in this association with a decline for the youngest cohort (a very similarly shaped, though non-significant trend, is reported in Pfeffer [2008], 552).

In sum, while we earlier showed a relatively weak but steady decrease in the association between men's class and their social origin based on father's class, here we find no such decrease based on parental education. In terms of men's own educational attainment, we even see evidence of an increasing role of parents' educational status.

These conclusions about trends in the distribution of opportunities thus differ quite substantially from those derived earlier based on a measure of social class origin. Ascribing these differences to the decreasing validity of "big" social class measures would overlook the fact that, in both sets of analyses, our measure of socio-economic destination is social class. That is, if decreasing associations between class backgrounds and class destinations are interpreted as indicative of decreasing validity of social class measures, stable or increasing associations between educational background and class destinations would suggest stable or increasing validity of our measure of social class destinations. Instead, we believe that the results just presented imply that the structuration of life chances in terms of class destinations continues and is increasingly tied to educational backgrounds.[10] Rising intergenerational associations in educational attainment may, for instance, reflect increased information requirements to navigate a greatly expanded set of educational options, which may be best met by parents' own knowledge and experience of the educational system (see also Baker 2014, 54).

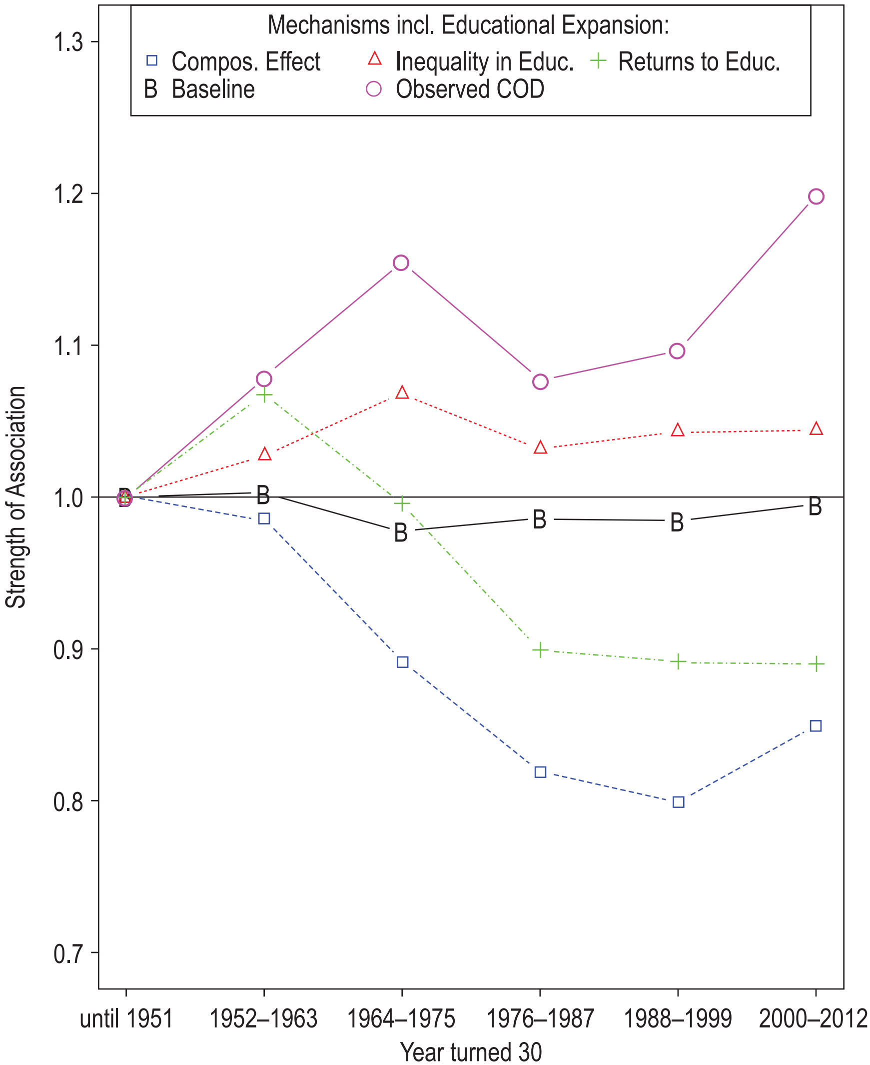
Overall, the evidence presented here thus provides an important and cautionary tale about mistaking increasing levels of social class mobility, analyzed as intergenerational associations in social class, for a general and broad trend toward more fluidity.

Decomposition Analysis

The divergent trends in social fluidity based on parental education versus father's class immediately raise the question of which way the three mechanisms assessed earlier can explain the observed trends in this dimension of inequality in opportunity. Results from the decomposition analysis again provide a clear-cut answer (see figure 5).

Educational expansion *decreased* the association between parental education and sons' class destination through the compositional effect (□), and, at least for the youngest three cohorts, through changing class returns to education (+); although, as shown above, the latter changes show no consistent pattern. In

Figure 5. Parental education: Counterfactual trends in social mobility



Data: GSS 1972–2012.

Note: Displaying UniDiff parameters from separate models fitted to counterfactual and observed cross-classifications of parental education, education, and class destination (see Appendix A).

other words, these two mechanisms worked in the opposite direction of the actually observed trends. The strong positive influence of the compositional effect—similar to its major role in class fluidity trends—has been counterbalanced by a simultaneous increase in educational inequality (documented above): the counterfactual changes in fluidity generated by the latter trend (△) closely track the observed changes. That is, educational expansion has increased educational inequalities tied to parental education to an extent that offsets the otherwise strong positive influence of the compositional effect.[11]

Conclusion

Many agree upon increasing intergenerational social mobility as a policy goal, whether out of consideration of social justice or economic efficiency. The education system has long been acknowledged as a central sphere for the provision of such opportunities for mobility (Durkheim 1965[1922]; Coleman 1968; Labaree 1997). In this analysis, we expand on recent work (Breen 2010) to shed new light on the role of education for social mobility by tracking the relationship between shifts in the educational distribution and long-term trends in social fluidity for the United States. We identify three main channels through which educational expansion may shape social fluidity trends - changes in educational inequality, changes in returns to education, and the compositional effect - and we test their relative importance in accounting for cohort changes in social fluidity.

In terms of social class fluidity, we find a slow but steady increase across cohorts born throughout the first eight decades of the 20th century. This finding constitutes a separate contribution to an ongoing controversy about long-term trends in social class fluidity (Long and Ferrie 2013; Xie and Killewald 2013; Hout and Guest 2013). We find that the fluidity-inducing effects of educational expansion are nearly entirely accounted for by the compositional effect (the fact that the direct link between social origins and destinations is severed among those men who attain a college degree; see Hout 1988; Torche 2011). Because educational expansion has increased the share of the population with college degrees, its effect on social fluidity has been positive. In contrast, educational expansion did not contribute to higher rates of social class fluidity by equalizing educational outcomes. We have shown, in line with prior evidence, that it left the degree of class inequality in education largely unchanged. Also, increasing levels of social class fluidity cannot be ascribed to the way in which educational expansion has impacted class returns to educational degrees, whose development across cohorts does not follow a consistent pattern.

Hout and Dohan have argued that "the lack of coordinated or sustained policy regarding equality of educational opportunity makes the United States a prototypical example of a nation that has relied on expansion more than policy to promote equality of educational opportunity" (Hout and Dohan 1996, 212). Like others before us, we have shown that educational expansion alone is a poor policy when aimed at decreasing class inequality in education, which has persisted quite stubbornly. While more targeted policies are needed to decrease inequality in education in the United States (Haveman and Smeeding 2006), our findings suggest that educational expansion has nevertheless contributed in a major way to increasing men's mobility opportunities (see also Breen 2010, 382). As hypothesized a quarter century ago by Hout (1988), the greatest part of the increase in social fluidity (in our empirical results, 90 percent) can be ascribed to the compositional effect.

In comparison to the three national cases presented by Breen (2010), our findings for the United States are most akin to the results from the United Kingdom, where the compositional effect emerged as the only fluidity-inducing factor. The evidence that the compositional effect is the near exclusive channel through which educational expansion has positively influenced social class fluidity in these two Anglo-Saxon countries corresponds to findings from cross-national comparative work that has hypothesized that the compositional effect is "most pronounced in the liberal welfare setting where the association would otherwise be greatest" (Beller and Hout 2006b, 353).

We have argued that despite a long sociological tradition of assessing trends in mobility opportunities tied to parents' social class, there are sound reasons to be interested in other dimensions of socio-economic inequality in opportunity as well. Having analyzed inequalities tied to parental education, we are wary of broad claims about social progress solely based on analyses that use just one select measure of social origin. Unlike the picture of moderately growing social fluidity generated by our analyses based on parents' occupational status, considering the role of parental education for sons' educational and class attainment offers a less dynamic view. We find no evidence for a decrease in the association between parental education and sons' class attainment (social fluidity); if anything, this association has increased over time. Also, the intergenerational association in educational status has increased, effectively counterbalancing the positive compositional effect tied to parental education.

The divergent trends in educational inequality and social fluidity based on two different indicators of social origins may indicate that the channels of intergenerational status transmission change across time (Sorokin 1927). While one dimension of socio-economic advantage may lose some power in enabling the success of the next generation, another dimension of advantage may gain traction. Based on the findings presented here, such a story could be told about social class inequalities in opportunity making way for inequalities tied to parental education (Bourdieu 1984, 1996). However, our conclusions about the role of educational expansion hold for both of these divergent trends: Educational expansion contributed to more equal opportunities for social class attainment by breaking the direct intergenerational transmission of status among an increasing number of men attaining a college degree—and by thereby counterbalancing the stability of class inequalities in educational attainment and the increase of educational inequalities tied to parental class.

The findings presented here can inform future research seeking to address related topics and unresolved questions. First, our finding of divergent trends tied to parental class and parental education raises the question of how other dimensions of inequality in opportunity have evolved over time. Another such dimension is income, the subject of a large field of research with some partial evidence that awaits integration. For example, recent research indicates that the intergenerational income correlation has remained largely stable (Lee and Solon 2009; Chetty et al. 2014); that income inequality in education has recently been increasing (Belley and Lochner 2007; Reardon 2011; Bailey and Dynarski 2011); that income returns to education have experienced a great upswing; and that the compositional effect also holds for this dimension (Torche 2011). Noting parallel trends in some legs of the mobility triad (Mazumder 2012; Corak 2013) is still a far cry from establishing the overall role of education and educational expansion in explaining income mobility trends. Significant progress in this direction has been made by Bloome and Western (2011), but the relative role of the compositional effect in explaining changes in income mobility has not yet been studied.

Second, switching from occupation-based measures to income measures entails more than merely empirical curiosity—it requires us to cross a well-maintained chasm between categorical and gradational approaches to inequality and mobility (Weeden and Grusky 2012). One specific version of the categorical view that is still tied to occupations (and therefore comes with an explanatory rather than merely a descriptive aim) has been provided in the "micro-class" approach (Weeden and Grusky 2005). We have no issue with the claim that associations of attitudes, lifestyles and sentiments is more closely aligned with "micro-classes" than "big classes" (see also Chan and Goldthorpe 2007). We are, however, less convinced that existing empirical evidence suggests a decreasing structuration of life chances in the economic terrain along broadly defined class lines. In particular, we do not view decreasing intergenerational associations in (big) social class measures as an indication of decreasing validity of class measures. In fact, our finding of an increasing association between parental education and son's class attainment would allow claiming the contrary.

Third, our mobility analyses are limited to male-only lineages. Future work will have to establish whether the processes studied apply in a similar fashion to women's fluidity patterns as well as to the effects of mother's social class (but see also Appendix B and Online Supplement). Such work is highly relevant because educational expansion has followed different patterns for males and females (DiPrete and Buchmann 2006; Hout and Janus 2011) and because the speed and extent of the increase in educational participation among women make for a particularly interesting case to assess the underlying mechanisms. In particular, a future analysis of women may further strengthen or undermine our finding of the dominant role of the compositional effect in driving trends in class fluidity.

Fourth, we stress that—like most other mobility research—our evidence is associational. We have followed Breen (2010) in focusing on a mechanistic explanation of the impacts of educational expansion to the detriment of causal inference. Methodological tools to unite causal inference methods and mechanistic approaches are developing (e.g., der Weele and Robins 2007; Knight and Winship 2013), so we may in the future get closer to identifying causal mechanisms. But in the context of the questions studied here, we will likely not be able to draw on long-term historical trends but will instead need to investigate the effects of specific institutional and policy changes that significantly and abruptly altered education systems (Rauscher 2013).

Notes

1. For a detailed study of the single legs of the mobility triad in eight European countries, see Pollak (2009).
2. Of course, there are a range of additional theories about the factors accounting for trends in educational returns that are not directly connected to changes in the educational structure but that locate these factors primarily in labor-market changes, such as those caused by rent-seeking behavior (e.g., MacLean and Grusky 2014).

3. Again, alternative explanations focusing on labor-market changes are feasible. For instance, Jackson, Goldthorpe, and Mills (2005) argue that structural changes toward service-oriented occupations have lowered the importance of technical skills but increased the demand for personal skills for which education credentials become "a 'more' noisy signal than previously" (Jackson, Goldthorpe, and Mills 2005, 12–13). The expansion of the service sector should consequently produce a decreasing association between educational attainment and social class attainment (see also Goldthorpe 2013, 15–16).
4. Unlike Weeden and Grusky's analysis of the role of micro-classes in capturing lifestyles, sentiments, and dispositions, their claim about the superiority of micro-class measures with regard to life chances and material inequality—here measured as the combination of educational credentials, parental education, income, homeownership, employment level, and subjective financial position—overstates their own empirical evidence (Weeden and Grusky 2012). Their results (1742) suggest that material inequalities are more highly associated with macro-classes than with micro-classes (60 versus 40 percent of total association, respectively). Furthermore, their trend analysis (1747) reveals little difference across periods between the association of life chance indicators and either micro-classes (0 percent change) or aggregated classes (2 percent increase). These results have not gone unnoticed by the authors—for instance, when they state that "[t]he life chances domain is the only one in which big-class gradationalism is increasing, whereas the general trend is of declining big-class gradationalism" (1754). For another critical perspective, see also Erikson, Goldthorpe, and Hällsten (2012).
5. We have also fitted models that additionally allow the pattern of the association to differ across cohorts (Goodman and Hout 1998). The improved model fit, however, comes at too high a cost in terms of parsimony, as suggested by the BIC statistic (not shown).
6. The available data force us to use cohorts that are not age standardized, that is, the younger cohorts are observed, on average, at younger ages. This could raise the concern that we may underestimate the class status in younger cohorts since more of these cohort members may not have reached their final or typical class position. We test for this potential bias, within the strict limits of data availability, by increasing the lower age limit from 30 to 35 (anything beyond that would leave us with too few observations). These stability analyses (available from the authors) do not yield substantively different conclusions about the observed cohort trends. Furthermore, since the cohorts are drawn from different GSS waves, we have performed additional analyses to assess the stability of our findings against potential survey effects. The results show that the fluidity trends are not substantially altered if survey year is considered (available upon request).
7. The GSS occupational coding scheme changed from 1970 to 1980 Census Occupational Classifications during the late 1980s. This change has hindered the assessment of long-term social mobility trends spanning all GSS waves in prior research (e.g., Beller and Hout 2006a). We draw on crosswalks from 1970-based to 1980-based EGP codes that have been developed and fruitfully applied in prior research (Hertel and Groh-Samberg 2014; for a similar effort, see Mitnik, Cumberworth, and Grusky 2013) and validate the resulting measures through a comparison of social mobility trends based on three double-coded GSS waves (results available from the authors). The GSS is currently engaged in a large-scale project to recode occupational information in all waves using a common occupational coding scheme, which will allow future research to circumvent these crosswalk procedures.
8. We have opted for a cohort analysis of overall fluidity trends because our main analytic interest lies in the relationship between broad trends in social fluidity and shifts

in education, which should exert a common influence on those attending school around the same time. In contrast, Mitnik, Cumberworth, and Grusky apply a mixed period-age design with a focus on selected cells of the mobility tables because they are interested in tracking the impact of the recent takeoff in economic advantage at the top of the class distribution. The clearest indication of decreasing social fluidity that they present applies to the increasing reproduction of professional/managerial status (EGP I and II) among the youngest individuals.

9. We have noted earlier that this finding is in line with international evidence and also not at odds with the widely acknowledged finding of growing income or earnings returns to education. The coexistence of these two trends (which we are also able to replicate based on our own data; available from the authors) is explained by the increasing earnings gap between low-paying and high-paying occupations that underlies much of the overall increase in income inequality (Mouw and Kalleberg 2010; Wright and Dwyer 2003). Take higher managers as an example. Educational credentials have always been and continue to be important to enter these positions. At the same time, the earnings of higher managers have increased disproportionally relative to the rest of the earnings distribution (Mouw and Kalleberg 2010; Morris and Western 1999). Similarly, the role of low educational qualifications in relegating individuals to the bottom of the occupational hierarchy may not have changed substantially, while earnings in occupations at the lowest class level have suffered pronounced declines (Morris and Western 1999) .
10. Additional analyses (available upon request) also indicate that the difference in trends does not arise from other measurement issues. First, the difference cannot be ascribed to a change from a paternal to a parental measure. Second, it is not based on a trend toward the decoupling of class background and educational background. In fact, the association between parental education and father's class has increased over cohorts.
11. The finding that the compositional effect also applies to the influence of parental education on class attainment opportunities (for a direct illustration, see online supplement) also constitutes a further generalization of the compositional effect to other dimensions of socio-economic standing (Torche 2011).
12. The strength of the compositional effect itself could, of course, also differ across cohorts (additional analyses, available from the authors, fail to yield convincing evidence for this). This would require us to free up the COED parameter and leave us with a fully saturated model, that is, the observed trends.

Appendix

A. Decomposition Method

Breen (2010) demonstrated that the three-way probability distribution of cohort by origins by destinations (COD) can be derived from saturated log-linear models for the cross-classification of cohort by origin by education (COE) and cohort by origin by education by destination (COED), that is:

$$f_{ikl} = \mu\gamma_l^C\gamma_i^O\gamma_k^E\gamma_{li}^{CO}\gamma_{lk}^{CE}\gamma_{ik}^{OE}\gamma_{lik}^{COE} \tag{A1}$$

$$f_{ijkl} = \alpha\beta_l^C\beta_i^O\beta_k^E\beta_j^D\beta_{li}^{CO}\beta_{lk}^{CE}\beta_{lj}^{CD}\beta_{ik}^{OE}\beta_{ij}^{OD}\beta_{kj}^{ED}\beta_{lik}^{COE}\beta_{lij}^{COD}\beta_{lkj}^{CED}\beta_{ikj}^{OED}\beta_{likj}^{COED}. \tag{A2}$$

Leaving out selected, theoretically meaningful parameters from equations A1 and A2 produces counterfactual OEDC distributions, that is, predicted frequency distributions across the four-way cross-classification of origin, education, destination, and cohort. Collapsing these counterfactual distributions over E yields an implied three-way relationship between O, D, and C, which serves as the basis for the assessment of counterfactual trends in social fluidity.

Table A1 provides an overview of the parameters included in the generation of each counterfactual COD table analyzed in this paper. The order in which we proceed differs slightly from Breen's original introduction of this decomposition method and ongoing comparative work drawing on the same modeling framework (Breen, Luijkx, and Müller forthcoming). Instead of freeing up parameters incrementally, in models 1–3 we free up a single parameter that identifies a specific mechanism in order to investigate its net effect.

Baseline Model (B)

fits parameters in both the COE and COED tables that are of no substantive interest in this paper, namely, the main effects (C, O, E, D) and all relevant two-way interactions with the exception of γ_{ik}^{CE}, that is, cohort changes in the education distribution (educational expansion). The three-way interactions that represent the main mechanisms studied in this paper (marked in gray in table A1) are only freed up in the following models.

Model 1

additionally frees up the parameters for educational expansion, γ_{ik}^{CE}, and the compositional effect, β_{ikj}^{OED} (marked in gray). It creates a simulated mobility table (COD) that allows the compositional effect to impact mobility trends through educational expansion.

Model 2

instead frees up the parameters for educational expansion, γ_{ik}^{CE}, and changes in inequality in education, γ_{lik}^{COE}. Substantively, this allows us to assess the impact of changing educational inequalities at the backdrop of educational expansion.

Model 3

frees up the parameters for educational expansion, γ_{ik}^{CE}, and changes in class returns to education, β_{lkj}^{CED}. That is, we assess the impact of changing educational returns at the backdrop of educational expansion.

Observed (O)

The last remaining three-way interaction that has not been fitted so far is β_{lij}^{COD}, that is, cohort changes in the direct effects of origins on destinations. However, fitting this parameter implies that the simulated COD cross-tabulation is equivalent to the observed COD cross-tabulation (see Breen 2010, 387). This hinders the separate assessment of the role of

Table A1. Parameters Fitted to Generate Counterfactual Mobility Tables

		Main effects				Two-way interactions						Three-way interactions				4-way
Model	Table	C	O	E	D	CO	CE	CD	OE	ED	OD	COE	CED	OED	COD	COED
Baseline (B)	COE	x	x	x		x			x							
	COED	x	x	x	x	x	x	x	x	x	x	x				
1: Compositional	COE	x	x	x		x	x		x							
	COED	x	x	x	x	x	x	x	x	x	x	x		x		
2: Chang. educ. ineq.	COE	x	x	x		x	x		x			x				
	COED	x	x	x	x	x	x	x	x	x	x	x				
3: Chang. ed. returns	COE	x	x	x		x	x		x							
	COED	x	x	x	x	x	x	x	x	x	x	x	x			
Observed (O)	COE	x	x	x		x	x		x			x				
	COED	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

cohort changes in the direct inheritance of class status outside the education system since we cannot separate it from the impact of freeing up the four-way COED interaction.

A few additional explanations may be in order:

- Note that the parameters CE and COE are always fitted in the COED table to yield consistent and unbiased parameters in the prediction of that cross-classification. However, fitting these parameters in the COED table does not require the same parameters to be fitted in the COE table. The method applied here reweights the predicted COED frequencies by the values of the fitted COE margins (personal communication with Richard Breen, November 2013).
- We add CE concurrently with the three parameters of interest in models 1–3 (rather than including CE in the baseline model) for the reasons listed below. Doing so allows us to estimate the relative impact of each mechanism separately.
  - In line with our theoretical motivation, model 1 assesses whether the compositional effect has gained a more pronounced role by virtue of educational expansion (since more individuals move into those educational positions where the OD association is lower). Freeing up OED separately would not capture this process.[12]
  - Model 2 mechanically requires fitting CE since we fit the higher-order COE interaction. Doing so, however, is also in line with our theoretical motivation that is chiefly interested in the development of educational inequalities at the backdrop of the educational expansion rather than independent of it.
  - By the same token, model 3 assesses whether educational returns have changed over time at the backdrop of the educational expansion rather than independent of it.

Appendix B

Trends for Women

Women's labor-force participation changed radically across the cohorts studied here. As shown in table B1, it increased in our sample at a steady rate from 38 to 74 percent for the first four cohorts and remained at about that level for the last three cohorts. Given the size of our sample, this also means that we observe a

Table B1. Trends in Female Labor-Force Participation

	Year turned 30					
	Until 1951	1952–1963	1964–1975	1976–1987	1988–1999	2000–2012
% in labor force	38.4	49	60.6	73.9	75.4	73.4
Sample *N* in labor force	342	944	1,907	3,176	2,154	670

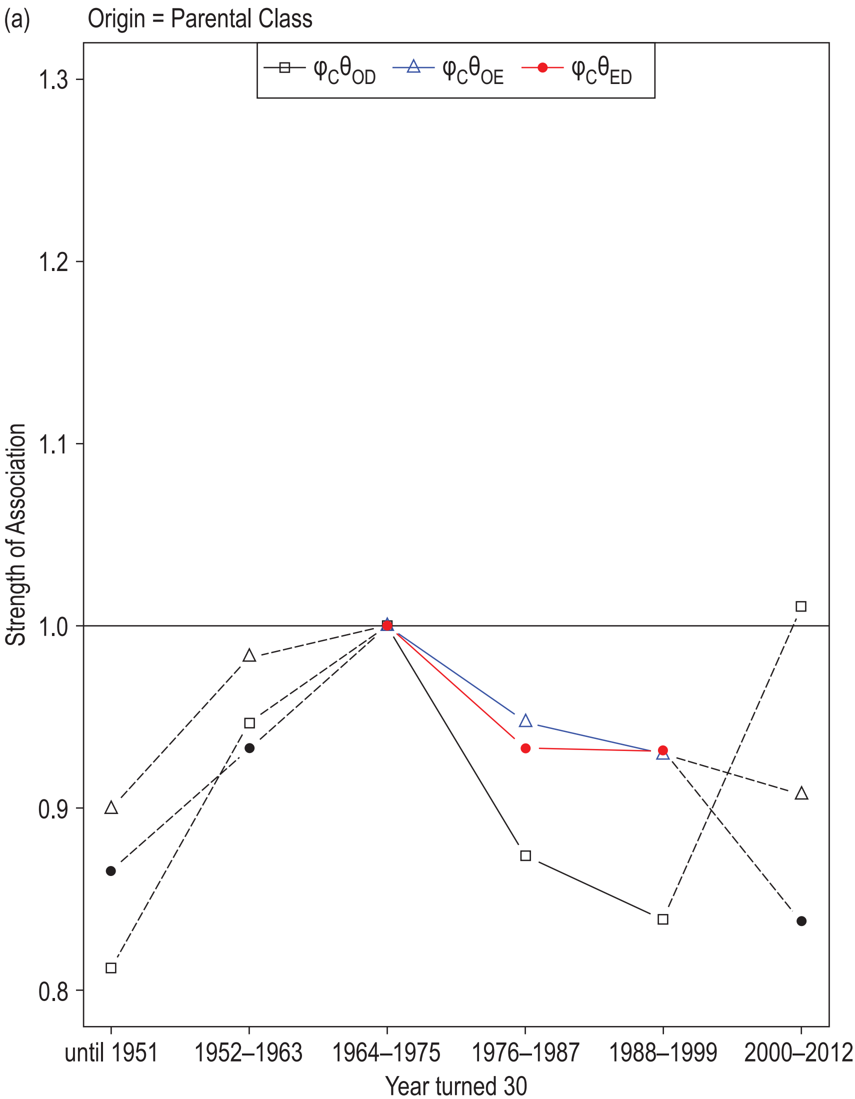
particularly low total count of women with occupational information in the oldest two cohorts (and, for other reasons, in the youngest cohort).

Two issues challenge the trend analysis for women. First, the low statistical power of our sample suggest that we may provide reasonable descriptive analyses for only three selected cohorts (turning 30 in 1964–1975, 1976–1987, and 1988–1999). It also prohibits us from engaging in the decomposition analysis for women not only because such analysis would be of severely limited value based on just three cohorts but also because, in even some of those cohorts, the four-way cross-classification of origin, destination, cohort, and education yields many sparse cells. Second, beyond the observed changes in the rates of female labor-force participation, we expect changes in its selectivity. That is, the factors determining whether a woman takes up work were likely much different for a woman born at the beginning of the 20th century compared to a woman born toward the end of the century. Even if we had a much larger sample, we should still consider adjustments for the expected changes in selectivity of labor-force participation. Here — as we did for men — we impute social class for all sample members based on all variables used in the analysis. Doing so is an effective strategy if values are "missing at random," in our case meaning that selection into the labor market occurs based on the characteristics we observe (though we observe few of them, educational attainment should certainly count as an important one).

Taking both of these complications into consideration, we provide suggestive estimates to tentatively describe changes in the mobility triad for women. For the reasons just outlined, we do so with some degree of hesitation—overcome only by the importance of the scientific question—and believe that definite answers rely on efforts that expand the data basis for the assessment of mobility trends among US women (which we attempt in an ongoing project; also see Grusky, Smeeding, and Snipp [2014]). While we report results for all cohorts, we emphasize the particularly tentative nature of the estimates for the first two cohorts due to their small sample sizes and potential unobserved selectivity of labor-market participation as well as of the estimates for the last cohort, again due to its small sample size. We also run stability analyses that drop these problematic cohorts.

Whether social origins are measured as parental class or parental education and whether the analysis includes or excludes the problematic cohorts, our findings about trends in the mobility triad are the same for all legs: in all cases, the preferred model is that of constant association (results available upon request). In other words, we cannot detect statistically significant trends in social mobility, educational inequality, or returns to education for women. This finding of stability may underline the insufficiency of our data. For readers who are willing to read tendencies into the parameter estimates from the non-preferred unidiff models, we report them in figure B1. The unidiff estimates are centered on the cohort born 1934–1945, and the problematic cohorts are marked by dashed lines. The scale of the *y*-axis corresponds to that for men. Again, re-estimating the models restricted to the middle three cohorts yields virtually identical results. For trends based on parental class (figure B1a), we

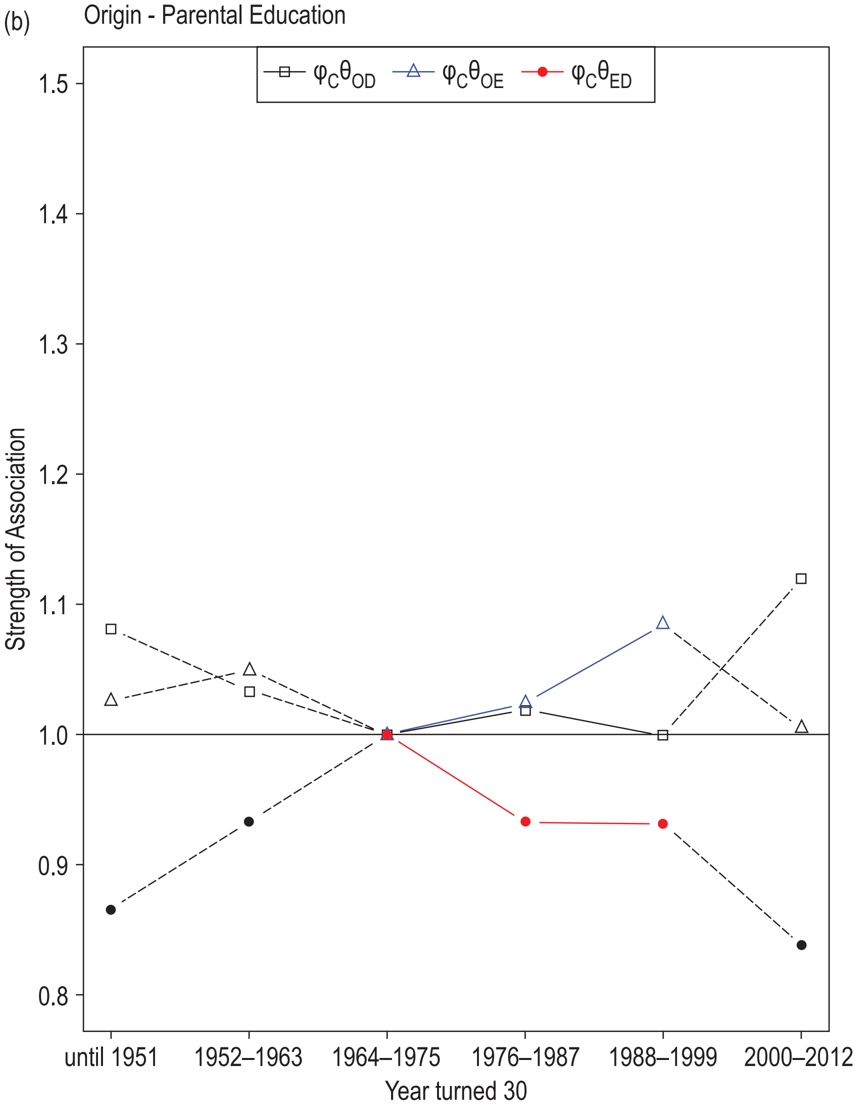
Figure B1. UniDiff parameters (non-preferred model)



Data: GSS 1972–2012.

observe a tendency toward decreasing associations for the cohorts we consider least problematic, meaning that social mobility increases while educational inequality and returns to education decrease, but at a level that we cannot distinguish from stability based on these data. The estimates based on parental education (figure B1b) provide yet less evidence in favor of notable trends in the mobility triad for women.

Figure B1. ***continued***



Data: GSS 1972–2012.

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Supplementary Material

Supplementary material is available at *Social Forces* online, http://sf.oxford journals.org/.

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