Intergenerational Educational Mobility and Life-Course Income Trajectories in the United States

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Abstract

This paper offers a fresh framing for studying intergenerational educational mobility and its economic consequences. It brings to the fore of intergenerational educational mobility research the important distinction between absolute and relative mobility, while focusing on the largely neglected upward and, more crucially, downward mobility patterns. It further puts to empirical test a theoretical formulation derived from the cumulative advantage mechanism about enduring life course effects of such mobility patterns on earnings. These are in a sharp contrast to traditional educational mobility research that focuses on the intergenerational educational association (relative mobility), and on a snap shot perspective to study the economic consequences of educational mobility. Data for this study are based on the NLSY79 survey (with the PSID data-set serving for robustness checks). To these data we apply growth models to estimate if and how educational mobility shapes American's earnings trajectories, from their 20s thought to their 50s. We further examine if these earnings trajectories vary by race and gender. Results indicate that for men the earnings trajectories of the different mobility groups (upward, downward, immobile hi, and immobile low) have developed significantly differently over time. In particular, we see evidence in support of the argument that the intersection of parental and respondent education, represented by four educational mobility categories, bears important long-term earnings consequences. For women, however, parental education, and therefore intergenerational educational mobility, have relatively weak effect on earnings trajectories among the undereducated, and no effect at all among college graduates. The results for both men and women do not vary by race. We discuss these results.

Key words: intergenerational educational mobility; life-course earnings; upward and downward mobility; earnings trajectories; race and gender; USA.

Introduction

The vast and expanding literature on social as well as economic mobility, both intra- and inter-generational – emphasizes repeatedly the importance of education in facilitating social mobility. Nonetheless, this literature appears to neglect systematic examination of the intergenerational educational mobility process and its impacts on long-term economic consequences, specifically long-term income trajectories. We aim to bridge this gap in the literature proposing fresh evidence on this issue based on data from the NLYS79 (National Longitudinal Survey of Youth 1979). Aiming to understand patterns of intergenerational transmission of education and their labor market consequences also across sub-populations by gender and race, we ask the following:

1. What are the patterns of intergenerational educational mobility in the US?
2. Do similar intergenerational educational mobility patterns characterize gender and race sub-populations in the US?
3. What are the long-term economic consequences (i.e., income trajectories) of intergenerational educational mobility in the US?
4. Do similar economic consequences characterize gender and race sub-populations in the US?

A plethora of explanations exists for the association between social background and educational attainment, the most rigorous of which is provided by the rational choice theory. The concept of rational educational choices dated back to Boudon's (1974) and Gambetta's (1987) seminal works, but only with the work of Breen and Goldthorpe (1997) did it gain formal propositions. This theory argues that parents and their children make rational educational decisions based on the costs, utility, and success probability of educational alternatives. The crucial point, however, is that social differentials in educational choices arise from the assumed motivation of parents to ensure status maintenance for their children. Although the status maintenance mechanism at the heart of the theory refers to class, many have operationalized it also in terms of education (Need and Jong 2001; Davies, Heinesen, and Holm 2002; Pfeffer 2008). That is, parents are assumed to show a preference for their children to attain at least the same educational level as they did. The status maintenance mechanism can be seen therefore as an intergenerational educational reproduction mechanism. Motivation for intergenerational educational reproduction should be stronger at higher educational levels, because children of highly educated parents can only experience downward

mobility. Thus, educated parents' knowledge of the educational system and attainment process are crucial resources that might contribute to maintain a relatively high level of intergenerational educational *im*mobility, and a strong intergenerational educational association.

In conjunction with this argument, industrialization theories would argue that in industrial society, achievement replaces ascription in the process of social reproduction, and thus society becomes increasingly more meritocratic (Treiman 1970). Thus, the intergenerational educational association should be relatively weak in industrial nations, and is expected to weaken over time – with industrialization. Since educational institutions in modern society are expected to increase their accessibility to individuals of *all* social backgrounds, more upward intergenerational educational mobility is expected.

Our second goal in this paper is to study the long-term consequences of intergenerational educational mobility. However, when examining economic returns to education, the most prominent theory – human capital theory (Becker 1964/1975), does not consider parental education as a factor. According to this theory, remuneration from employment is tied to productivity, which is a function of human capital – mainly education. Here, the productivity of one's parents is irrelevant, and therefore, parental education and other origin effects should not determine one's remuneration from employment. This also suggests that intergenerational educational mobility should not affect economic returns to education. Although the human capital model has important implications for income trajectories over the life course (see table 1 below), its application is mostly associated with studies of economic returns to education at fixed points in time. In contrast, we take here a life course perspective and study individual's income trajectories over a long time. This perspective is rare in the field of stratification and inequality, because of its demand on data (cf. Song and Cheng 2016), but it nonetheless carries many advantages, as discussed by Manzoni, Härkönen, and Mayer (2014: 1285-6).

Differentiations in income trajectories, like many other dimensions of social inequality, are path-dependent. This concept is often used interchangeably with the notion of cumulative advantage (Bernardi 2014), which suggests that an initial advantage in access to a particular resource tends to grow over time (Merton 1988; DiPrete and Eirich 2006). If success begets success, parents with more resources at their disposal may help their offspring launch a career with higher income, thereby leading

to a long-term advantage of their offspring over their peers from less fortunate origins. Following Gabay-Egozi and Yaish (2017), we propose four possible scenarios to illustrate the ways in which, *ceteris paribus*, intergenerational educational mobility might shape life-course income trajectories. These four scenarios are discussed extensively by Gabay-Egozi and Yaish (2017), and are presented in Table 1 below.

Table 1 about here

As noted above, we examine mobility rates and patterns, as well as their long-term economic consequences, across gender and racial/ethnic lines. Previous research in the US, however, mainly focused on group differences in educational attainment and returns to own educations. For example, research has shown that women experienced substantial gains in educational attainment since the 1980's (Goldin et al. 2006). As of 2010, women have an approximately seven percent advantage in acquiring a BA as compared with men (DiPrete and Buchmann 2013). In graduate degrees, too, women are consistently increasing their relative share of degrees since 1992, to a point where women exceeded men in obtaining master's degrees by 9% around 2014, roughly achieving parity in doctoral and professional degrees (Posselt and Grodsky 2017). Women have more than caught up with men in degree attainment in the U.S.

These educational gains have bore their fruit. Though labor market returns have increased for the highly educated across the gender divide (Kim and Sakamoto 2008; Autor 2014), scholars have documented female wage increases outpacing those of men since the 1970's (Morris and Western 1999), narrowing the gap between the two genders (Leicht 2008). This is largely due to higher returns from college education (Diprete and Buchmann 2006). In other words, the premium on college degrees is now higher for women than for men (Card and DiNardo 2002; Dougherty 2005). Similarly, women with an advanced degree - a master's, doctoral, or professional degree, earn a larger premium over less educated women compared with the equivalent male premium (NSF 2013). Yet, paradoxically, due to marriage patterns, this relative increase in female earnings is also often captured by men (Kim and Sakamoto 2017). Regardless, the returns to education for women have increased over time.

The racial gap in educational attainment, as opposed to the gender gap, remains strong. Despite overall educational expansion since the 1970's, the college

attainment gap between blacks and whites remained relatively stable at 11-14% between 1988-2015 (Ryan & Bauman 2016). Similarly, African Americans remain underrepresented in many graduate programs, especially doctoral degrees (Posselt and Grodsky 2017).

In general, racial income gaps between underrepresented groups and whites since the 1990's have either stagnated or widened slightly (Leicht 2008), though the rank inequality between blacks and whites improved significantly (then offset by widening income inequality – Manduca 2018). This racial "penalty" has either increased or remained the same for every level of education since 1980. In 2014, this racial gap was around 15-18% for new male workers and 21-28% for experienced males, 6-12% for new female workers and 10-13% for experienced females (Wilson & Rogers 2016). Even if the overall returns to education have increased, the racial gap remains robust at every level of education.

The current study expand on this literature by exploring how the intersection of parental education with own education – i.e., intergenerational educational mobility – affects income dynamics over the life course.

Data and Methodology

Data and Sample

In order to follow individuals' income over time, we used data from the NLSY79, a national longitudinal survey. NLSY79 Individuals were interviewed annually 1979-1994, and biennially since. Original respondents were between the ages of 14-22 at the time of first interview, meaning their ages span eight years at any given interview. From an original sample of 12,686 individuals, we excluded those who were missing data on their own education, both parents' retrospective education, or any of our central independent and control variables. The final analytical sample includes 11,557 individuals – 5,725 women and 5,832 men (full respondent characteristics separate for males and females in Appendices A and B), who we follow across ages 20-51. We also utilized the PSID in order to perform robustness checks on our results.

Variables

Our central variable marks four ***intergeneration educational mobility groups*** based on combinations of parental and respondent education. Parental education is a retrospective variable in NLSY79, indicating years of education. We marked

respondents as having highly educated parents if at least one parent was reported as having sixteen years of education or above, which included 14.7% of the sample. For respondent education, we used the college degree variable. Since the college degree question changed over time, we marked respondents as highly educated if they indicated receiving a bachelor's or master's degree between years 1980-1984, or if they indicated receiving a bachelor of arts or science, master's, or doctoral degree between years 1989-2014. Our final analysis used mobility as a time-varying variable so respondents may be categorized in one mobility group in one year and another in the following year if they completed a degree in that year. This transition characterizes 1,636 of our 1,687 respondents who obtained higher education.[1] Our intergenerational educational mobility variable comprised four distinct categories in a 2X2 table. The two cells on the main diagonal represent the two educationally immobile groups: the immobile degree holders (*immobile high*), and the immobile undereducated (*immobile low*). The two cells off the main diagonal represent the two educationally mobile groups. Below the main diagonal is the cell representing the educationally upwardly mobile group (*mobile up*), composed of first generational degree holders. Above the main diagonal is the cell representing the educationally downwardly mobile group (*mobile down*), composed of undereducated children of degree holder parents.

Average annual weekly income is based on measures of annual income from wages and salary, as well as annual income from farm or business. We divide the sum of all income by the number of weeks worked in the year and then log the result.[2] Finally, we use the Bureau of Labor Statistics' CPI Inflation Calculator to adjust income to 2018 dollars. The final variable is an individual logged annual inflation-adjusted income measure.

To capture the differentiation in the intergenerational educational attainment distribution between the various sub-populations, we generated a dummy for ***male*** and three dummy variables for ***race/ethnicity***: blacks; whites; and Hispanics. Other control variables of interest: ***ability*** based on the Armed Forces Qualifications Tests (AFQT) taken in 1980, which combines both verbal and mathematical thinking skills, and ranges from 0 to 100; and geographic variables reflecting ***region*** of the U.S. (Northeast, North Central, South, and West) and whether ***urban*** (urban, rural, or unknown). Appendices

[1] However, our results are robust to treating mobility group as time-invariant.
[2] To avoid computing the log of zero, or having negative (ln) income, we added 1 to all income values prior to computing the log of income.

C and D present the means (standard deviations) and proportions of respondents' person-year characteristics by the four intergenerational educational mobility groups.

Methods and Statistical Models

Our analysis consists of two parts: absolute intergenerational educational mobility, including separated by sub-populations, and its consequences for adult children's income trajectories. The analysis of intergenerational educational mobility patterns relies on the analysis of mobility tables. First, by counting individuals off the main diagonal in the mobility tables we measure total mobility rates (TMR). Then we will decompose TMR to upward and downward mobility, and examine gender and racial/ethnic differences in educational mobility rates and patterns. Finally, to explore differences in gender and racial/ethnic distributions across the four mobility groups, net of potential confounding variables, we fit multinomial logistic models to the data, predicting educational mobility group as a function of gender and race/ethnicity net of our control variables.

From absolute mobility, we move to the analysis of the economic consequences of intergenerational educational mobility. For this analysis, we adopt a somewhat more novel approach. Here, we take full advantage of the NLSY79's rich longitudinal data and apply income growth curves models (Singer and Willett 2003). Specifically, we transform yearly data into a person-year, converted year to age, and fit multilevel models to study the life course income trajectories of the four educational mobility groups identified earlier (up mobile , downward mobile, high immobile and low immobile), net of potential confounders (e.g., respondents' ability, geography, etc.) and for different sub-populations. Fitting multilevel models to these data, we allow both the intercept and the slopes for age and age square in level one to vary between individuals who make level two. This analytic technique requires observing at least one time point for each respondent but does not require observing the same number of time points for each respondent (Bliese and Ployhart 2002). With these models we estimate the underlying earnings trajectories of the four educational mobility groups.

Results

Intergenerational Educational Mobility

Table 2 shows the weighted distribution (%) of NLSY79 respondents by patterns of intergenerational educational mobility according to respondents' highest achieved education across the life course. Since we classify respondents' and parents' education into two levels (no college and college education), respectively, there are four intergenerational educational mobility groups: 1) mobile up (respondents who had college education but whose parents did not have college education); 2) mobile down (respondents who did not have college but whose parents had college education); 3) immobile high (respondents who had college education and whose parents also had college education); 4) immobile low (respondents who did not have college education and whose parents did not have college education).

Our results indicate that educational reproduction, particularly of low education, is the dominant pattern, with about seven in ten educationally immobile in the NLSY79. In contrast, the first two columns in Table 2 indicates that about 22% of all American have experienced some sort of intergenerational educational mobility – a rather low level when compared to intergenerational occupational mobility. A more detailed examination reveals important differences between the sub populations, particularly in their upward to downward mobility ratio. Thus, white male and females, who enjoy the highest mobility rates (24%), are also more likely be downwardly mobile than upwardly mobile (15:9 and 13:11, for men and women respectively). That is, their relatively high mobility rates works to their disadvantage. Studying mobility rates and patterns in the context of mobility tables allow us to focus attention on immobility and mobility, and more crucially on upward as well as downward mobility. Studying the intergenerational educational association alone, by contrast, conceals these important patterns, and their potential consequences.

Table 2 about here

It is interesting to examine next if these gender and race/ethnic differences hold also after taking into account important background characteristics. To address this question, we applied a multinomial logit model to the data to estimate how gender and race/ethnicity sub-populations are selected into each of the four mobility groups, net of important background characteristics. The parameter estimates of this model are

presented in Appendix E, and indicate statistically significant race/ethnic and gender differences in the selection into the four mobility groups.[3] To facilitate interpretation of these rather complex parameters, Figure 1 shows the adjusted predicted probability of the selection of each sub-population to the four mobility groups. Note that the y-axis for immobile high and immobile low (upper set of graphs) are not similar, although the scale is identical (ranging 0.2, 0—0.2 or 0.75—0.95).

Adjusting for background characteristics, Figure 1 replicates the results presented in Table 2, prior to the introduction of controls for background characteristics. Now, moreover, statistically significant gender differences exist only among the upwardly mobile group, where African-American and white women enjoy more upward mobility than men (among Hispanic the gender difference is not significant). When race/ethnic differences are the focus of the analysis, the pattern presented in Figure 1 indicates that after adjusting for background characteristics, it is the African-American sub-population that stands out with the most advantageous educational mobility pattern. Compared to Hispanic and white, African-American are more likely to experience upward mobility, and less likely to end up without a degree if their parents do not have a degree (immobile low).

The above does not mean, however, that African-American attain higher education level than white or Hispanic American. Studying intergenerational educational mobility tables, we are able to show how detrimental lack of parental education was for their offspring's educational attainment. This is because, as we show in both Table 2 and Figure 1, educational reproduction processes are mainly associated with lack of education, which are more pronounced among African-American than white. That is, the undereducated tend to reproduce themselves intergenerationally much more than the educated. This scenario runs contrary to modernization, industrialization and globalization processes that resulted in expansion of educational opportunities and attainments and anticipate much more upward than downward mobility, coupled with less – and declining – immobility amongst the undereducated.

Figure 1 about here

[3] A model that tests for an interaction between race/ethnicity and gender did not improve statistically significantly over the model presented in Appendix E. These results can be obtained from the authors on request.

These important distinctions between upward mobility and immobility and downward mobility and immobility cannot be observed when the focus of analysis is on the intergenerational educational association alone, as most educational mobility studies are. This is yet another advantage of studying absolute educational mobility on the basis of mobility tables. Next, the economic consequences of these mobility patterns are examined.

Long-term Economic Consequences for Intergenerational Educational Mobility

Following estimates of the relative share of the population in each mobility group, we ask what economic ramifications belonging to each mobility group has across the life course. As discussed in the methods section, we use income growth models to test how income changes in different stages according to one's mobility group: mobile up, immobile high, mobile down, immobile low. Specifically, we regress log weekly income on mobility groups and a host of controls, including age at two different levels, and interactions between mobility group and age, as well as mobility group with age squared. As in previous analyses, we are also interested in differences in these trajectories across sub-populations, and thus we extended the analysis further by gender, and interact the above mobility effects with race/ethnic groups.

Appendix F indicates that the best fitting model, for both men and women, denotes different income trajectories by educational mobility groups that do not differ by race/ethnicity.[4] Specifically, though race and ethnicity affect the overall level of income throughout the life course, interacting race with mobility group or age produced overwhelmingly statistically insignificant coefficients, and a model that does not fit the data as well. In Table 3 we then focus only on the sets of coefficients that, as explained above, produce the earnings trajectories of interest, for men and women separately.

The coefficients in Table 3 indicate that the income trajectories of the four mobility group somewhat differ in their starting point (at age 20) as well as in their growth rate over the life course. Because we are interested in the long-term effects intergenerational educational mobility, special attention in these models should be

[4] Returned BIC statistics from Models II and III that allow for the income trajectories to differ also by race/ethnicity are larger than the returned BIC statistics from Model I (see BIC statistics at the foot of Appendix F).

given to the coefficients pertaining to the contrasts between individuals with similar education levels but different parental education levels.[5]

Table 3 about here

Consider for example the income trajectories of men in both degree holder groups: immobile high and mobile up. Table 3 indicates that first time graduates earn at age 20 about 21.7% more than their multi-generation graduate counterparts, possibly due to being positively selected on unobservables (e.g., motivation and effort). However, as time progresses the income trajectory of the multi-generation graduates supersedes that of the first generation graduates due to about 3% higher annual income growth rate. When the undereducated groups (immobility low and mobility down) are examined, a similar pattern appears. The earnings trajectory of the educationally downwardly mobile (undereducated whose parents hold a degree), grows at about 5.3% higher annual rate compared to that of the multi-generation undereducated. This is a clear depiction of a 'glass floor effect' (Reeves and Howard 2013; McKnight 2015), according to which educated parents use their resources to guarantee a smooth landing for their educationally downwardly mobile offspring. We see here a clear payoff to the life-course perspective, and a clear support to the four cumulative advantage scenarios presented at the outset.

To better appreciate how mobility group impacts income trajectories over the life course, we graph the predicted income trajectory, by mobility group and separately for men and women, according to our models.[6] These graphs clearly show just how mobility group, and therefore parental education, matters for income trajectories. For men, higher parental education improves income over the majority of the life course for both higher educated individuals (immobile high) and lower educated individuals (mobile down). For women, higher parental education improves income over most of the life course for those with lower education (mobile down) but not so for those with

[5] Clearly, intergenerational educational mobility also pertains to the contrasts between individuals with different education levels but similar parental education levels. This, however, would state the obvious – that individuals with college degree have higher and steeper income trajectories than those without a degree (cf. Cheng et al., 2018).

[6] For brevity we display the earnings trajectory of an average American man or woman, ignoring race/ethnic differences because, according to model I in Appendix F, the earnings trajectories of the three race/ethnic groups have similar shapes but only different income levels.

higher education (immobile high). Mobility group matters for income over the life course, but it does not matter equally for men and women.

Figure 2 about here

As the growth curve model figures above demonstrate, parental education, and thus mobility group, has different effects in different stages of the life course. While in general it appears that higher parental education provides an income advantages throughout most of the life course, this is not true for its entirety. Specifically, at the beginning of one's employment trajectory, higher parental education seems to have a negative effect or no effect at all. This finding seems to be consistent across genders – lower educated women with higher parental education do worse compared with their lower-parental-education counterparts, as is the case for lower educated men. For higher educated men and women, parental education does not seem to matter at the beginning. Later in the life course, as stated above, parental education bestows an income advantage to all men and lower educated women, but not higher educated women. And finally, approaching the later years of employment trajectory around age 50 income gaps widen for men. Here there is a gross discrepancy between men and women, even less educated women, as the income gap largely closes by the time lower educated women enter their fifties.

To examine these differences across the life course, particularly between groups with the same education levels, we plot the change over time in adjusted marginal effects of mobility groups for men and women. The mobility group listed first in the graph's title is represented by the black line with its corresponding 95% confidence interval, the group listed second is represented by the flat red line. These marginal plots show more clearly that for men, parental education has an effect at the beginning, middle and end of the income trajectory, but in different directions. For women, parental education has less of an effect and when it does it subsides by the end of the career.

Figure 3 about here

Discussion

This study brings to the fore the importance of absolute intergenerational educational mobility. Though this approach is the gold standard in occupational mobility studies – it has been largely neglected in the educational mobility literature. Studying absolute intergenerational educational mobility in the US, we show that intergenerational educational reproduction entails different things for the different sub-populations. For African-American and Hispanics it mostly means reproduction of disadvantages, while for whites it means reproduction of advantages. Furthermore, we have shown that the whites' greater mobility rates result from upward but even more so from downward mobility. Focusing on the intergenerational educational association, as most previous research does, conceals these interesting results.

The second aim of this paper was to puts to empirical test a theoretical formulation derived from the cumulative advantage mechanism about enduring, life-course effects of educational mobility on earnings. At the heart of this mechanism is the view that advantages and disadvantages cumulate to generate growing effects on earnings. We then argue that parental education is one such advantage, which cumulates on an individual's own education in producing earnings trajectories. This, however, is in sharp contrast to traditional school-to-work studies that measure economic standings at a single point in time, usually at labor market entry.

While human capital is an appealing explanation for earnings trajectories differentiated by own education, cumulative advantage mechanisms explain the same respecting both own and parental education. Parental education in this process is often equated with social and economic resources that bear significantly on their offspring's long-term attainment process. That is, educated parents have more knowledge of the educational system, they are better equipped to guide their children on what and where to study, and they possess more social capital that can ease the transition from school to work. Thus, the advantages associated with both own and with parental education grow over the life-course. Our results support this expectation, showing how the earnings trajectories of individuals in the four mobility groups have fanned out over the life course – chiefly in the case of men – as expected by our four cumulative advantage scenarios.

In particular, we show that the earnings trajectories of American men and women are differentiated by both own and parental education. Whereas college graduates' earnings curve lines have a high start, over time those who were raised by

college educated parents show a steeper upward curve compared to those from uneducated households. This scenario, however, apply to American men, but not women. One possible explanation for this is that the occupations available for degree holder women in the US labor market are too homogeneous to allow further differentiation by parental education. Finally, among those without a degree, the income trajectory of those with college educated parental background shows a rather moderate upward curve over the life course, whereas that for uneducated parents has the flattest curve. This pattern squares well with the ‘glass floor effect’ and seem to work similarly for both men and women.

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Table 1. Expected Effects of Intergenerational Educational Mobility on Income

Theoretical Mechanism	Parental Education	Respondent Education	Income Trajectory
Human capital	Irrelevant	High	High start, steep upward curve
Human capital	Irrelevant	Low	Low start, moderate upward curve
Cumulative advantage	High	High	High start, steep upward curve
Offsetting advantage	Low	High	High start, less steep curve
Compensatory advantage	High	Low	Low start, moderate upward curve
Cumulative disadvantage	Low	Low	Low start, flattest curve

Table 2: Distribution (%) of NLSY79 Respondents by Patterns of Intergenerational Educational Mobility

	Mobile		Immobile		Total
	Upward	Downward	Hi (College)	Low (No College)	
Black Female	9	5	3	82	100
White Female	11	13	10	66	100
Hispanic Female	9	7	2	84	100
Black Male	8	5	3	84	100
White Male	9	15	9	66	100
Hispanic Male	5	7	3	85	100
Total	10	12	8	70	100

Due to rounding error, the total may not sum to 100 exactly.

Table 3. Selected coefficients from model I in Appendix F, by gender (person-years).

Men (N=83,877)			
	vis-a-via 2. Mobility up	vis-a-via 3. Immobile high	vis-a-via 4. Mobility down
Entrance (main effect)			
1. Immobile low	-0.055	0.162***	0.315***
2. Mobility up		0.217***	0.371***
3. Immobile high			0.153***
Growth rate (by year)			
1. Immobile low	-0.023***	-0.052***	-0.053***
2. Mobility up		-0.029***	-0.030***
3. Immobile high			-0.001
Curve (by year^2)			
1. Immobile low	0.000	0.001***	0.001***
2. Mobility up		0.000	0.001***
3. Immobile high			0.001**
Women (N=78,017)			
	vis-a-via 2. Mobility up	vis-a-via 3. Immobile high	vis-a-via 4. Mobility down
Entrance (main effect)			
1. Immobile low	-0.449***	-0.358***	0.233***
2. Mobility up		0.091	0.681***
3. Immobile high			0.590***
Growth rate (by year)			
1. Immobile low	0.020***	0.010	-0.055***
2. Mobility up		-0.010	-0.075***
3. Immobile high			-0.065***
Curve (by year^2)			
1. Immobile low	-0.001***	-0.000	0.002***
2. Mobility up		0.000	0.002***
3. Immobile high			0.002***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1. Adjusted predicted probability (with 95% CIs) of Race/Ethnic and Gender in the four intergenerational mobility groups (Men N=5,832, Women N=5,725).

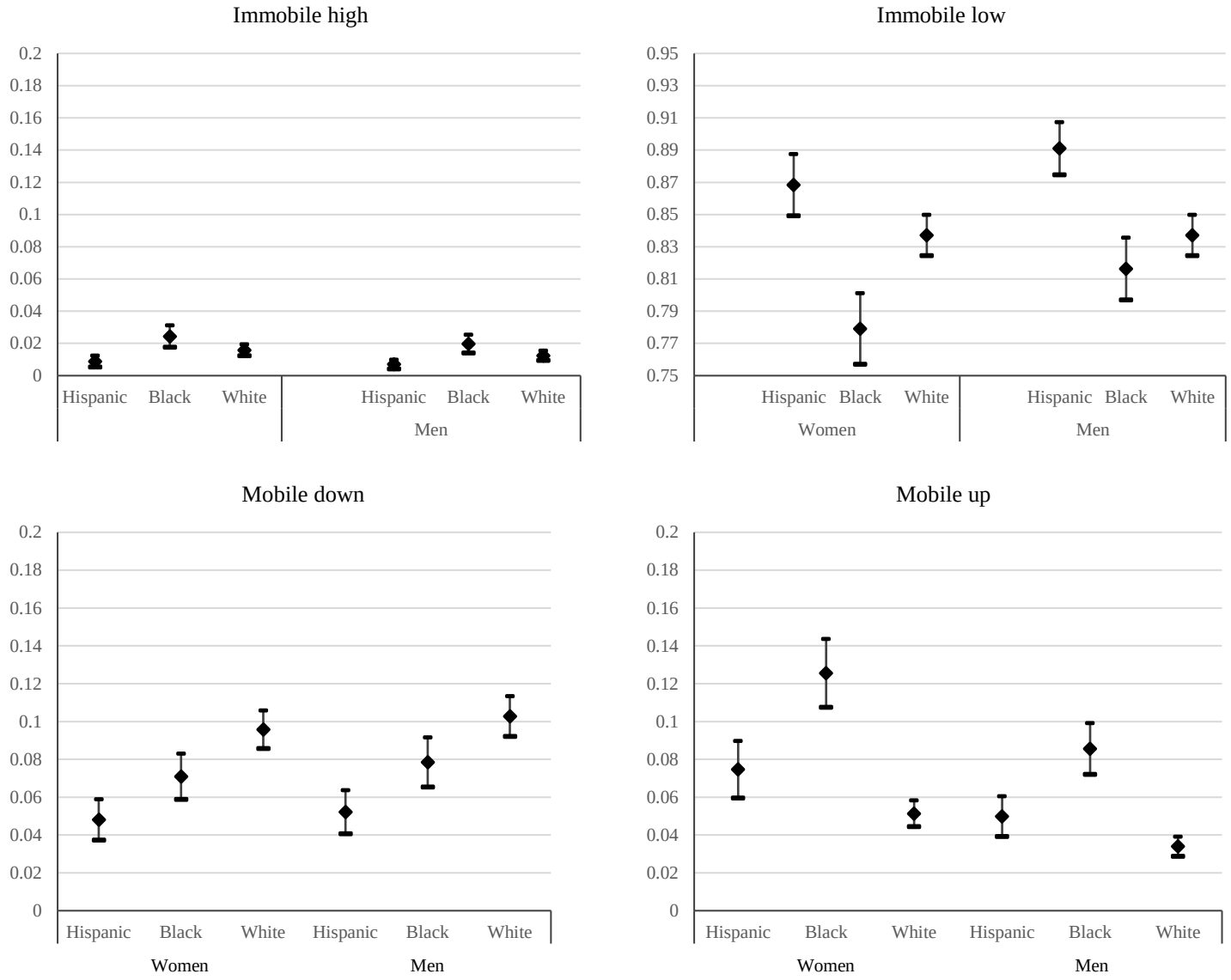


Figure 2. (ln) Income Growth Curve, by Mobility Group and Gender.

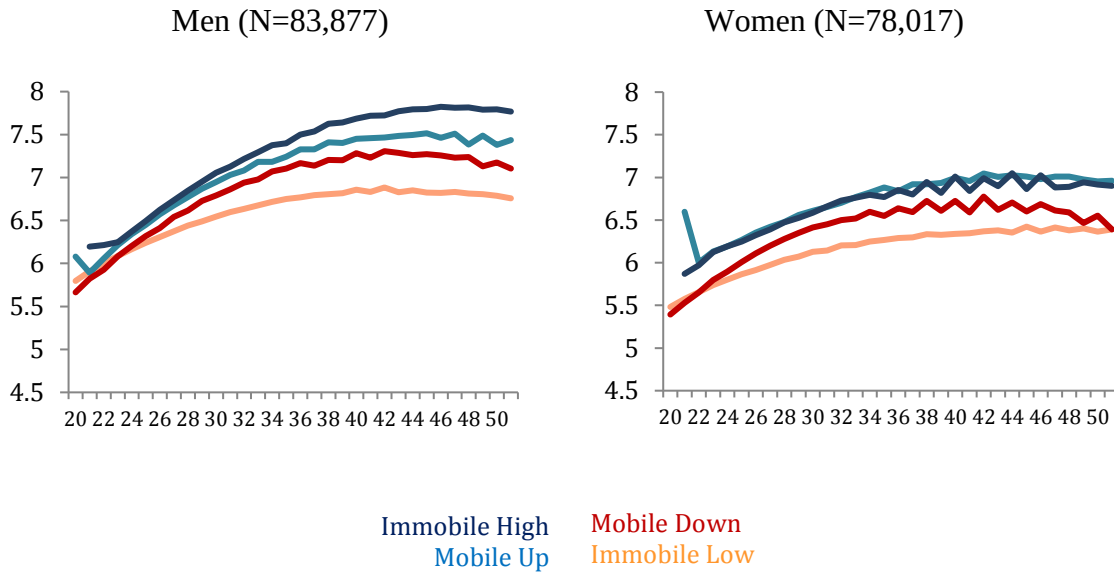
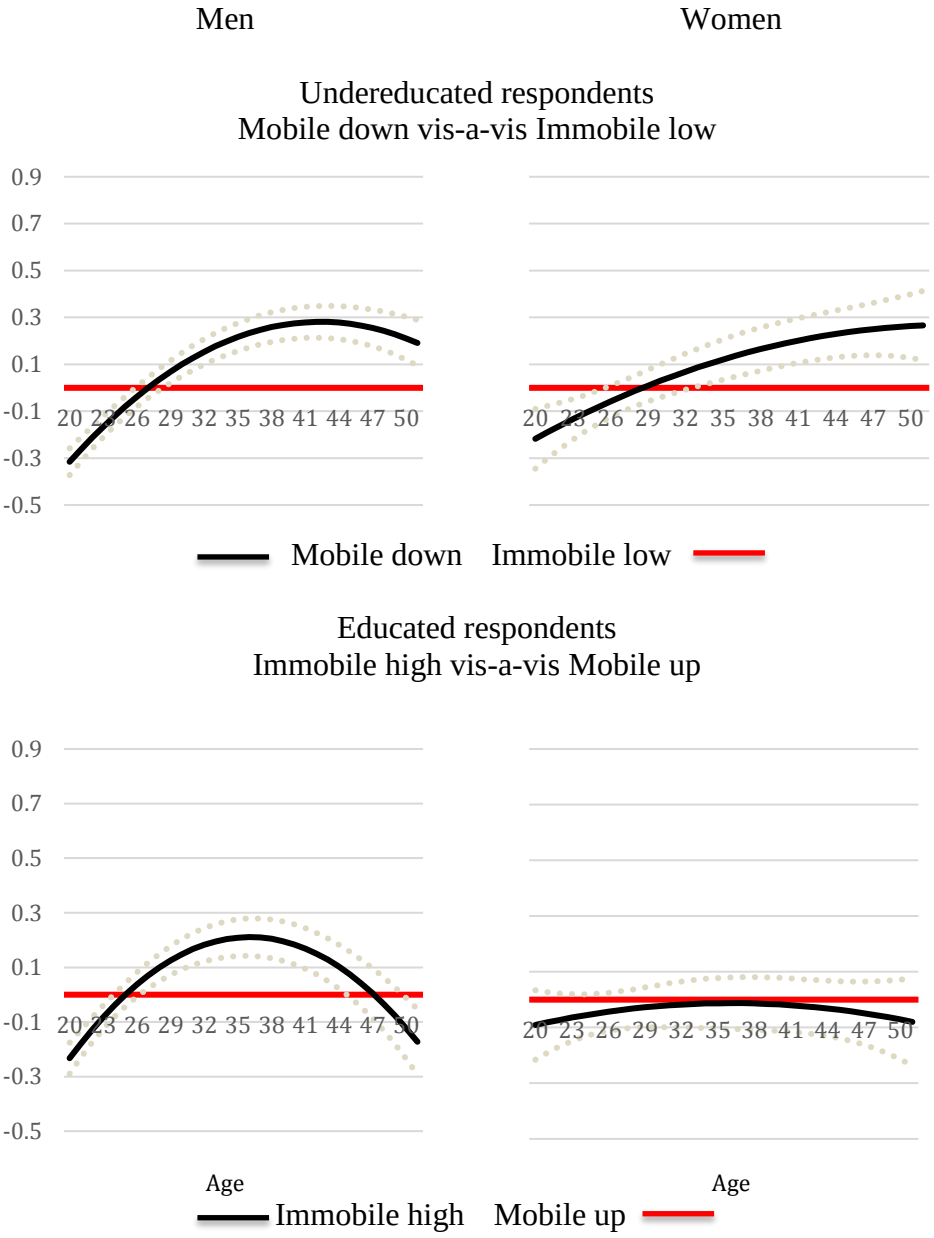


Figure 3. Change in adjusted marginal effects of intergenerational educational mobility on income, with 95% CI envelopes (dotted grey), by gender.



Appendix A: Weighted Means (standard deviations) and proportions of Men's background characteristics (time invariant), by mobility group.

	Min	Max	All	Immobile low	Mobile up	Immobile high	Mobile Down
ln Weekly Income (1979)	1.118	8.086	6.137	6.219***	5.923	5.811***	6.182
			(0.025)	(0.030)	(0.075)	(0.072)	(0.070)
YOB	1957	1964	1961	1961	1960	1960	1961
			(0.039)	(0.045)	(0.130)	(0.143)	(0.114)
Race/ Ethnicity							
Black	0	1	0.14	0.17***	0.10***	0.05	0.06***
			(0.004)	(0.005)	(0.012)	(0.009)	(0.008)
White	0	1	0.80	0.76***	0.86***	0.93	0.91***
			(0.005)	(0.006)	(0.014)	(0.011)	(0.009)
Hispanic	0	1	0.06	0.07***	0.04	0.02	0.03***
			(0.002)	(0.003)	(0.006)	(0.006)	(0.005)
Ability	0	100	50.51	40.94***	76.32***	83.90***	64.19***
			(0.49)	(0.52)	(1.07)	(0.93)	(1.19)
Urban (1979)							
Rural	0	1	0.201	0.231*	0.141	0.163	0.190**
			(0.013)	(0.017)	(0.032)	(0.038)	(0.033)
Urban	0	1	0.782	0.751**	0.853	0.834	0.845*
			(0.013)	(0.017)	(0.032)	(0.038)	(0.034)
Unknown	0	1	0.016	0.019**	0.006	0.003**	0.025
			(0.002)	(0.003)	(0.003)	(0.003)	(0.006)
Region (1979)							
Northeast	0	1	0.200	0.193	0.251	0.228	0.158
			(0.013)	(0.016)	(0.041)	(0.045)	(0.038)
North Central	0	1	0.332	0.337	0.343	0.378	0.254
			(0.016)	(0.189)	(0.045)	(0.051)	(0.044)
South	0	1	0.309	0.318	0.283	0.266	0.319
			(0.015)	(0.018)	(0.041)	(0.046)	(0.047)
West	0	1	0.159	0.151	0.123	0.128*	0.269*
			(0.012)	(0.013)	(0.031)	(0.035)	(0.045)
N			5,832	4,522	411	304	595
%			100	77.54	7.05	5.21	10.20

Appendix B: Weighted Means (standard deviations) and proportions of Women's background characteristics (time invariant), by mobility group.

	Min	Max	All	Immobile low	Mobile up	Immobile high	Mobile Down
ln Weekly Income (1979)	0.975	7.961	5.711	5.786**	5.604*	5.389**	5.703
			(0.025)	(0.032)	(0.057)	(0.082)	(0.063)
YOB	1957	1964	1960	1961	1960	1960	1961
			(0.040)	(0.046)	(0.115)	(0.138)	(0.128)
Race/ Ethnicity							
Black	0	1	0.141	0.167***	0.120***	0.052	0.067***
			(0.004)	(0.005)	(0.011)	(0.009)	(0.009)
White	0	1	0.798	0.759***	0.828***	0.932	0.909***
			(0.005)	(0.006)	(0.013)	(0.010)	(0.010)
Hispanic	0	1	0.061	0.075***	0.051***	0.015	0.025***
			(0.002)	(0.003)	(0.006)	(0.004)	(0.005)
Ability	0	100	49.852	40.863***	67.150***	79.186***	66.209***
			(0.463)	(0.503)	(1.066)	(1.076)	(1.222)
Urban (1979)							
Rural	0	1	0.182	0.201	0.188	0.122	0.112*
			(0.012)	(0.016)	(0.033)	(0.034)	(0.032)
Urban	0	1	0.816	0.797	0.812	0.878	0.884*
			(0.012)	(0.016)	(0.033)	(0.034)	(0.032)
Unknown	0	1	0.002	0.033***	0.036	0.041**	0.039
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Region (1979)							
Northeast	0	1	0.234	0.198**	0.325	0.344	0.221
			(0.014)	(0.016)	(0.041)	(0.051)	(0.045)
North Central	0	1	0.284	0.317*	0.214	0.182	0.277
			(0.015)	(0.019)	(0.034)	(0.040)	(0.048)
South	0	1	0.310	0.318	0.269	0.321	0.303
			(0.015)	(0.018)	(0.037)	(0.049)	(0.049)
West	0	1	0.172	0.167	0.191	0.153	0.198
			(0.012)	(0.015)	(0.034)	(0.039)	(0.042)
Ns			5,725	4,311	578	333	503
%			100	75.30	10.10	5.82	8.79

Appendix C: Means (standard deviations) and proportions of Men's background characteristics (time variant), by mobility group.

	Scale range			Immobile	Mobile	Immobile	Mobile
	Min	Max	All	low	up	high	Down
ln weekly income	0.03	12.08	6.54	6.45	7.09	7.24	6.60
			(0.89)	(0.85)	(0.80)	(0.89)	(0.93)
Respondent's age	20	51	31.46	31.13	35.15	34.67	30.44
			(8.53)	(8.49)	(8.16)	(8.01)	(8.50)
Race/ Ethnicity							
Black	0	1	0.26	0.29	0.19	0.10	0.14
			(0.44)	(0.45)	(0.39)	(0.31)	(0.35)
White	0	1	0.58	0.52	0.70	0.83	0.78
			(0.49)	(0.50)	(0.46)	(0.37)	(0.42)
Hispanic	0	1	0.17	0.19	0.11	0.06	0.08
			(0.38)	(0.40)	(0.31)	(0.24)	(0.28)
Ability	0	100	44.27	36.98	73.75	83.63	64.40
			(29.73)	(26.80)	(21.91)	(15.05)	(26.01)
Urban							
Rural	0	1	0.21	0.23	0.16	0.13	0.14
			(0.41)	(0.42)	(0.37)	(0.34)	(0.35)
Urban	0	1	0.76	0.74	0.80	0.83	0.82
			(0.43)	(0.44)	(0.40)	(0.38)	(0.39)
Unknown	0	1	0.04	0.03	0.04	0.04	0.04
			(0.18)	(0.18)	(0.19)	(0.20)	(0.20)
Region							
Northeast	0	1	0.17	0.17	0.23	0.22	0.18
			(0.38)	(0.37)	(0.42)	(0.41)	(0.38)
North Central	0	1	0.25	0.24	0.25	0.27	0.26
			(0.43)	(0.43)	(0.43)	(0.45)	(0.44)
South	0	1	0.38	0.40	0.35	0.33	0.31
			(0.49)	(0.49)	(0.48)	(0.47)	(0.46)
West	0	1	0.20	0.20	0.18	0.18	0.25
			(0.40)	(0.40)	(0.38)	(0.39)	(0.44)
N (person years)			83,877	65,725	45,98	3,686	9,868
%			100	78.36	5.48	4.39	11.76

Appendix D: Means (standard deviations) and proportions of Men's background characteristics (time variant), by mobility group.

	Scale range Min	Max	All	Immobile low	Mobile up	Immobile high	Mobile Down
ln weekly income	0.02	12.31	6.14	6.05	6.72	6.64	6.17
			(0.91)	(0.88)	(0.78)	(0.89)	(0.97)
Respondent's age	20	51	31.65	31.39	35.49	33.96	30.02
			(8.67)	(8.63)	(8.47)	(8.23)	(8.41)
Race/ Ethnicity							
Black	0	1	0.26	0.29	0.23	0.12	0.15
			(0.44)	(0.45)	(0.42)	(0.32)	(0.36)
White	0	1	0.58	0.53	0.64	0.84	0.76
			(0.49)	(0.50)	(0.48)	(0.36)	(0.43)
Hispanic	0	1	0.16	0.19	0.13	0.04	0.08
			(0.37)	(0.39)	(0.34)	(0.20)	(0.28)
Ability	0	100	45.15	38.45	65.91	77.87	64.25
			(27.75)	(25.36)	(22.69)	(18.69)	(24.18)
Urban							
Rural	0	1	0.20	0.22	0.17	0.14	0.14
			(0.40)	(0.41)	(0.37)	(0.35)	(0.35)
Urban	0	1	0.77	0.75	0.79	0.83	0.82
			(0.42)	(0.43)	(0.41)	(0.38)	(0.38)
Unknown	0	1	0.03	0.03	0.04	0.03	0.03
			(0.17)	(0.16)	(0.20)	(0.18)	(0.18)
Region							
Northeast	0	1	0.17	0.16	0.23	0.26	0.20
			(0.38)	(0.36)	(0.42)	(0.44)	(0.40)
North Central	0	1	0.23	0.24	0.21	0.22	0.23
			(0.42)	(0.43)	(0.41)	(0.41)	(0.42)
South	0	1	0.41	0.41	0.41	0.38	0.37
			(0.49)	(0.49)	(0.49)	(0.49)	(0.48)
West	0	1	0.19	0.19	0.16	0.15	0.21
			(0.39)	(0.40)	(0.36)	(0.36)	(0.41)
N (person years)			78,017	60,054	5,500	3,712	8,751
%			100	76.98	7.05	4.76	11.22

Appendix E: Multi-logit coefficients (standard errors in parentheses) on the odds of accessing one of the intergenerational educational mobility groups.

	Immobile low	Mobile up	Mobile down	Mobile up	Mobile down
	Rather than Immobile high			Rather than Immobile low	
Male	0.259**	-0.172	0.313**	-0.430***	0.0546
	(0.093)	(0.105)	(0.105)	(0.074)	(0.068)
Race/Ethnicity [*Black*]					
Hispanic	1.119***	0.490*	0.622*	-0.629***	-0.497***
	(0.231)	(0.246)	(0.261)	(0.133)	(0.145)
White	0.504***	-0.462**	0.732***	-0.966***	0.228*
	(0.152)	(0.165)	(0.174)	(0.103)	(0.103)
Age	-0.196***	0.004	-0.200***	0.200***	-0.004
	(0.021)	(0.024)	(0.024)	(0.017)	(0.016)
Ability	-0.075***	-0.024***	-0.042***	0.050***	0.033***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.001)
Urban [*Unknown*]					
Rural	-2.313***	-0.622	-3.039***	1.691***	-0.725***
	(0.405)	(0.450)	(0.417)	(0.226)	(0.138)
Urban	-3.053***	-1.078*	-3.116***	1.976***	-0.0625
	(0.391)	(0.434)	(0.397)	(0.213)	(0.112)
Region [Northeast]					
North Central	0.426***	0.118	0.360*	-0.307**	-0.066
	(0.128)	(0.144)	(0.147)	(0.105)	(0.102)
South	-0.092	-0.167	0.063	-0.075	0.155
	(0.124)	(0.137)	(0.142)	(0.100)	(0.097)
West	0.278	0.028	0.587***	-0.250*	0.309**
	(0.155)	(0.174)	(0.171)	(0.121)	(0.106)
Constant	19.670***	3.382*	16.210***	-16.290***	-3.458***
	(1.273)	(1.424)	(1.426)	(0.984)	(0.908)
N			11,557		
BIC			15222.3		

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix F: Coefficients from mixed models on average weekly (ln) income ages 25-51, by gender.

	Men			Women		
	I	II	III	I	II	III
Age	0.090***	0.090***	0.086***	0.072***	0.072***	0.083***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.004)
Age^2	-0.002***	-0.002***	-0.002***	-0.001***	-0.001***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ability	0.004***	0.004***	0.004***	0.006***	0.006***	0.006***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cohort	0.006*	0.006*	0.006*	-0.006	-0.006	-0.006
	(0.003	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
Urban [Unknown]						
Rural	0.093***	0.093***	0.092***	-0.028	-0.028	-0.028
	(0.014)	(0.014)	(0.014)	(0.017)	(0.017)	(0.017)
Urban	0.137***	0.138***	0.138***	0.054***	0.054***	0.053***
	(0.013)	(0.013)	(0.013)	(0.016)	(0.016)	(0.016)
Region [Northeast]						
North Central	-0.108***	-0.108***	-0.109***	-0.126***	-0.126***	-0.126***
	(0.017)	(0.017)	(0.017)	(0.018)	(0.018)	(0.018)
South	-0.072***	-0.071***	-0.070***	-0.070***	-0.070***	-0.070***
	(0.015)	(0.015)	(0.015)	(0.016)	(0.016)	(0.016)
West	-0.023	-0.024	-0.025	-0.030	-0.030	-0.030
	(0.017)	(0.017)	(0.017)	(0.018)	(0.018)	(0.019)
Race/Ethnicity [Black]						
Hispanic	0.179***	0.205***	0.218***	0.074***	0.081***	0.127***
	(0.023)	(0.024)	(0.034)	(0.022)	(0.024)	(0.035)
White	0.186***	0.214***	0.159***	-0.007	0.010	0.085**
	(0.018)	(0.019)	(0.027)	(0.018)	(0.019)	(0.027)
Educational group [Immobile low]						
Mobile up	0.055	0.196**	0.434***	0.449***	0.462***	0.465***
	(0.043)	(0.062)	(0.102)	(0.042)	(0.058)	(0.093)
Immobile high	-0.162**	0.004	0.119	0.358***	0.387***	0.139
	(0.051)	(0.087)	(0.151)	(0.050)	(0.088)	(0.151)
Mobile down	-0.315***	-0.169**	-0.048	-0.233***	-0.091	-0.185*
	(0.029)	(0.057)	(0.075)	(0.029)	(0.056)	(0.073)
*Educational group [Immobile low]*Age*						
Mobile up*Age	0.023***	0.024***	-0.007	-0.020**	-0.020**	-0.026
	(0.007)	(0.007)	(0.015)	(0.006)	(0.006)	(0.014)
Immobile high*Age	0.052***	0.052***	0.036	-0.010	-0.010	0.034
	(0.008)	(0.008)	(0.023)	(0.008)	(0.008)	(0.024)
Mobile down*Age	0.053***	0.053***	0.029*	0.055***	0.055***	0.077***
	(0.005)	(0.005)	(0.012)	(0.006)	(0.006)	(0.014)
Educational group [Immobile low]Age^2*						
Mobile up*Age^2	-0.001	-0.001	0.001	0.001**	0.001**	0.001*
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Immobile high*Age^2	-0.001**	-0.001**	-0.000	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Mobile down*Age^2	-0.001***	-0.001***	-0.001*	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Educational group [Immobile low] Race/Ethnicity [Black]*						
Mobile up*Hispanic		-0.253**	-0.220		-0.000	0.133
		(0.080)	(0.180)		(0.069)	(0.162)
Mobile up*White		-0.168**	-0.485***		-0.019	-0.056
		(0.054)	(0.113)		(0.0492	(0.105)
Immobile high*Hispanic		-0.121	-0.457		-0.015	-0.377
		(0.126)	(0.250)		(0.146)	(0.291)
Immobile high*White		-0.197*	-0.291		-0.041	0.248

		(0.079)	(0.161)		(0.081)	(0.160)
Mobile down*Hispanic		-0.188*	-0.312*		-0.102	0.064
		(0.087)	(0.123)		(0.088)	(0.124)
Mobile down*White		-0.170**	-0.290***		-0.173**	-0.085
		(0.057)	(0.081)		(0.057)	(0.080)
*Race/Ethnicity [Black]*Age*						
Hispanic*Age			-0.005			-0.008
			(0.005)			(0.004)
White*Age			0.009*			-0.018***
			(0.004)			(0.005)
Race/Ethnicity [Black]Age²						
Hispanic*Age²			0.000			0.000
			(0.000)			(0.000)
White*Age²			-0.000			0.001***
			(0.000)			(0.000)
Educational group [Immobile low] Race/Ethnicity [Black]*Age*						
Mobile up*Hispanic*Age			-0.011			-0.023
			(0.026)			(0.022)
Mobile up*White*Age			0.042*			0.017
			(0.017)			(0.016)
Immobile high*Hispanic*Age			0.050			0.052
			(0.039)			(0.047)
Immobile high*White*Age			0.012			-0.049
			(0.025)			(0.026)
Mobile down*Hispanic*Age			0.024			-0.042
			(0.020)			(0.023)
Mobile down*White*Age			0.024			-0.019
			(0.013)			(0.015)
Educational group [Immobile low] Race/Ethnicity [Black]*Age²*						
Mobile up*Hispanic*Age²			0.001			0.001
			(0.001)			(0.001)
Mobile up*White*Age²			-0.001			-0.001
			(0.001)			(0.001)
Immobile high*Hispanic*Age²			-0.001			-0.001
			(0.001)			(0.001)
Immobile high*White*Age²			-0.000			0.001
			(0.001)			(0.001)
Mobile down*Hispanic*Age²			-0.001			0.001
			(0.001)			(0.001)
Mobile down*White*Age²			-0.000			0.000
			(0.000)			(0.000)
Constant	5.112***	5.091***	5.118***	5.542***	5.525***	5.473***
	(0.163)	(0.163)	(0.163)	(0.166)	(0.166)	(0.167)
Observations (person-years)	83,877	83,877	83,877	78,017	78,017	78,017
BIC	162,597	162,642	162,761	166,387	166,445	166,575

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$