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The Glass Floor:

Education, Downward Mobility, and Opportunity Hoarding

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Summary

From an intergenerational perspective, the U.S. income distribution is sticky at both ends. Affluence and poverty are both partially inherited. Policy and research has focused on upward mobility, especially from the bottom. But relative intergenerational upward mobility is only possible with equivalent rates of downward mobility, where much less attention has been directed. Those born into more affluent families may be protected from falling by a "glass floor," even if they are only modestly skilled.

In this paper we identify a group raised in higher-income households (top two-fifths of family income), who are predicted on the basis of their skills—both cognitive and non-cognitive—to fall down the ladder, but who remain in the higher-income bracket.

Our principal empirical findings are as follows:

1. Skills, as measured in adolescence by the Armed Forces Qualifying Test (AFQT) and coding speed, strongly predict the chances of being in a higher-income household as an adult.
2. A sizable proportion (43%) of those who remain in a higher-income household are of modest skill, and would be expected on the basis of skill to fall.
3. Getting a college degree is associated with a 23% greater chance of an adolescent of modest skills—i.e., predicted to fall—remaining in a higher-income household as an adult.
4. Lower-income adolescents with the smarts and drive to get into the higher-income bracket have a 42% greater chance of making it if they have a college degree.

From a mobility perspective, it would be better if college slots currently taken up by modestly skilled kids who remain at the top were filled instead with the smart, motivated kids who remain stuck at the bottom.

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Background

Relative intergenerational social mobility has two essential elements: people moving up, and people moving down. Upward mobility without downward mobility is a mathematical impossibility.

Upward mobility is the star of the show, attracting most of the attention of politicians, policy-makers, foundations, and researchers. Horatio Alger stories of success against the odds dominate public debate, and animate much of the research agenda.

Downward mobility is the Cinderella of inequality studies. In 1969, S.M. Miller wrote:

> The concern with upward mobility has obscured the importance and amount of downward mobility…[but] it may well be that downward mobility is a better indicator of fluidity in a society than is upward mobility….A society which is dropping sons born in advantaged strata has more openness that one which brings up the talented manual sons but safeguards the privileges of the already advantaged.

But the obscuring continues four decades later. This lacuna is particularly striking in the U.S., given that, from an intergenerational perspective, our income distribution has sticky ends: those born at the bottom or top are more likely to end up in the same place as adults than in other countries.

Previous research shows that children born into a household in the bottom fifth (quintile) of the income distribution have a 42% chance of being in the bottom quintile as adults.[1] But the distribution is equally sticky at the top: 39% of top-quintile children end up as top-quintile adults, as Figure 1 shows.

On the upward side of the mobility scales, a good deal of research effort goes into identifying children who "ought", on the basis of some measure of merit or market ability, to end up with better outcomes, in terms of education, jobs, and income—but remain stuck on the bottom rung of the ladder. Investigations are then conducted into the complex mix of personal, familial, educational, informational, and cultural barriers they face: effectively, a glass ceiling.

There are almost certain to be processes working in the opposite direction at the other end of the income distribution. John Goldthorpe describes stratified societies as having "self-maintaining properties," at the bottom but especially at the top. Children in affluent households receive multiple advantages that may secure them a higher place in the distribution in adulthood, even when their own skills are modest. The writer Reihan Salam dubs this phenomenon "incumbent protection:" we call it a glass floor.[2]

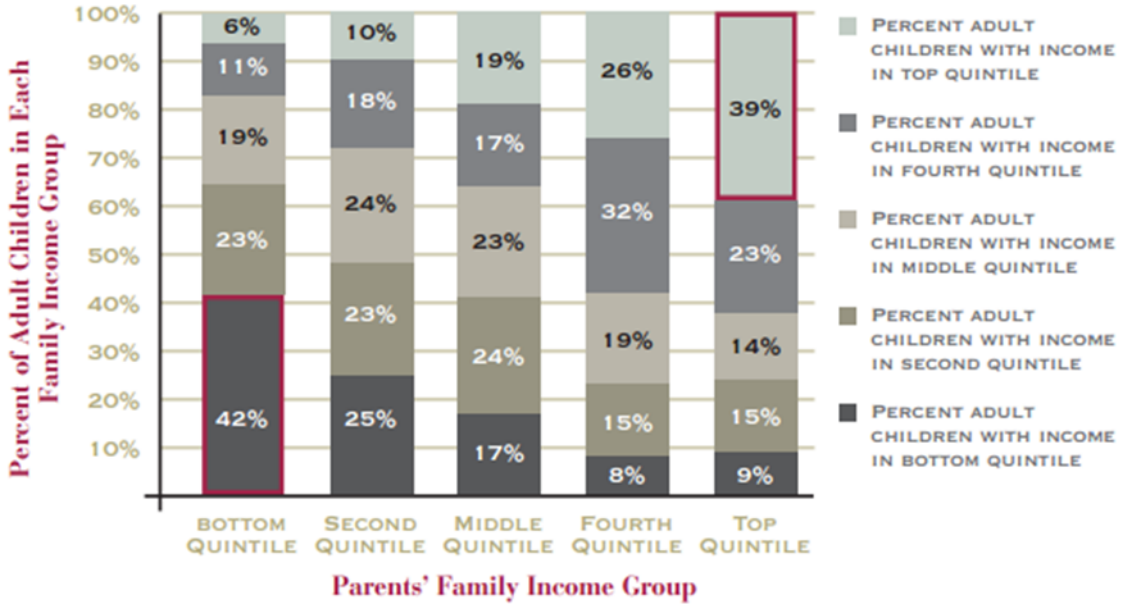
The French have a single, slightly disdainful, word for falling down the social ladder: *declassement.* Our research is aimed at finding out whether some people of modest skill are saved from *declassement*; and if so, who they are, and how they are managing it.

Previous studies

There is a rich empirical literature on intergenerational relative social mobility, both in the U.S. and internationally.[3] Many studies have also focused on the particular barriers faced by children from disadvantaged backgrounds. There is, however, little research that examines mobility from the other end of the telescope.

Figure 1: 'Sticky ends' for intergenerational income mobility

Children's Chances of Getting Ahead or Falling Behind, by Parent's Family Income



Credit: Isaacs, Sawhill, and Haskins (2008)

Corak, Lindquist, and Mazumder (2010) examine "rank directional mobility"—movement up or down the income distribution ladder—for male earnings relative to fathers' earnings, in the U.S., Canada, and Sweden. Strikingly, they find "larger cross-country differences in downward mobility from the top of the income distribution than upward mobility from the bottom." While 69% of Canadian sons with fathers in the top earnings quintile drop into a lower quintile, the figure is 62% in the U.S. Similarly, 59% of Canadian sons with fathers in the top 5% of the distribution fall at least 20 percentiles down the earnings ladder, compared—to 44% in the U.S. However, this study makes no attempt to measure skill levels. It is possible that the lower risk of downward mobility for U.S. sons results from stronger intergenerational transmission of market-relevant skills.

Bhattacharya and Mazumder (2011) also use rank directional mobility to investigate a variety of measures of upward mobility by race, using the National Longitudinal Survey of Youth (NLSY), the same dataset we use in the present study. There are big differences in upward mobility rates by race: blacks are 26 percent less likely to move out of the bottom quartile than whites, for instance. But once outcomes are controlled for cognitive skills in adolescence (using the Armed Forces Qualification Test, or AFQT), most of the race mobility gap disappears.

Acs (2011) examined downward mobility from the middle of the income distribution: a third of those raised in families with incomes between the 30th and 70th percentile "fall out of the middle" as adults. The risk factors for this "middle-down" mobility are divorce (for white women), drug use, lower levels of cognitive ability, and lack of education. For example, downward mobility was 13 to 16 percentage points lower among college graduates than high school dropouts. Like Bhattacharya and Mazumder, Acs found that "AFQT score differences appear to be the most important factor behind black-white downward mobility differences."[4]

Two studies in Sweden cast a different light on the idea of a glass floor. Examining downward occupational mobility, Alm (2009) found that individual academic ability—measured with a cognitive test taken at age 12—was by far the strongest predictor of falling down the occupational ladder, followed by parental education. Parental attitudes towards education and aspirations for their children's careers also had some modest effects. Bjorklund et al (2008) use a large administrative dataset to investigate income and earnings elasticity at different points in the distribution. They find high levels of earnings mobility, especially toward the bottom, with almost none of the earnings of a low-earning father being passed on to sons. But the persistence of earnings, and especially of income, is much higher at the top of the income distribution, especially at the very top. Income elasticity for the top 0.1%, for instance, is measured at 0.83, compared to 0.26 for the income distribution as a whole. Sweden, the authors conclude, "is a society where equality of opportunity for a large majority of wage earners coexists with capitalist dynasties."

Existing research on downward mobility—limited though it is—suggests that this is an area worthy of further investigation. In particular, there is a need for a treatment of downward mobility that includes some estimation of market skills, or merit.

Does downward mobility—or lack of it—matter?

Committed parents work very hard to make sure their own kids do as well as possible. They invest time, love, money, and energy into their well-being and prospects. This is a natural, commendable instinct, one of the deepest instincts of any of us. Indeed, we want more parents to feel like this. Why shouldn't they do everything they can to help their children do well, even if—perhaps especially if—they are somewhat dim? What's the problem here, exactly?

Of course advantage is passed down from one generation to the next in many ways that are benign, fair, and legitimate. Nobody is going to suggest affluent parents stop reading bedtime stories to their children in the interests of equal opportunity. But there may be some transmission mechanisms that are less legitimate. The use of social networks to close off certain areas of the labor market (e.g., the informal allocation of internships) could be seen as unfair hoarding of opportunities. Gaining preferential access to valuable education opportunities—for example, through legacy admissions—is another potential opportunity-hoarding mechanism. At the same time, the accumulation and transmission of financial wealth may also contribute to immobility at the top. Greater capital may, for example, ease transitions to higher education, or help with getting a foothold on the housing ladder in an area with good jobs.[5]

Here, then, is the problem: the laudable desire of parents to do the best for their own children translates into systematic opportunity hoarding at the top of the income distribution.[6] There is a strong meritocratic argument that lower-skill rich children should not triumph over the highly-skilled poor, and take up disproportionate space at the top.

Measuring Merit: "Smarts" and "Drive"

In order to assess the meritocratic credentials of the income distribution, some measure of merit is required. Ideally one which is wholly objective, and perhaps administered at birth or, even better, *in utero* to a large, representative sample. Of course there is no such thing. Merit is a combination of abilities, skills, and traits, shaped and reshaped over the life course. It is not reducible to a single test at a single point in time. There is no essential essence of merit within each of us.

The best we can hope for is to capture the skills important for success in a market economy, through a robust measure or set of measures. For our research purposes—examining intergenerational trends—these

measures will have to be reliably captured in a dataset that contains adult outcomes. It is also important to quantify both cognitive and non-cognitive skills—"smarts" and "drive"—since both are important in determining adult outcomes (Heckman, forthcoming).

We use two components of the Armed Services Vocational Aptitude Battery (ASVAB), developed by the U.S. Department of Defense as a measure of trainability and eligibility for enlistment. The ASVAB is included in the National Longitudinal Survey of Youth 1979 (NLSY79).

Cognitive skills—smarts—can be gauged with the AFQT, a subtest based on math and reading skill sections of the ASVAB.[7] The AFQT is frequently used to quantify cognitive skill and has been shown to be a strong predictor of adult outcomes, including earnings and employment.[8]

To capture non-cognitive skills—drive—we use the coding speed section of the ASVAB. Participants match words with four-digit numbers using a key that provides these pairings in a multiple-choice format. The goal is to get as many correct answers as possible within seven minutes. No background knowledge beyond basic literacy was needed to complete the task. Importantly, there was also no particular incentive to do well on the test: participants received $50 for completing the ASVAB regardless of how well they scored. Therefore, although not originally intended to measure non-cognitive skills, the coding speed test turns out to be a good gauge of intrinsic motivation, independent of cognitive ability. The coding speed score has been shown to strongly predict adult earnings, independent of AFQT performance.[9]

Our primary interest is the influence of family income background on mobility. We therefore attempt to capture skill levels as early as possible in the lifecycle by selecting individuals who took the test between the ages of 15 and 18.[10] Needless to say, adolescent AFQT and coding speed scores are far from a pure test of merit, or market ability. They simply measure certain skills that have developed up to the time of test taking. A whole host of factors—family background, formal education, and social environment—will have influenced this development. It is important to stress that our measures do not—cannot—capture innate levels of skill or ability.

However, comparing gaps in cognitive test scores by socio-economic background across time suggests that our adolescent scores are reflecting a fairly stable distribution of these skills. Six out of ten adolescents from the top income quintile get a top-third AFQT score and exactly the same proportion from the bottom income quintile are placed in the bottom third of AFQT results (see Figure 2a and 2b). These gaps are almost identical to income-related gaps in Peabody Picture Vocabulary Test (PPVT) scores, administered to 3-4 year olds, and Peabody Individual Achievement (PIAT) scores, administered to 13-14 year olds which also aim to measure cognitive ability.[11]

In other words, income gaps in cognitive test scores emerge early and persist.[12] This has clear policy implications, but for the purposes of our research, the persistence of the gaps by income suggests that the

Figure 2a: Richer kids do well on tests…

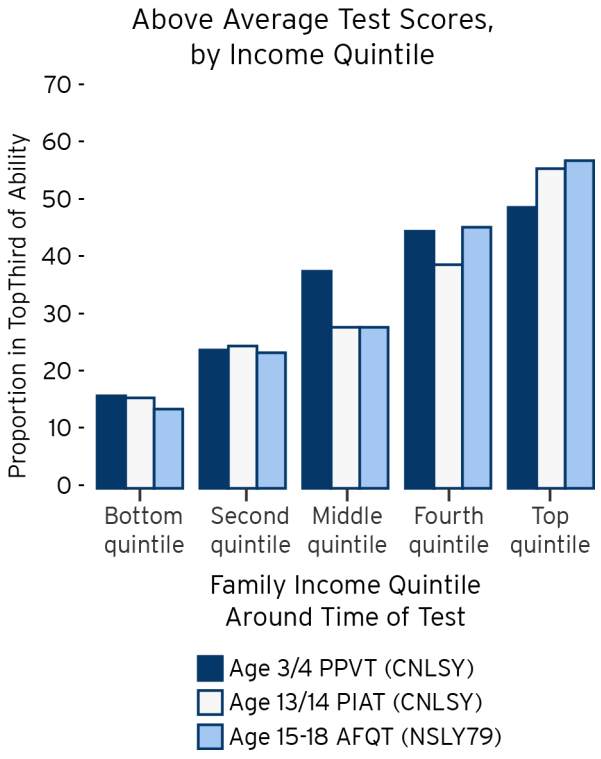


Figure 2b: …while poor kids struggle

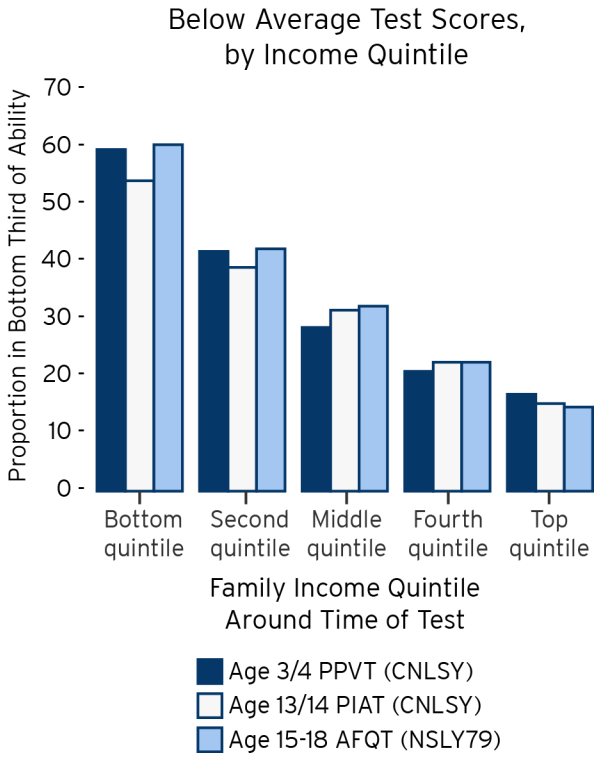
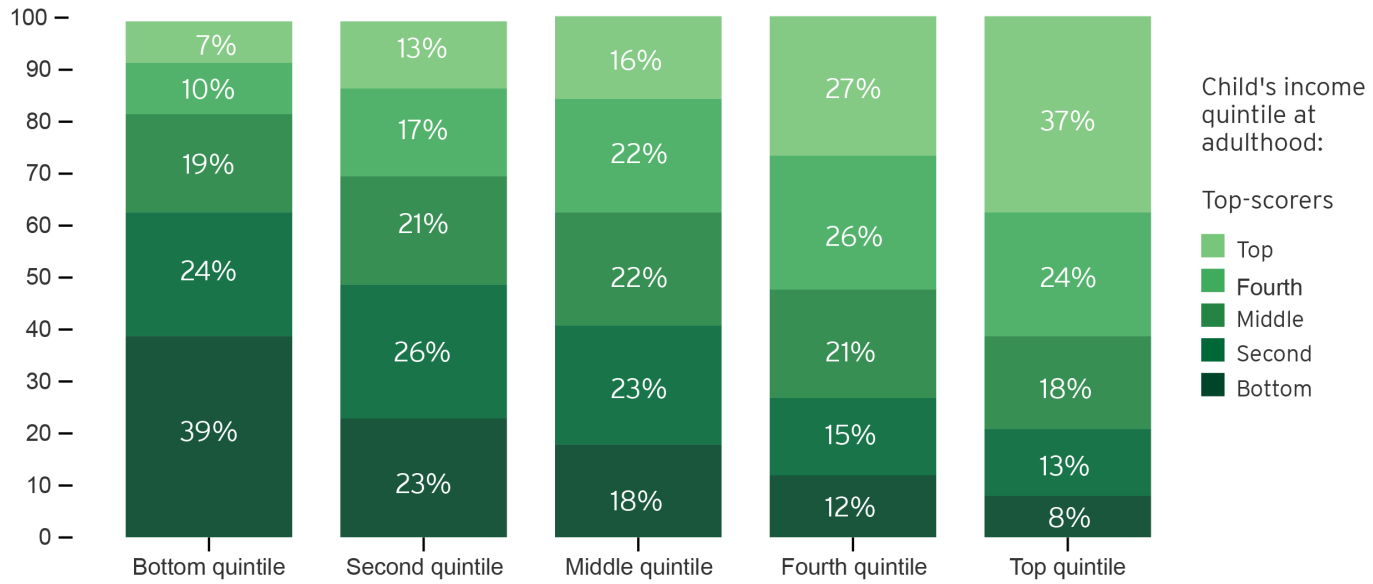


Figure 3: Rich teen, poor teen = Rich adult, poor adult

Percent chance of moving up or down the family income ladder, by parents' income quintile (among all teens)



ASVAB is a serviceable measure.

Mobility & Skills

A transition mobility matrix for our sample (2,985 individuals from the NLSY79) comparing income quintile in adolescence and adulthood (Figure 3) shows a similar pattern to previous studies of intergenerational income mobility (see, for example, Figure 1).

In themselves, these mobility patterns tell us little about the fairness of the mobility patterns. Mobility may track some measures of skill quite precisely. To explore the links between levels of skill and levels of mobility, we split individuals into three groups—low, medium, and high—for both cognitive skills and non-cognitive skills, using their AFQT and coding speed score, respectively.

Figure 4a shows intergenerational mobility for those scoring in the top third and the bottom third of the AFQT distribution. Figure 4b presents the equivalent pattern for high and low scorers on the non-cognitive measure.

These charts show that both cognitive and non-cognitive skills matter a great deal for mobility. Over 40

Figure 4a: Smarts Matter...

Percent chance of moving up or down the family income ladder, by parents' income quintile and cognitive skills

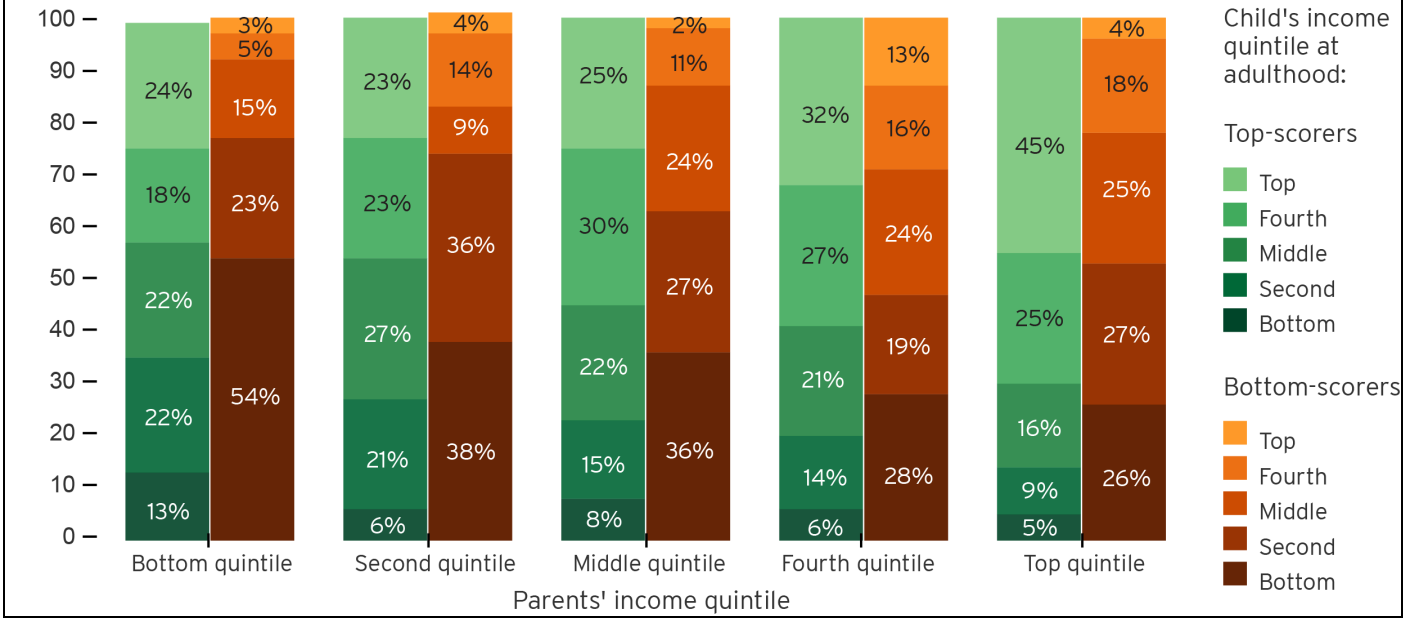
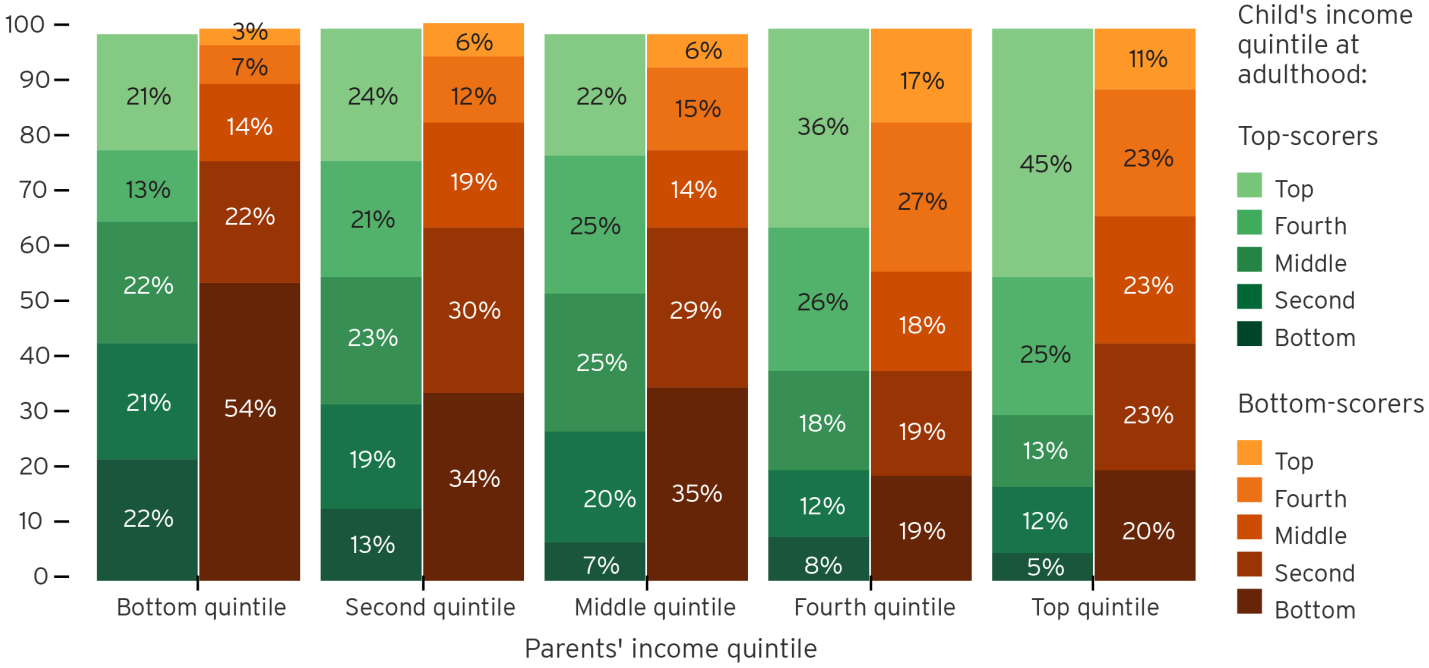


Figure 4b: Drive Matters, Too

Percent chance of moving up or down the family income ladder, by parents' income quintile and non-cognitive skills



percent of adolescents who score in the top third on the AFQT in the bottom quintile make it to the top two-fifths. However, those low on both family income and cognitive skills have little chance of moving up: only 8% of bottom fifth, low-skill teens make it to the top two-fifths. Very similar patterns are observed by non-cognitive skills.

This is not to say that individual skill wipes away all traces of family income. In terms of mobility, it's better to be smart, motivated, and rich, than smart, motivated, and poor. Of higher income adolescents who score in the top third on both the AFQT and coding speed, 71% are in the top two-fifths as adults. Of comparably skilled lower-income adolescents, 54% are in the top two-fifths as adults. Other factors, beyond our measures of skills, are influencing patterns of upward—and downward—mobility.

The Glass Floor

Smarts and drive, then, explain a large part of the mobility distribution. But there is a group who remain in the top two quintiles as adults, against the expectations set by their low ASVAB scores. These are the people we are interested in here.

Our focus on downward mobility from the top two quintiles stems from our overall objective: to examine potential mechanisms through which downward mobility may be averted, thereby perpetuating relative income status. We do not assume that there is a single glass floor in operation at the 60th percentile; while these people have higher incomes than most, they are not the super-elite. If there are factors working against downward mobility, they are likely to be in operation across the income distribution, almost certainly to varying degrees. Indeed, previous research suggests that the glass floor thickens the higher we move up the income distribution. Any results we can find from investigating the top two quintiles are likely to be amplified nearer to the top.

To identify the individuals who remain in the higher income bracket, we first run a regression predicting the probability of each individual being in the top two income quintiles as adults, based on their teenage AFQT score, teenage coding speed score, and the interaction of the two.[13] If the probability is above 0.5, they are predicted to make it.[14] We then compare predicted success with actual success.

Some who were in higher-income households as adolescents remain there as adults, despite being predicted to fall. They start life well-off, and despite not being particularly skilled, stay well-off. Indeed, 43% of those who stay well-off are predicted by their skills to fall. By comparison, there is a group who drop down the income scale, as predicted.

A simple comparison of mean attributes of the two groups shows one clear difference: education (see Table 1). Those who remain at the top are almost three times as likely to have completed college as those who fall down (25% v. 9%). They are also more likely to have parents who went to college for at least one year.

To further investigate the association with education, we use a logit model to estimate our adult success measure (top two-fifths of income around age 40) from education, as well as a set of controls (Table 2), for all those who were in higher income households as

Table 1: Characteristics of High-Income Adolescents Predicted by Skill Levels to Fall

	Remain in top two-fifths as adults	Fall to bottom three-fifths as adults
Female	46%	45%
Black	8%	10%
Hispanic	6%	6%
Other	3%	6%
Family income in adolescence	$89,066	$87,252
Has college degree at 40*	25%	9%
Mother completed at least 1 year of college*	22%	20%
Father completed at least 1 year of college*	34%	28%
Self Esteem (standardized)*	-0.04	-0.09
AFQT percentile score	43.77	36.76
Coding Speed (standardized)	0.09	-0.10
N	212	261

Means weighted using custom weight. Base sample is respondents in top two-fifths of family income as adolescents who are predicted to fall out of the top based on their poor performance on the AFQT and coding speed test.
* Not available for all respondents.

Table 2: Probability of Staying in the Top Two-Fifths for High-Income Adolescents Predicted by Skill Levels to Fall

	raw	*mfx*
Female (d)	-0.122	-0.030
	(0.238)	(0.059)
Black (d)	-0.089	-0.022
	(0.314)	(0.077)
Hispanic (d)	0.130	0.032
	(0.330)	(0.082)
Other race (d)	-0.655	-0.153
	(0.596)	(0.128)
Log (adolescent family income)	-0.297	-0.074
	(0.522)	(0.129)
Bachelor's degree or higher (d)	0.952**	0.233**
	(0.338)	(0.078)
Mother Completed at least 1 year of college (d)	-0.160	-0.040
	(0.308)	(0.075)
Father Completed at least 1 year of college (d)	0.024	0.006
	(0.278)	(0.069)
Self Esteem	0.010	0.003
	(0.117)	(0.029)
AFQT	0.016*	0.004*
	(0.007)	(0.002)
Coding Speed	0.199	0.049
	(0.146)	(0.036)
N	466	

Raw coefficients and marginal effects; standard errors in parentheses
* p<0.05; ** p<0.01; *** p<0.001.
(d) for discrete change of dummy variable from 0 to 1
Estimations using custom weights

Table 3: Probability of Rising to Top Two-Fifths for Low-Income Adolescents Predicted by Skill Levels to Rise

	raw	*mfx*
Female (d)	-0.723	-0.179
	(0.441)	(0.107)
Black (d)	-0.388	-0.096
	(0.563)	(0.137)
Hispanic (d)	-0.085	-0.021
	(0.622)	(0.155)
Other race (d)	1.213	0.274
	(1.089)	(0.201)
Log (adolescent family income)	1.146*	0.286*
	(0.516)	(0.129)
Bachelor's degree or higher (d)	1.812***	0.419***
	(0.464)	(0.092)
Mother Completed at least 1 year of college (d)	-0.837	-0.203
	(0.565)	(0.129)
Father Completed at least 1 year of college (d)	-0.376	-0.093
	(0.556)	(0.136)
Self Esteem	0.499*	0.125*
	(0.220)	(0.055)
AFQT	-0.018	-0.004
	(0.017)	(0.004)
Coding Speed	0.666	0.167
	(0.354)	(0.089)
N	182	

Raw coefficients and marginal effects; standard errors in parentheses

* p<0.05; ** p<0.01; *** p<0.001.

(d) for discrete change of dummy variable from 0 to 1

Estimations using custom weights

adolescents and who are predicted by skills levels to fall out. Completing college is the only variable beyond AFQT score that predicts adult success with statistical significance. We estimate that the marginal effect of a college degree, for this group, is a 23% increased probability of staying in the top two-fifths.

If college does protect against downward mobility, it is likely that it acts in the other direction, too. Failing to get a degree may squash the chances of upward mobility for smart, poorer kids. As a test, we estimate instead for low-income adolescents who are predicted, based on their AFQT and coding speed scores, to move into the top two-fifths by adulthood (Table 3). There is a strong association here, too: those with a degree had a 42% higher chance of making it from a lower-income household as a child into the higher-income bracket as an adult. We also find an association between a measure of self-esteem and upward mobility.

Our findings reinforce Ron Haskins' research—published in *Getting Ahead or Losing Ground?-Economic Mobility in America*—showing that non-graduates are at greater risk of downward mobility. [15]

Conclusions

Our principal empirical findings are as follows:

1. Skills, as measured by adolescent AFQT and coding speed, strongly predict the chances of being in a higher-income household as an adult.
2. A sizable proportion (43%) of those who remain in a higher-income household are of modest skill, and would be expected on the basis of skill to fall.
3. Getting a college degree is associated with a 23% greater chance of an adolescent of modest skills—i.e., predicted to fall—remaining in a higher-income household as an adult.
4. Lower-income adolescents with the smarts and drive to get into the higher-income bracket have a 42% greater chance of making it if they have a college degree.

There are of course serious limitations to our study. Most important, by adolescence, income-related gaps in test scores are already very wide. It seems highly likely that most of the work done to insulate children against the risks of downward mobility, especially by parents, occurs before the age of 16.

Narrowing gaps before this point is the motivation for a wide range of policy interventions—most recently the President's push for universal pre-k education. Our findings support the established view that when it comes to promoting life chances, the earlier the better. As Bhattacharya and Mazumder (2011) put it, after finding that AFQT gaps explain black-white mobility gaps, "early life interventions that address pre-market skills may be more effective than those that target labor market institutions."

Our research attempts to account for both cognitive and non-cognitive skills in assessing mobility—and finds important, and almost equal, effects from both. But when we turned to other variables that could be associated with a lack of expected downward mobility, only a fairly narrow range was available, largely because of shortcomings in the data. There are likely many other factors contributing to any glass floor effects, which we were unable to investigate: social networks, school quality, neighborhood effects, and wealth transfers, among others. Evidence from other studies shows, for example, that wealthy parents are able to make regular transfers of capital to their children. These transfers are not sufficient in themselves to alter the cross-sectional income distribution. But they might have important effects on mobility by helping with key transitions, especially between school and college, or between college and the labor market.[16] (Indeed, the relationship between inequalities in wealth and mobility is one in urgent need of more research.)

There is, however, one variable strongly associated with both a reduced risk of downward mobility from the top and an improved chance of upward mobility from the bottom: a college degree. This suggests that we should look hard at the fairness and efficiency of the U.S. higher education system. In 2011, seven out of ten 24 year-olds from an affluent (top quartile) family had a college degree, compared to just one in ten from a low-income (bottom quartile) background.[17] Scaling up from our sample, we estimate that around 250,000 college degrees were awarded to those of modest skills, but comfortable backgrounds. Meanwhile, approximately 400,000 youngsters with high skills who failed to make it to higher-income bracket did not complete college.[18] On the face of it, this represents a mismatch between institutional resources and individual skills. The importance of a college education for promoting upward mobility has been demonstrated in a number of previous studies.[19] Our results suggest that a college degree may also have an effect in the other direction: preventing downward mobility among the less-skilled offspring of better-off families.

This points toward college admission policies that attempt to level the playing field.[20] Colleges need to make greater efforts to attract and support students from low-income backgrounds, and strive to educate the best and brightest, regardless of background. Right now, there is a shortfall in applications to selective colleges from bright kids from poor backgrounds. Attempts to improve application and admission rates focus on a small number of high schools in urban areas: but most of the high-skill, low-income adolescents are scattered across a much broader range of neighborhoods and schools.[21] New approaches are required. One study shows, for example, that simply providing more information about college and financial aid, at a cost of $6 per student, can significantly raise the chances of applying.[22]

Colleges ought to look hard, too, at programs or policies that risk favoring those of modest abilities because of their more affluent backgrounds: preferences for children of alumni, for example.

The question of affirmative action on racial grounds for college admission is a contentious issue, not only in terms of policy—but legally and politically. The Supreme Court is due to issue a judgment on the legal question in *Fisher v. University of Texas-Austin*. An important question is whether rather than being repealed, affirmative action should be re-tasked to favor lower-income applicants.

More broadly, researchers and policy-makers interested in relative intergenerational inequality need to explore not only the barriers to upward advancement but also the glass floors preventing movement in the opposite direction.

Endnotes

1. Isaacs, Sawhill, and Haskins (2008), using the Panel Study of Income Dynamics (PSID).
2. "Should We Care About Relative Mobility?" in *National Review Online*, November 29, 2011. Salam, however, argues against a focus on downward mobility, arguing that 'stickiness at the bottom' is the principal challenge.
3. See for example Isaacs, Sawhill, and Haskins (2008); Ermisch, Jäntti, and Smeeding (2012); Korzeniewicz and Moran (2012); Massey (2008); Bernhardt, et al. (2001); Smeeding, Erikson, and Jäntti (2011).
4. Acs, (2011) p. 29.
5. See Zissimopoulos and Smith (2011).
6. Charles Tilly (1998) coined the phrase "opportunity hoarding" as a factor in the creation of "categorical inequality…relying on the establishment of a partial frontier": "*Opportunity hoarding*, which operates when members of categorically bounded network acquire access to a resource that is valuable, renewable, subject to monopoly, supportive of network activities, and enhanced by the network's modus operandi."
7. The sections of the ASVAB that comprise the AFQT are arithmetic reasoning, mathematics knowledge, word knowledge, and paragraph comprehension.
8. See for example Hansen, Burton, and Scanlon (1970); O'Neill (1990); Neal and Johnson (1996); and Heckman, Stixrud and Urzua (2006).
9. See Segal (2012)
10. See the Appendix for more on how we defined our analysis sample. Family income is captured at around the same time as AFQT.
11. PPVT = Peabody Picture Vocabulary Test, meant to measure verbal ability or scholastic aptitude. PIAT = Peabody Individual Achievement Test, meant to measure academic achievement. We use a composite score that is the average of standardized math and reading subscores. Note that the PPVT and PIAT results are taken from the CNLSY sample, who were mostly born in the 1980s and 1990s, while the AFQT scores are from the NLSY79, whose respondents were born in the 1960s. Therefore the three sets of scores are not directly comparable.
12. Halle et al. (2009).
13. We include an interaction term to account for the possibility that being high on both cognitive and non-cognitive skills or low on both is predictive of adult success beyond the individual effects of cognitive and non-cognitive skills.
14. We use a logit model to estimate the predicted probability of ending up in the top two-fifths of the income distribution by middle age.
15. Haskins, in Isaacs, Sawhill, and Haskins (2008).
16. See Zissimopoulos and Smith (2011).
17. According to Tom Mortensen, cited in Catherine Rampell, "Data Reveal a Rise in College Degrees Among Americans," *New York Times*, June 13, 2013.
18. To estimate the national population numbers, we use the custom weights created by NLS staff which are appropriate for respondents with data in the years 2002, 2004, or 2006 (the years when our sample is middle aged). The weighted number of respondents with valid weights is 11,116,900, which roughly matches the national population of 40-42 year-olds in 2004 (note that the NLSY79 does not include anyone who immigrated to the US after 1978). We drop people from our sample without observed income or ASVAB, leaving us with a weighted N of 10,855,169. Therefore, to get a weighted N for any subgroup of our analysis sample, we adjust by a factor of (11,116,900/10,855,169).
19. See Haskins, Holzer, and Lerman (2009) and Haveman and Smeeding (2006).
20. Echoing the conclusions of Sawhill, Winship, and Grannis (2012).
21. Hoxby and Avery (2012)
22. Hoxby and Turner (2013)

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Appendix on Data

The basis of our analysis is the National Longitudinal Survey of Youth 1979 (NLSY79). The 12,686 men and women in the NLSY79 were 14 to 22 when first surveyed in 1979, and were between 45 and 53 in 2010, the last available round. Because we are interested in intergenerational mobility, we need to observe people both in adolescence (when they are still living with their parents) and in middle age. Therefore, we limit our sample to those born in 1962 to 1964, meaning they were 14 to 17 in the first round. Limiting our sample by age is also important when we look at test scores as a predictor of later outcomes. We want to disentangle, as much as possible, early skill development from later experiences that might affect skills (such as higher education or work experience). Of the original 12,686 respondents, 4,415 were born after 1962.

In order to look at economic mobility, we must observe adolescent and adult income. This limits our sample to those who remained in the survey through middle age, which we define as being observed at age 38, 39, 40, 41, or 42. We observe adolescent and adult income for 2,985 of the sample in the appropriate age range. We also must control for skills, so everyone in our sample must have an ASVAB score. This leaves us with 2,919 individuals.

Key variable definitions:

Adolescent income: average of any total net family income values observed when the individual is age 14 to 17. We take the average of as many years of income as possible within the age range but keep individuals even if we only observe their income in one year. Income is observed at 2 or more ages for 96 percent of the sample. All incomes are in constant 2010 dollars, using the CPI-U-R-S.

Adult income: average of any total net family income values observed when individual is age 38 to 42. We take the average of as many years of income as possible within the age range but keep individuals even if we only observe their income in one year. Income is observed at 2 or more ages for 70 percent of the sample. All incomes are in constant 2010 dollars, using the CPI-U-R-S.

Adolescent cognitive skill: percentile score on the Armed Forces Qualifying Test. These scores are calculated from the Armed Services Vocational Aptitude Battery tests, which the respondents took in 1980, and are age-normed.

Adolescent non-cognitive skill: age standardized score on the Coding Speed section of the Armed Services Vocational Aptitude Battery test, which respondents took in 1980.

Parental education: mother and father's highest grade completed. We create two categories: parents who completed at least one year of college and those who didn't. We chose this categorization because parents' highest degree completed isn't available.

Own education: highest degree attained by the respondent by age 40. We create two categories: individuals with at least a bachelor's degree and those without.

Self-esteem: age standardized score on the Rosenberg Self-Esteem Scale, which respondents took in 1980.

All of our analyses are weighted using NLS-constructed custom weights. The custom set of survey weights adjust both for the complex survey design and for using data from multiple years. We use the weights for the data when respondents are in any of the years 2002, 2004, or 2006 (which are the years when our sample is middle aged). As a check that we are using the appropriate weights, we also conducted the analysis with only the cross-sectional sample of the NLSY79 (which excludes the military and poor white oversamples) and using the cross-sectional sampling weights from the first round (which are equal to zero for anyone in an oversampled population). The results were similar and the sample size smaller, so we decided on the entire sample with custom weights.