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ECONOMIC MOBILITY IN AMERICA
A STATE-OF-THE-ART PRIMER

PART 2: *THE UNITED STATES IN COMPARATIVE PERSPECTIVE*

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WHAT'S INSIDE

EXECUTIVE SUMMARY

The conventional wisdom—both outside and inside the research community—is that if someone wants to achieve the "American Dream" of upward mobility, she should move to Canada or Scandinavia. However, this conclusion is largely based on research that conflates rising income inequality with immobility from one's parental income position. These studies mistakenly claim to be assessing "relative mobility"—the link between parent and child *ranks*—but are actually about "absolute mobility" (the link between parent and child income levels). Following Chetty et al. (2014), a number of recent studies have focused on true measures of relative mobility, and many newer studies have found less mobility in countries outside the US than the earlier research. In addition, too many conclusions about the US's comparative standing in terms of intergenerational mobility have failed to differentiate between, for example, male earnings mobility and family income mobility.

This report—Part Two of a three-part primer on economic mobility in the US—reassesses the cross-national evidence on intergenerational economic mobility, updating previous conclusions by reviewing more recent research and reevaluating the older literature. While it affirms much of the conventional wisdom about cross-national comparisons, it highlights previously neglected nuances in the literature that complicate the simple conclusion that the fates of American children are more tied to their family circumstances than is true of children in other countries. Various difficulties measuring intergenerational mobility introduce a significant amount of imprecision in making cross-national mobility comparisons.

Among the Findings

In terms of relative mobility, American sons and daughters appear about as mobile in the US as in other countries when their earnings are compared with those of their fathers.

- The best-developed literature on relative mobility (comprising 25 studies involving countries outside the US) compares fathers' and sons' earnings. American men with fathers in the bottom quarter, fifth, or tenth of earnings are about as likely as their international counterparts to see upward mobility out of the bottom as adults (based on 18 studies involving countries outside the US). Downward earnings mobility from the top is not obviously lower among American men than it is for sons in other countries. While the evidence is not dispositive, these conclusions are supported by research using harmonized methods and data to compare countries and are reinforced by multiple single-nation studies.
- Similarly, research estimating the intergenerational rank association (IRA) for male earnings indicates, at worst, only modestly lower mobility in the US than in Norway, Sweden, Finland, and Canada, with Denmark perhaps higher than all of them. The differences that turn up across these studies—12 of which involve countries outside the US—may simply reflect methodological challenges afflicting mobility and cross-national research.
- American daughters also experience comparable mobility to their international counterparts if their earnings are compared to those of their fathers. Seven studies estimate upward and downward mobility for countries other than the US, and the US appears to have roughly the same mobility as do the Scandinavian nations (and probably Great Britain).
- Just three studies include father–daughter earnings IRAs for countries outside the US, but they suggest that mobility is the same in the US, Norway, Sweden, and Italy.

However, when sons' and daughters' outcomes are compared with parental family income instead of father earnings, the US has lower relative mobility than other countries (particularly lower upward mobility).

- Comparing parental family income to sons' earnings, individual income, or family income (15 studies involving countries outside the US), American men raised at the bottom appear more likely to end up in the bottom as adults than men in Canada, Norway, Sweden, Finland, and Denmark.
- Among men raised at the top of the distribution of parental income, Americans seem more likely to be at the top of the distribution themselves than are Canadians. But they appear no more likely to remain at the top than men in Scandinavia (or, perhaps, Great Britain and West Germany).
- There is only one study using harmonized data and methods that reports IRAs comparing parental family income to sons' earnings or individual income. A small literature assesses single countries in isolation. The limited evidence (based on three studies of the US, four studies of Sweden, and eight of other countries outside the US) suggests less mobility in the US than in Scandinavia, Canada, or Italy. Great Britain may have mobility as low as or lower than in the US. The sparse evidence comparing the family incomes of parents and sons (four studies involving countries outside the US) suggests that the US has a higher IRA (lower mobility) than Norway, Sweden, West Germany, and Canada. A fifth study indicates higher family income mobility in Australia than in the US, pooling sons and daughters.
- American daughters also may have less upward and downward mobility than Sweden, Finland, and Canada when family incomes are compared, but that conclusion is based on just one study for each of those countries.

- Comparing daughter's earnings or family income to parent family income, Americans have lower mobility (a higher IRA) than their counterparts in Norway, Sweden, West Germany, and Canada. There are just seven studies of IRAs comparing parental income to daughter outcomes that involve countries outside the US.
- An important caveat is that research by Landerso and Heckman (2016, 2017) suggests that American IRAs are significantly lower when years without parental family income or child earnings are excluded from averaging. The entire gap in the Danish–US IRA looking at child earnings or child pre-tax and -transfer income disappears after dropping these years.

Absolute mobility patterns in the US reduce childhood inequalities less than absolute mobility patterns in other countries. However, some cross-national differences have been overstated by earlier studies.

- As discussed in Part One of this primer, summary measures such as the intergenerational elasticity (IGE), intergenerational correlation (IGC), and the sibling correlation are conventionally, but wrongly, thought to summarize relative mobility. In fact, they summarize absolute mobility; they depend not only on relative mobility (changes in rank) but on changes in the cross-sectional distribution of incomes between generations.
- The IGE summarizes the extent to which childhood absolute income inequalities are reduced in adulthood as a result of the absolute mobility patterns of poor, middle-class, and rich children. A higher IGE indicates that the pattern of absolute mobility reduces childhood income inequalities less in percentage terms.
- The US has a higher male earnings IGE than Canada, Norway, Sweden, Finland, and Denmark, and there is no reason to think that it has a lower IGE than West Germany, Great Britain, Australia, or Italy. There are 65 studies involving IGEs from outside the US. In the US, absolute childhood inequalities decline less in percentage terms by adulthood than they do in other nations. That said, previous reviews (e.g., Corak, 2016) have overstated the extent to which the US lags other countries.
- IGE studies comparing parental family income to sons' earnings or family income are rarer (28 involving countries outside the US) and suffer from limitations, but they also show the US having a higher IGE than other countries (Canada, Great Britain, Norway, Sweden, Finland, Denmark, and West Germany). These are reinforced by studies that pool sons and daughters (10 studies involving non-US countries).
- Comparing father and daughter earnings, the US has a higher IGE than Canada and Scandinavia. Comparing parental family income to daughter earnings or family income, the US IGE is larger than in Scandinavia but not necessarily Great Britain. In total, there are 28 studies involving daughter IGEs outside the US.

This conclusion holds even if we disregard intergenerational changes in the cross-sectional dispersion of income.

- The intergenerational correlation (IGC) indicates the extent to which absolute mobility patterns reduce childhood inequalities in adulthood after factoring out the change in the standard deviation of income between generations. It still reflects dollar changes (in percentage terms) rather than only rank changes.
- There are 20 studies estimating male earnings IGCs for countries outside the US. The US has a higher IGC (less reduction of childhood inequalities by adulthood) than the Scandinavian countries, though the evidence is less clear in comparison to Canada, Great Britain and West Germany.
- Comparing parental family income to sons' earnings, individual income, or family income, the US has a higher IGC than Norway, Sweden, Finland, and Canada, but it is unclear whether Great Britain's IGC is lower than in the US. Eleven studies involving countries outside the US are included in this analysis, five of which involve only Great Britain.
- Only eight studies estimate IGCs for daughters outside the US. Reliable conclusions cannot be drawn about how the US compares with other countries on this dimension of mobility.
- Similarly, only three studies estimate IGCs outside the US pooling sons and daughters. It is not possible to draw reliable comparative conclusions from this research.

The limited research examining how strongly siblings' incomes are correlated—another measure of absolute mobility—suggests that family influences affect child incomes more in the US than in Scandinavia.

- Sibling correlations indicate the extent to which shared influences affect siblings' incomes. They depend on the IGC but also on the relationship between other shared influences and grown-child income. (In Part One of this primer, I estimate sibling *rank* correlations, which are summary measures of relative mobility.)
- Only 13 studies estimate brother correlations for countries outside the US, 12 of them involving only Scandinavian countries. The US has more similarity between siblings' incomes than those nations, and possibly more than West Germany.
- Just eight studies estimate sister correlations for countries outside the US, seven of them involving only Scandinavian countries. The limited evidence suggests lower mobility in the US than in Scandinavia, but higher mobility than in West Germany.

Research on some kinds of intergenerational mobility is practically non-existent.

- There are no studies of countries outside the US that examine what is perhaps the best measure of intergenerational mobility: sibling rank correlations. There are practically no such studies of the US either.
- Outside the US, the research assessing how likely children are to exceed parental income is confined to a single study of Canada. There do not appear to be significant differences between Canada and the US on this indicator.

The cross-national research on educational and occupational mobility does not consistently show that the US trails other countries, though a number of studies suggest that the relationship between parental education or income and child outcomes (including test scores) is stronger in the US than elsewhere.

This report makes clear that the question of whether Americans are more closely tied to their parental origins than are residents of other nations is much more complicated than believed by commentators, researchers, and even mobility researchers. The better standing of the US versus other countries in terms of relative earnings mobility—as contrasted with its worse standing in terms of relative family income mobility—may also point to cross-national differences in marriage and single parenthood as drivers of family income mobility differences. That hypothesis is consistent with the finding that the US looks worse primarily in terms of upward mobility from the bottom—rather than downward mobility from the top—when using parental family income.

1. Introduction

The United States is richer than all but a few of the nations on earth. According to the World Bank, our gross domestic product per person ranks us behind only a dozen mostly idiosyncratic nations that together have 15 percent the population of the US.[1] It is true that this bounty is distributed more unequally here than income in our peer nations.[2] But the median American household's disposable income is larger than that enjoyed by a preponderance of its counterparts in Europe and the major "Anglosphere" countries formerly in the British Commonwealth.[3]

Despite the nation's affluence, there is no shortage of observers inclined to deliver the eulogy for the American Dream. According to Stanford University economist Raj Chetty, a leading scholar of opportunity, "Your chances of achieving the 'American Dream' are almost two times higher if you're growing up in Canada relative to the United States."[4] Other outlets proclaim that the dream is "alive and well—in Northern Europe."[5] *The Atlantic* columnist David Frum concludes that "the American dream is less likely to come true in the USA than in any other major economy except the United Kingdom's."[6]

Why does the conventional wisdom discount the evidence of American affluence? One explanation is that low-income households in the US fare worse than most of their counterparts in western and northern Europe.[7] But the bigger factor is over two decades' worth of evidence indicating that the US has lower economic mobility than its peers. The economic fates of American adults are apparently more closely tied to family background than is true of adults in other countries. Rich children, it is said, are more likely to stay rich in the US, and poor kids are more likely to stay poor.

However, this conclusion is primarily based on studies using a measure of economic mobility, the "intergenerational elasticity," or IGE, that reflects not just movement from "bottom" to "top" between generations, but changes in the magnitude of the gap between "bottom" and "top." If that gap increases—if point-in-time inequality grows—but it becomes easier to move from the bottom to the top, mobility rises even though inequality does too. Elasticities conflate relative mobility—movement between ranks or positions—with absolute mobility (becoming richer or poorer).

Some proponents of the view that the US is a mobility laggard do cite research on relative mobility. But they typically cite a single study from over a decade ago (Jantti et al., 2006) that turns out to offer an apples-to-oranges comparison of the US with Scandinavia.

This is the second of three installments constituting a primer on intergenerational economic mobility in the United States. The first installment (Winship, 2017a) assessed contemporary levels of American economic mobility, and the final one will examine trends in American mobility. Part One distinguished between measures of relative mobility, absolute mobility, and sibling similarity, as well as between distributional and summary measures. It also treated separately the evidence for male and female earnings and household income mobility. The current installment uses this typology to make sense of the existing cross-national body of research on mobility, focusing on how the US stands relative to other countries.

While others have reviewed the evidence along one or two of these dimensions, none of the earlier reviews has attempted such a systematic differentiation. And thanks to the research of Chetty and his coauthors (Chetty, Hendren, Kline, and Saez, 2014), the past few years have seen an explosion of studies explicitly using true measures of relative mobility (rather than the IGE, which Part One of this primer explains is a measure of absolute mobility). The time is ripe for a reassessment of the state of opportunity in America versus its peer nations.[8]

The review offered here affirms many—but not all—of the existing conclusions from past reviews. Its most important contrarian conclusion is that in terms of relative earnings mobility, the US appears to do just as well as other countries, even though American children seem to do worse when their economic outcomes are compared with parental family income.

METHODOLOGICAL ISSUES IN ESTIMATING INTERGENERATIONAL MOBILITY

As detailed in Part One of this primer, there are a number of methodological decisions to make when estimating economic mobility. Some relate to income measurement. These choices include whether to account for noncash government benefits, employer fringe benefits, or taxes; whether to combine the incomes of roommates or unmarried romantic partners living together; how to account for increases in the cost of living; and whether to factor in the different needs of families and households of varying sizes.

A number of other measurement problems make it challenging to estimate mobility. Income may often be poorly measured at the bottom of the income distribution, where underreporting in surveys and administrative data is common and where business owners may be found whose well-being is not well-reflected by their income in a given year. Especially at the top of the income distribution, tax avoidance strategies can affect what shows up as income in administrative data. Measuring self-employment earnings also raises the question of how to allocate self-employment income between labor income (a form of "earnings," based on the work that is put into the job) and capital income (deriving from the investments made in the business).

Beyond measurement issues, other methodological decisions require attention. How should people or households reporting no earnings or income be treated in mobility analyses? When the earnings of non-resident fathers are unavailable, should those sons be dropped from analyses, or should earnings be imputed to absent fathers? What should the researcher do about survey attrition and nonresponse, which affect who shows up in mobility analyses using longitudinal data?

These issues are thorny when researching a single country's economic mobility, but the problems multiply when comparing nations.[9] For instance, most Canadian analyses use data that does not include self-employment earnings, and the major British datasets do not measure such earnings well. The different ways in which public and private safety nets and welfare states are organized in different nations make the question of what to include in "income" especially important. In many Scandinavian analyses, for example, the administrative data on "earnings" includes as income parent allowances or unemployment, disability, or sick-leave benefits. In addition, while public benefits are generally included in income, the same is not true of private fringe benefits. Income in countries that rely disproportionately on private fringe benefits will less completely reflect household resources.[10]

Cross-national differences in the value placed on work or leisure affect international income comparisons too. Places where leisure is valued more highly will feature relatively low hours of employment, lowering income but not necessarily happiness. Even the size and geographic distribution of countries' populations can affect cross-national comparisons. Larger and more populous countries will tend to have bigger regional cost-of-living differences, and those within-nation price differences are almost never taken into account. For example, there may be more inequality in large countries than in small ones among people holding the same occupation, simply because in large countries, some will live in higher-cost regions and others in lower-cost areas. That will affect mobility estimates too.

Other methodological considerations revolve around the measurement of mobility itself. Because of income volatility from year to year (and idiosyncratic misreporting of income), mobility estimates based on one year of income will differ from those based on 30 years of income, even when the same people are assessed. Furthermore, earnings and income typically grow over much of adulthood before falling later in life. That means that if incomes are assessed between the ages of 25 and 34, mobility estimates will differ from those measured between 45 and 54. What is more, mobility estimates will also be different if childhood income is assessed when parents are 25 and 34 while adult income is measured from 45 to 54 than if both were assessed over the same age range.

These issues are behind two types of "bias" that mobility researchers try to avoid. Researchers are typically interested in mobility in terms of "permanent" income or lifetime income. Permanent income is an econometric concept whereby income change is separated into regular, predictable, and gradual change (in permanent income) and irregular, unpredictable, and sudden change (in transitory income). Given that we almost never have data on the lifetime incomes of children

and parents, mobility researchers must think about how their estimates might differ from those they would find with ideal data.

They focus in particular on "attenuation bias" and "lifecycle bias." The former involves the extent to which some mobility estimate (typically the IGE) departs from the ideal estimate using lifetime income because incomes are observed over a limited number of years. Lifecycle bias refers to the extent to which non-ideal mobility estimates are due to the age range over which incomes are measured as a proxy for lifetime income. Most researchers focus on bias caused by mismeasurement of parental lifetime income, because under certain common statistical assumptions, mismeasurement of the incomes of adult children will not affect IGE estimates. However, it is questionable whether these assumptions are innocuous for IGE estimation, and they absolutely are not for estimation of other mobility measures.[11]

Researchers have established that in the US, incomes averaged around age 40 better proxy lifetime income than averages centered around other ages. (There is no consensus, however, that age 40 is the ideal center point in other countries.) Perhaps the best attempt to proxy mobility in terms of lifetime income is Mazumder (2016), which centers incomes on age 40 and averages up to 15 years of income for fathers and sons around age 40. In Part One of this primer, I modified this approach to look at averages of up to 15 years over a 31-year period.

A final issue worth noting that complicates comparison of mobility rates in different countries is the varying birth cohorts and calendar years examined in the literature. If two studies find different mobility rates between two countries, it might reflect a real difference, but unless the studies examine parental and grown child income in the same birth cohorts and the same calendar years, we cannot rule out the possibility that the countries have the same mobility. That equivalence might be missed, for instance, because grown child incomes are observed in a recession year in one country and at the peak of an economic expansion in the other. Or perhaps a 1960 birth cohort in one country is being compared inappropriately to a 1970 cohort in the other country.

A Note on "Two Sample Two-Stage Least Squares" Estimation

Many countries lack true multi-generational datasets, where parents are initially observed when their children live at home and where the grown children are observed years later. In the absence of such data, researchers often resort to "Two Sample Two-Stage Least Squares" (or "TSTSLS") strategies. The approach is feasible if there is a dataset with measures of both adult income (typically men's earnings), and parental socioeconomic status retrospectively reported by grown children (typically fathers' educational attainment or occupation).

In such a dataset, individuals are not observed when living at home as children, so there is no measure of fathers' earnings. However, there are two ways to get around this omission. In some cases, respondents report their own socioeconomic status too, and the relationship between their status and their earnings may be used to estimate father earnings from father status. In other cases, there may be a second dataset that includes both earnings and the same socioeconomic status measure as in the main dataset. The relationship between status and earnings in that second dataset is then used to estimate father earnings in the main one. Either way, the idea is to predict earnings from, say, occupation and then use the results of the modeling to estimate paternal earnings in the main dataset. Then the researcher may compute the IGE as the relationship between grown-child earnings and estimated paternal earnings.

Unfortunately, the TSTSLS approach has a number of problems that render the IGE estimates it produces of questionable value, discussed in Appendix One. These methodological problems make cross-national comparisons of mobility questionable when some countries' estimates are based on TSTSLS. Because TSTSLS estimates of the IGE and IGC for different countries may be biased by different amounts and even in different directions depending on study details, cross-country rankings that are produced by TSTSLS estimates may differ from those that would be obtained from estimates based on actual parent observations.

This installment of the primer focuses only on countries where there exists at least one reasonably high-quality mobility estimate that does not rely on TSTSLS strate-

gies. Because of this restriction, I ignore some estimates that have been cited in other studies, from both industrialized and developing countries.[12]

The foregoing difficulties of measuring mobility introduce a significant amount of imprecision in making cross-national mobility comparisons. In some cases, differences between two countries are so large that we can fairly reliably say that one has more or less mobility than the other. But when differences are small, strong conclusions become unwarranted. Income measures may differ, income measured the same way may be more or less reflective of wellbeing in different countries, lifetime incomes may be more or less accurately proxied, datasets may be of better or worse quality, and TSTSLS estimates may be incomparable to conventional estimates (or to each other).

As the next sections will reveal, the US clearly has "less mobility" than other countries as measured by intergenerational elasticities (actually, less reduction of childhood absolute income inequality in adulthood). But it is far less obvious that the US is an international laggard in terms of relative mobility. In fact, the existing evidence consistently shows that American sons and daughters experience as much relative earnings mobility as their peers in the developed world.

The next sections assess the evidence as it currently stands. It is important to highlight one last comparative methodological point. The literature on countries outside the US almost invariably reports higher mobility than is indicated by the high end of the range of American estimates. In particular, non-American estimates indicate higher mobility than my American estimates in Part One of this primer. However, that is partly a function of the research on American mobility being better developed than the research on mobility in most other countries.

Studies of Americans have found lower mobility the better researchers have become at addressing attenuation and lifecycle bias. Until more studies of non-American countries average many years of income for both parents and children, with the averages centered around the age at which lifecycle bias is minimized, the most sophisticated American estimates cannot be reliably compared with estimates from most other countries. In my review, I report the range of best American estimates found in the previous literature (detailed in Appendix Two of Part One of this primer), as well as my preferred estimates from Part One, but the conclusions I draw about the US's relative standing versus other countries are based on more comparable research.

2. Relative Economic Mobility

As detailed in Part One of this primer, one useful way to distinguish between types of mobility measures is to separate relative and absolute mobility. Relative mobility refers to movement between income ranks between generations, regardless of how much income grows at different points in the distribution. If all children end up 20 percent richer than their parents, but the poorest children become the poorest adults and the richest children become the richest adults, no relative mobility will have occurred. Absolute mobility, discussed in the next section, refers to movement in terms of dollars. When everyone ends up 20 percent richer than their parents, they all experience upward absolute mobility, even if no one sees any relative mobility.

This section reviews the evidence on how countries' relative mobility compares to each other. In this and the subsequent section on absolute mobility, I present what I take to be the methodologically best mobility estimates from each study cited. Most papers present a range of estimates, including results of any number of sensitivity tests. I discuss the estimates in a given paper—often a range—that incorporate the most defensible methods used in the study.

Contrary to the conventional wisdom among public intellectuals and mobility researchers, most of the rich countries of Europe and the Anglosphere have similar levels of relative male earnings mobility (and as discussed below, the same is probably true comparing daughter and father earnings). The US appears to have less mobility than several other countries, however, if sons' or daughters' outcomes are compared with parental family income, though the literature is sparser and less well-developed than the research on male earnings relative mobility.

DISTRIBUTIONAL MEASURES OF RELATIVE MOBILITY—THE TRANSITION MATRIX

Distributional measures of mobility allow for a more detailed look at income dynamics at the expense of not having a single number to summarize the overall pattern of mobility. Distributional measures let the analyst assess upward and downward mobility from different starting points, such as from the bottom or middle quintile of parental income. Countries may be compared not simply in terms of their "overall mobility," but with respect to their upward mobility from the bottom, their downward mobility from the top, and other specific kinds of movements.

The most widely used strategy for describing the distribution of relative mobility conditional on parental income is the transition matrix. Transition matrices typically divide parent and child income distributions into equal numbers of quantiles (typically tenths, fourths, or fifths—deciles, quartiles, or quintiles). They display the share of adult children who end up in each quantile, conditional on starting in a particular parental quantile. In summarizing the research on mobility, I look at the evidence on sons, on daughters, and on samples that pool sons and daughters. The review focuses on upward immobility from the bottom and downward immobility from the top, though other indicators (such as upward or downward mobility from the middle, or movement from bottom to top) could also be considered.

Sons

FATHER EARNINGS VS. SON EARNINGS

Most transition matrices compare the annual earnings of fathers and sons.[13] Few studies include comparable matrices for multiple countries. In a widely cited study, Markus Jantti and his colleagues (2006) compared the mobility of Denmark, Sweden, Norway, Finland, Great Britain, and the US. The estimates for the Scandinavian countries were closely comparable and similar in magnitude. Among sons who were raised in the bottom fifth of the father earnings distribution, the share remaining in the bottom fifth as adults ranged from 25 percent in Denmark to 28 percent in Norway and Finland, with Sweden in between at 27 percent (26 percent when men with no earnings were excluded). Similarly, among sons raised in the top fifth, the share remaining in the top fifth as adults was 34 percent in Denmark and Finland, 35 percent in Norway, and 37 percent in Sweden.[14]

The Jantti et al. study reinforced the emerging view at the time that the US had lower rates of economic mobility than other nations. Putting aside the British results for the moment, the rate of downward mobility from the top was similar in the US and Scandinavia, with 36 percent of top-fifth American sons staying in the top as adults. But upward mobility was significantly lower in the US: 40 percent of American sons who began in the bottom fifth remained there (42 percent, excluding men with no earnings).

However, the US estimates compared sons' earnings not to father earnings (as was done for the Scandinavian estimates), but to parents' family income. The importance of this distinction came to light in a second paper comparing transitions across quintiles over multiple countries. Corak, Lindquist, and Mazumder (2014) carefully assembled highly comparable estimates of father–son earnings mobility for Canada, Sweden, and the US. They reported that the shares of men initially in the bottom fifth who remained there in adulthood were the same in each country: 32 percent in the US, 31 percent in Canada, and 30–32 percent in Sweden. The shares who started at the top and remained there were 38 percent in the US, 37–40 percent in Sweden, but somewhat lower in Canada (33 percent).

In other words, American relative mobility, at least when comparing father and son earnings, looked no worse in the US than in Canada (except perhaps for downward mobility from the top) or Sweden. And if that were true, then it called into question whether the US had lower mobility than the other Scandinavian countries.

Corak, Lindquist, and Mazumder were skeptical of this conclusion, noting that the Jantti et al. (2006) paper found lower mobility in the US than in Sweden. They also pointed out that other research—including by Mazumder (2005a)—had found lower American mobility than their own results, measured using the IGE. They offered several reasons to think that their finding of no-worse relative mobility in the US might be wrong, but the evidence indicates that none weaken the result.

First, their appeal to the Jantti et al. (2006) results, as we have seen, is undermined by the potential incomparability between Scandinavian estimates comparing father and son earnings and American ones compar-

ing family income to son earnings. In fact, a number of studies reinforce the magnitude of the American estimates in Corak, Lindquist, and Mazumder (2014).

One, by Leonard Lopoo and Thomas DeLeire for the Pew Charitable Trusts Economic Mobility Project (2012), reported that 31 percent of sons with father earnings in the bottom fifth ended up in the bottom fifth of earnings themselves. Similarly, Molly Dahl and DeLeire (2008) reported an estimate of 29 percent using a different dataset.[15] The Pew and Dahl–DeLeire estimates indicated a bit less downward mobility from the top than those in Corak, Lindquist, and Mazumder, with 43 percent (Pew) or 41 percent (Dahl–DeLeire) of sons starting at the top staying there.[16]

The Corak, Lindquist, and Mazumder estimates of upward and downward immobility from the bottom and top fourth or the bottom and top tenth yield the same conclusion as when quintiles are used. Looking at quartiles, upward immobility and downward immobility rates are 36 and 43 percent in the US, versus 37 and 44 in Sweden and 36 and 38 in Canada). The American estimates are similar to US estimates from Mazumder (2005b), where upward and downward immobility rates are 38 percent and 43 percent, and from Schnitzlein (2016), where they are 37–38 percent and 43–44 percent.

According to Corak, Lindquist, and Mazumder, 20 percent of American men starting in the bottom tenth remain there as adults, and 28 percent starting in the top tenth stay there. For Canada, the estimates are 19 and 23 percent. For Sweden, 21 and 29 percent. The US estimates are very similar to those in Mazumder (2005b)—22 and 26 percent immobility from bottom and top.

For that matter, the Canadian and Swedish estimates in Corak, Lindquist, and Mazumder are consistent with other studies.[17] That indicates that the Swedish–US similarity they find is not driven by the fact that they average 21 to 30 years of father earnings in Sweden but just nine in the US.

Corak, Lindquist, and Mazumder note that when they use methods similar to those used in Mazumder (2005a), they get lower estimates of American mobility, as reflected in a higher IGE. But the IGEs in Dahl and DeLeire also indicate low mobility, despite the relative mobility measures indicating higher mobility. Finally, Corak, Lindquist, and Mazumder speculate that the American administrative data might underestimate the earnings of the poorest fathers and sons, but this concern ignores the Pew results (based on survey data) and fails to consider that the same problem might be true of the Canadian and Swedish administrative data.

In short, the appropriate conclusion from the Jantti et al. (2006) and Corak, Lindquist, and Mazumder (2014) studies is that in terms of relative mobility comparing fathers' and sons' earnings, the US apparently has similar levels as in Sweden, Norway, and Finland. The US–Scandinavian similarity also is apparent in other studies.[18]

It may even be the case that the US and Denmark have similar male earnings mobility. In unpublished analyses generously conducted at my request, using data described in Landerso and Heckman (2017), the authors report that 28 percent of Danish sons starting in the bottom fifth remain there, while 34 percent of sons starting in the top fifth do. These estimates suggest less upward mobility than the Jantti et al. (2006) figures, but while the latter use only a single year of father earnings, Landerso and Heckman average nine years.[19] The authors also report (unpublished) estimates for the US of 30 percent and 32 percent. While the downward immobility figure is lower than in other American studies, the upward mobility estimate is similar to the US mobility reported by Corak, Lindquist, and Mazumder (who also average nine years of father earnings); Pew; and Dahl and DeLeire.

The evidence above also suggests the US has similar upward mobility as in Canada. Downward mobility may be greater in Canada than in the US, but the four studies with Canadian estimates never average more than five years of father earnings. As we will see below, the intergenerational rank association—a summary measure of relative mobility—indicates less Canadian mobility when 10 to 21 years of father earnings are averaged.

In a third multi-country study of transition matrices, Schnitzlein (2016) compares mobility across earnings quartiles in Germany and the US. Relying on datasets for each country that have been harmonized specifically for cross-national comparisons, and using nearly identical methodological choices in terms of the years and age ranges considered, Schnitzlein's results should be considered the best possible comparison of the two

countries. He found that 36 to 38 percent of German and American sons who started in the bottom fourth remained there in adulthood, and 42 to 44 percent in both countries who started in the top fourth remained there.[20] Reassuringly, Schnitzlein's US estimates are in line with the Corak, Lindquist, and Mazumder results when quartiles are considered, and similar to US estimates from Mazumder (2005b).

Turning to other countries, the Jantti et al. (2006) study is one of only a few that report male earnings transition matrices for Great Britain. The National Child Development Survey (NCDS) allows for a comparison of "usual" weekly father earnings to weekly son earnings.[21] Unfortunately, there are no transition matrix estimates for the US—or for any other country—relying on weekly earnings.[22] Mobility in terms of weekly earnings can differ from that in terms of annual earnings because of differences in the number of weeks men work in a year.

The British and US estimates in Jantti et al. (2006) are, thus, potentially incomparable because the US estimates are based on annual family income and earnings. While Jantti et al. show US estimates using sons' weekly earnings, they still use annual parent family income rather than weekly father earnings. The British data, generally, suffer from a variety of problems that would make comparisons difficult even if *weekly* earnings estimates were available for the US.[23]

A recent study (Cavaglia, 2016) produced transition matrices based on annual earnings for the United Kingdom and US, using the merged British Household Panel Survey (BHPS) and Understanding Society studies. It found similar rates of upward immobility in both countries, with 27 percent of UK sons who started in the bottom fifth remaining there, and 30 percent of American sons. Downward mobility was higher in the UK, however; 29 percent were immobile in the top fifth, compared with 39 percent in the US. The paper relied on TSTSLS strategies, and as the previous end note details, the annual incomes in the BHPS data often are imputed from other information. It is worth discounting the paper's results, though the American estimates are consistent with the other research cited above, and the UK estimates are consistent with the Jantti et al. (2006) results using *weekly* earnings.

The Cavaglia study also included estimates for Italy, indicating that 48 percent of sons starting in the bottom fifth remain there, versus 22 percent of sons starting in the top staying there. In contrast, Piraino (2007) reported the figures as 32 percent and 40 percent, also using a TSTSLS strategy. These differences underline the imprecision of the estimates from such a strategy.

One issue worth noting in regard to father–son earnings mobility estimates is that none of the American estimates are based on datasets in which sons are linked to nonresident fathers. In contrast, the Denmark and Norway estimates link sons to biological fathers (resident in the household or not). While the Canadian, German, British, Swedish, and Finnish estimates are similar to the US in excluding sons without an in-home father, the higher rate of single motherhood in the US means that father–son mobility estimates exclude more sons in American datasets than in other ones.

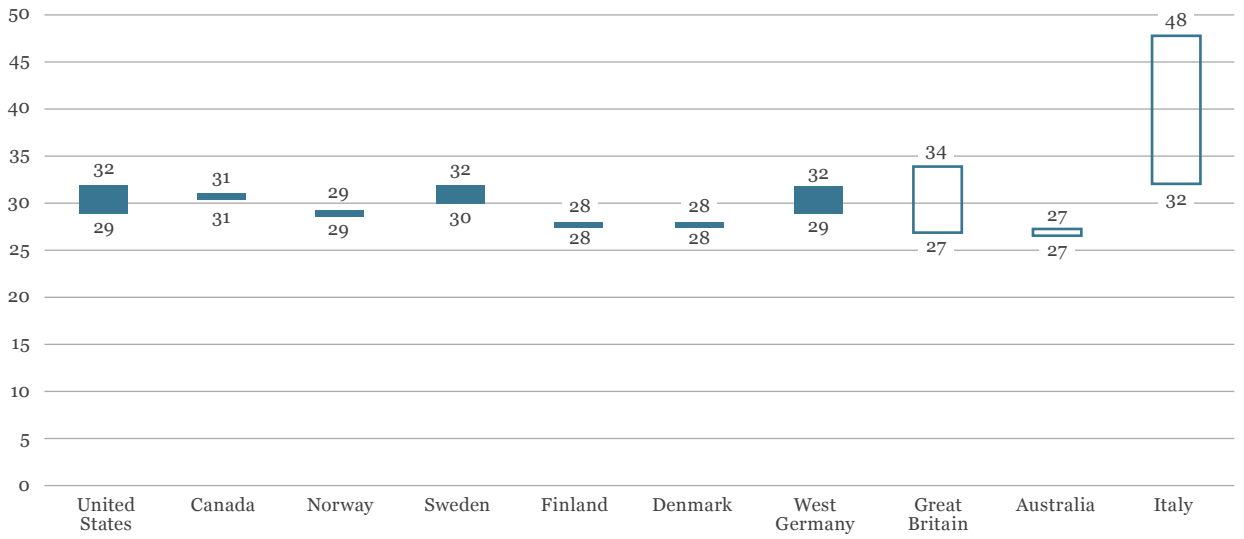
However, Part One of this primer (Winship, 2017a) notes that my own estimates of upward and downward transitions were little affected if I linked fatherless men to the partner of their mother (when one existed). Further, so long as years without earnings were excluded from multi-year earnings averages, the intergenerational rank association was little changed if sons were assigned the earnings of mothers' partners or (otherwise) of mothers.

The conventional wisdom, even among mobility researchers, is that the US has less mobility than other countries. Most mobility research compares the earnings of fathers and sons. But the review above should dispel the idea that American men have significantly lower relative earnings mobility. This conclusion is reinforced below in the section on summary measures of relative mobility, where only small differences of uncertain validity appear. **Figures 1 and 2** summarize the cross-national evidence on upward male earnings immobility from the bottom and downward immobility from the top.

COMBINED PARENT INCOME VS. SON EARNINGS

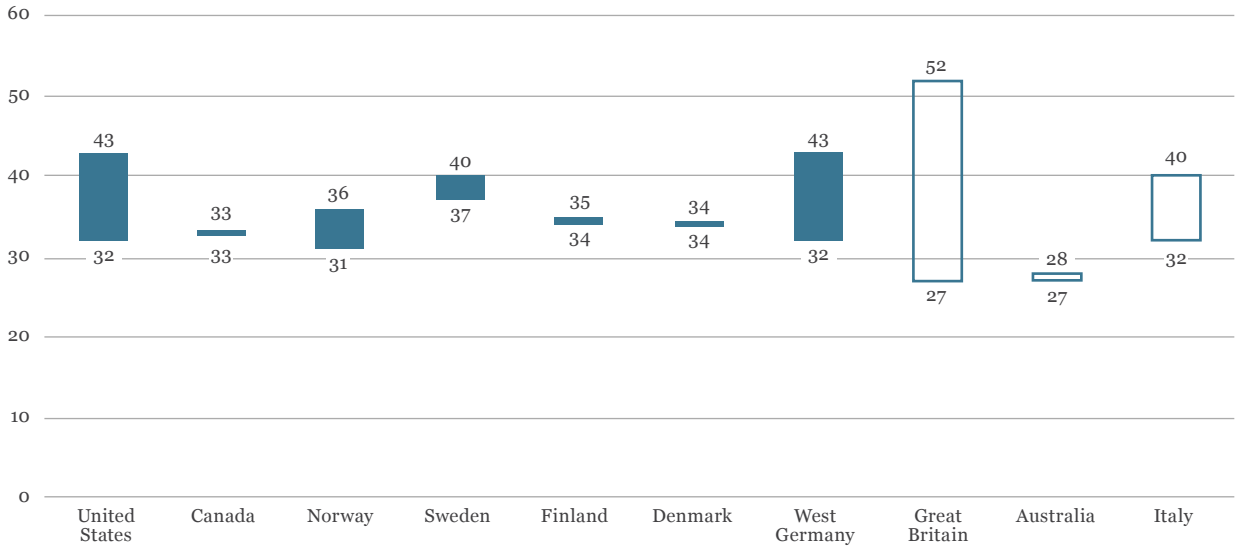
Other research constructs transition matrices that compare sons' earnings to combined parental income, family income, or household income. Blanden's (2005) doctoral dissertation was perhaps the first multi-country study of transition matrices. She compared the US, Great Britain, West Germany, and Canada. However, because the British data included only weekly income

Figure 1. Summary of Cross-National Differences in Upward Male Earnings Relative Immobility (Percent in Bottom Fifth of Father Earnings Remaining in Bottom Fifth)



Notes: Based on author's review of the literature. Bars indicate the point estimate or range of estimates that best characterize male earnings upward immobility from the bottom fifth. Bars are shown as outlines when the research on a country is inconclusive or of potentially limited comparability. The US estimates are selected from studies that use the methodological decisions most typical of the research from other countries, rather than the best available US estimates. Often, these estimates are from studies that attempt to use harmonized methods and data to compare the US to its peers. The evidence on Germany typically involves West Germany specifically, and the research on the United Kingdom rarely includes Northern Ireland with Great Britain.

Figure 2. Summary of Cross-National Differences in Downward Male Earnings Relative Immobility (Percent in Top Fifth of Father Earnings Remaining in Top Fifth)



Notes: Based on author's review of the literature. Bars indicate the point estimate or range of estimates that best characterize male earnings downward immobility from the top fifth. Bars are shown as outlines when the research on a country is inconclusive or of potentially limited comparability. The US estimates are selected from studies that use the methodological decisions most typical of the research from other countries, rather than the best available US estimates. Often, these estimates are from studies that attempt to use harmonized methods and data to compare the US to its peers. The evidence on Germany typically involves West Germany specifically, and the research on the United Kingdom rarely includes Northern Ireland with Great Britain.

and the German data only monthly, the American and Canadian estimates are the only ones that may be presumed to be comparable. Blanden reported that 42 percent of American sons starting in the bottom fourth of combined parental income remained in the bottom fourth of earnings as adults, compared with 33 percent in Canada. Similarly, rates of downward immobility from the top were 43 percent in the US and 34 percent in Canada.

While these results might seem to contradict the conclusion above that the US and Canada have similar rates of male earnings mobility, there is no reason that cross-country comparisons relating sons' earnings to combined parent income must produce the same rankings as those relating sons' earnings to father earnings. In particular, it appears from this study that the US has lower mobility when sons are assessed against combined parental income than it does when they are assessed against father earnings. The Canadian estimates are similar regardless of which parent measure is used.[24]

Using the British Cohort Study (BCS), Blanden found that 37 percent of British sons who started in the bottom fourth of weekly combined parental income ended up in the bottom fourth of weekly earnings. Among sons raised in the top fourth, 41 percent were immobile.[25] Those figures were about the same in West Germany (using monthly income). While these estimates suggest a bit more mobility than in the US, the fact that annual, rather than weekly or monthly, income is used for the US makes the comparisons unwarranted.[26]

The Jantti et al. (2006) study included analyses of Norway, Sweden, and Finland that compared combined parent earnings to sons' earnings. These analyses were an attempt to address the concern that the US estimates compared sons' earnings to parent family income (instead of to fathers' earnings). Rates of upward immobility out of the bottom quintile ranged from 25 to 28 percent across the three countries, compared with the American estimate of 40 percent. Once again, the US appears to have lower mobility when comparing sons' earnings to combined parent income.[27] In contrast, the rates of downward immobility out of the top quintile were between 34 and 36 percent in the three Scandinavian countries, versus 36 percent in the US.[28]

Estimates from Harding and Munk (2017) for Denmark also indicate higher upward mobility than the US, but similar downward mobility, when parent family income is compared to individual child income. They find that 26 to 30 percent of Danish sons starting in the bottom fifth of family income end up in the bottom fifth of individual income. At the top, 33 to 35 percent are immobile. Munk (2015) gives rates of 22 to 29 percent for Danish immobility from the bottom and 30 to 32 percent from the top. Boserup, Kopczuk, and Kreiner (2013), cited in Chetty et al. (2014), find that 12 percent of Danish children raised in the bottom fifth of parent family income rise to the top fifth of child individual income, which compares to 11 to 13 percent in Harding and Munk (2017) and 11 to 14 percent in Munk (2015).

PARENT FAMILY INCOME VS. SON FAMILY INCOME

A few studies focus on transition matrices that compare parental family or household income to sons' family or household income. Hirvonen (2008) reports upward immobility out of the bottom decile in Sweden is 16 percent and downward immobility out of the top decile is 27 percent. Those are similar to US estimates pooling sons and daughters reported in Chetty et al. (2014) (20 percent and 26 percent).[29] However, Hertz (2005) finds lower upward mobility (32 to 37 percent remaining in the bottom who start there), also pooling sons and daughters. Like Chetty et al., Hertz reports American downward mobility estimates that are similar to those in Hirvonen for Sweden (27 to 30 percent remaining in the top who started there). As in Jantti et al. (2006), the evidence suggests that the US may have lower upward mobility than Scandinavia when parental income (rather than father earnings) is the basis for assessing sons' mobility, but no lower downward mobility.

Hirvonen's Swedish estimates imply that 27 percent of sons starting in the bottom fifth remain there, compared with 36 percent of sons in the top fifth remaining there. Similarly, Sirnio, Martikainen, and Kauppinen (2013) found that 29 percent of Finnish sons who started in the bottom fifth of family income remained in the bottom fifth as adults, with an equivalent figure of 36 percent at the top. In Corak (2017), 32 percent of Canadian sons starting in the bottom fifth of family income end up there as adults, and 32 percent who start in the top fifth remain there.[30] American estimates for upward immobility from the bottom fifth that pool sons and daughters range from 30 to 44 percent, and downward immobility estimates from 35 to 47 percent.[31] My own

estimates from Part One of the primer were 46 percent and 41 percent (pooling sons and daughters), but these are not necessarily comparable to any of the existing studies of other countries.

The few studies using parental family income as the baseline include no harmonized estimates, but they support the conclusion that the US may lag other nations on this dimension. Multiple studies, however, indicate similar levels of downward mobility in the US as in the Scandinavian nations.

Daughters

Much less mobility research has been conducted looking at daughters than at sons. The Jantti et al. (2006) paper is the only study that compares transition matrices focused on daughters across multiple countries. As was the case for sons, relative mobility rates were very similar across the Scandinavian countries. In terms of immobility out of the bottom fifth of father earnings, 24 percent of daughters ended up in the bottom fifth of earnings in Norway, Sweden, Finland (26 percent when years with no earnings were included in averaging), and Denmark (21 percent including years with no earnings). The share of daughters remaining in the top fifth of earnings ranged from 30 to 32 percent.

The caveats about the potential incomparability of the American data based on parental family income and the Scandinavian data in the Jantti et al. paper still hold. As it happens, the American estimates in Jantti et al. were 26 percent immobility from the bottom and 31 to 34 percent from the top—quite close to the estimates for Scandinavia. (When Jantti et al. compared daughter earnings to combined parental earnings in Norway, Sweden, and Finland, immobility from the bottom ranged from 22 to 24 percent, and immobility from the top from 31 to 33 percent.[32]) Dahl and DeLeire (2008) estimated American immobility rates of 25 and 31 percent comparing father and daughter earnings. There is little daylight between American and Scandinavian mobility based on these measures.[33]

Jantti et al. (2006) compare weekly father earnings to weekly daughter earnings in Great Britain. They find that 23 percent of daughters starting in the bottom fifth remain there, compared with 30 percent of daughters starting at the top ending up at the top. The estimates when weekly earnings of American daughters are compared to annual parent family income are essentially identical—23 and 31 percent.[34]

Hirvonen (2008) compares Swedish daughters' family income to that of their parents. She finds that 14 percent of those starting in the bottom tenth end up in the bottom tenth. The rate of downward immobility from the top is 24 percent. Chetty et al. (2014) report American figures of 20 and 26 percent, pooling sons and daughters. Also pooling sons and daughters, Hertz (2005) reports estimates of 32 to 37 percent and 27 to 30 percent.

Hirvonen's estimates also imply that 25 percent of Swedish daughters are immobile in the bottom fifth, versus 34 percent being immobile in the top fifth. Sirnio et al. (2013) report that 32 percent of daughters in Finland who started in the bottom fifth of family income remained in the bottom fifth as adults, and 33 percent who started in the top fifth stayed there. Corak (2017) reports estimates of 27 and 33 percent for Canada.[35] As noted above, US estimates pooling men and women and looking at immobility out of the bottom and top fifth range from 30 to 44 percent in the bottom and from 35 to 47 percent at the top.

Without more research using harmonized methods, it is difficult to draw strong conclusions from these family income studies, but the IRA results below suggest American women may have lower relative mobility on this dimension. However, the research on relative mobility using daughters' individual income or earnings as the outcome does not point to the US being a laggard. That is also reinforced in the IRA studies discussed below.

Sons and Daughters Combined

A final multi-country study, Eberharter (2014), constructs transition matrices for the US, Great Britain, and West Germany. Uniquely, the paper looks at after-tax household income. The shares of grown children (pooling sons and daughters) who started in the bottom fifth of household income and ended up in the bottom fifth as adults was 52 percent in Britain (using annual income), 44 percent in West Germany, and 46 percent in the US. The shares who started in the top fifth and were still there as adults was 37 percent in Great Britain, 33 percent in West Germany, and 46 percent in the US. According to these estimates, then, the US has upward

mobility similar to that in West Germany and Britain but less downward mobility than either country.[36]

Corak (2017) and Connolly, Corak, and Haeck (2016) both report upward and downward immobility estimates of 30 and 32 percent for Canada, comparing parent and child family incomes.[37] In comparison, Chetty et al. (2014) find estimates of 34 and 37 percent for the US. More generally, American estimates that pool sons and daughters range from 30 to 44 percent (upward immobility), and from 35 to 47 percent (downward).

Jonsson, Mood, and Bihagen (2011) show transition matrices for Sweden using deciles. They find that 15 percent of adult children raised in the bottom tenth of parent family income remain in the bottom tenth, and 21 percent starting in the top tenth are immobile. The corresponding American figures in Chetty et al. (2014), which may not be comparable, are 20 percent and 26 percent.[38] Hertz (2005) reports US estimates of 32 to 37 percent for upward immobility and 27 to 30 percent for downward.

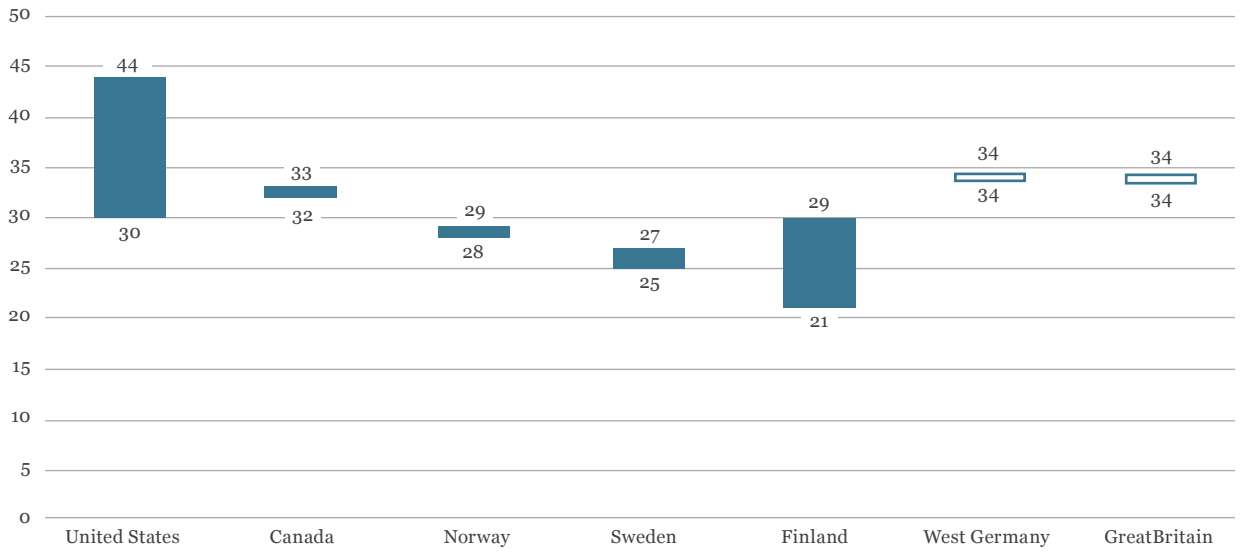
The literature pooling sons and daughters and estimating transition matrices is sparse, precluding strong conclusions about how countries fare against each other. Studies estimating IRAs after pooling sons and daughters yield a similarly frustrating conclusion, but they suggest that the US may fare worse in terms of family income mobility.

Figures 3 and 4 summarize the evidence for upward and downward relative mobility when parental family income is compared with sons' earnings, individual income, or family income. Since these results are generally similar regardless of which outcome is used for sons, pooling these studies provides a reasonably reliable assessment of how parental family income relates to sons' outcomes.

OTHER DISTRIBUTIONAL MEASURES OF RELATIVE MOBILITY

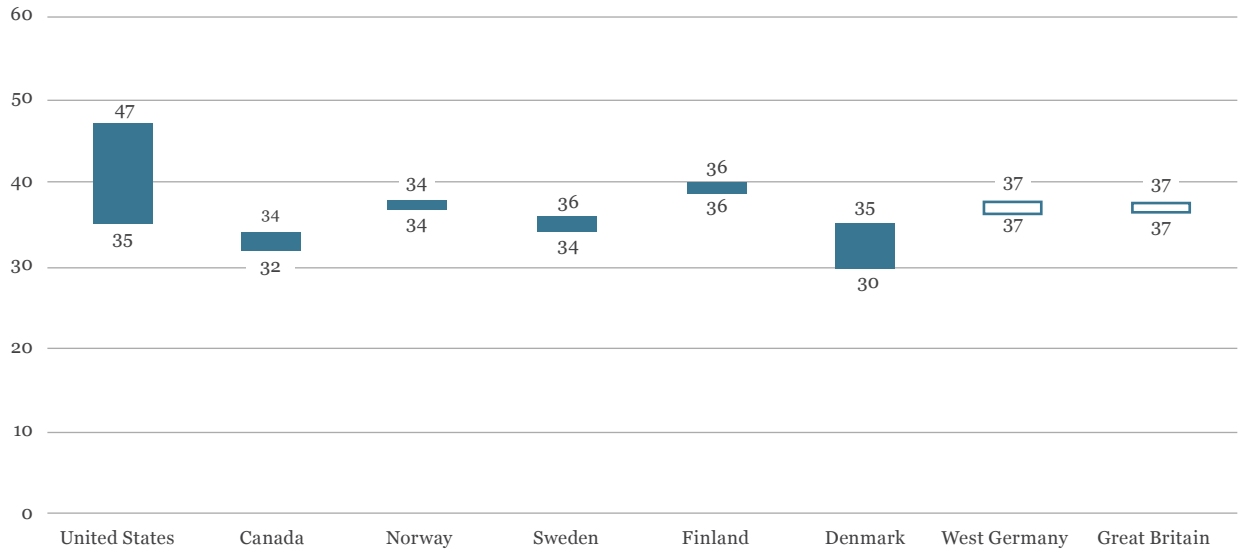
Corak, Lindquist, and Mazumder (2014) present other measures of relative mobility in their paper. For instance, the shares of sons starting in the bottom fifth of father earnings who exceeded their father's rank in the male earnings distribution were 83–85 percent in

Figure 3. Summary of Cross-National Differences in Upward Relative Immobility Comparing Parental Family Income to Sons' Outcomes (Percent in Bottom Fifth of Parental Income Remaining in Bottom Fifth)



Notes: Based on author's review of the literature, including studies comparing parental family income to sons' earnings, individual income, and family income. Bars indicate the point estimate or range of estimates that best characterize the upward immobility of sons with respect to their parental family income. Bars are shown as outlines when the research on a country is inconclusive or of potentially limited comparability. The US estimates are selected from studies that use the methodological decisions most typical of the research from other countries, rather than the best available US estimates. Often, these estimates are from studies that attempt to use harmonized methods and data to compare the US to its peers.

Figure 4. Summary of Cross-National Differences in Downward Relative Immobility Comparing Parental Family Income to Sons' Outcomes (Percent in Top Fifth of Parental Income Remaining in Top Fifth)



Notes: Based on author's review of the literature, including studies comparing parental family income to sons' earnings, individual income, and family income. Bars indicate the point estimate or range of estimates that best characterize the downward immobility of sons with respect to their parental family income. Bars are shown as outlines when the research on a country is inconclusive or of potentially limited comparability. The US estimates are selected from studies that use the methodological decisions most typical of the research from other countries, rather than the best available US estimates. Often, these estimates are from studies that attempt to use harmonized methods and data to compare the US to its peers.

Sweden, 84 percent in Canada, and 85 percent in the US. The shares who exceeded their father's rank by 20 percentiles or more were 56–58 percent, 56 percent, and 55 percent. Among those sons starting in the bottom who exceeded their father's rank, the average amount by which they surpassed their father was 36–39 percentiles in Sweden, 37 in Canada, and 34 in the US.

The corresponding shares of sons starting in the top who rank lower than their fathers were 79–80 percent in Sweden, 82 percent in Canada, and 81 percent in the US. The shares falling at least 20 percentiles below their father were 48–51 percent, 54 percent, and 48 percent. Among those starting in the top fifth who ranked lower than their fathers, the average drop was 35–37 percentiles in Sweden, 37 percentiles in Canada, and 35 percentiles in the US. These estimates temper the conclusion above that Canada has more downward male earnings relative mobility than the US.

Another measure of relative mobility is the average child rank at each percentile of parental income (or, equivalently, the average increase in ranks for a given part of the parental income distribution). These estimates are related to the income rank association estimates discussed in the next section, but they do not impose any parametric relationship between parent and child ranks.[39]

Bratberg et al. (2017) provide such results for Norway, Sweden, West Germany, and the US, comparing parent and child family incomes. They find very similar mobility levels in Norway and Sweden, lower upward relative mobility in the US below the 25th percentile and lower downward mobility above the 66th percentile of parental income, and imprecisely measured mobility in West Germany. One inconsistency that could affect the comparability of the cross-national estimates is that those for Norway and Sweden are based on administrative data, while the American and German ones come from surveys. Attrition from those surveys is a concern, as are imputation of missing data (for West Germany) and item nonresponse (for the US).[40] Still, the results reinforce the findings above that relative family income mobility is lower in the US.

Chetty et al. (2014) compare this measure of relative mobility in the US, Canada (using estimates from Corak

and Heisz, 1999), and Denmark (using estimates from Boserup et al., 2013). They also find lower upward mobility in the US below the top and lower downward mobility above the top, but the estimates across the three countries may not be comparable.[41]

SUMMARY MEASURES OF RELATIVE MOBILITY—THE INTERGENERATIONAL RANK ASSOCIATION

Summary measures of mobility condense the distribution of movement from point to point in the joint income distribution into a single number. The tradeoff for this simplicity is losing the ability to focus separately on upward or downward mobility or to look at mobility for adults who started off rich, poor, or middle class.

The main summary measure of relative mobility is the intergenerational rank association, or IRA, which is also known as the Spearman rank correlation coefficient or the rank–rank slope. This measure ranges from -1 to 1, with a value of 0 indicating no relationship. A value of 1 indicates that the linear relationship between parent and child income ranks perfectly predicts the average income rank of the grown children starting at any parent income rank. An IRA of -1 also means that parent income rank perfectly predicts average child income rank, but the poorest sons end up the richest while the richest sons finish poorest.

Sons

FATHER EARNINGS VS. SON EARNINGS

Beginning with the IRA comparing fathers' and sons' earnings, we can compare the US to Canada, Norway, and Sweden. In Corak, Lindquist, and Mazumder (2014), the IRA for Canada was 0.24, while it was 0.26–0.30 in Sweden, and 0.30 in the US. These estimates suggest that Canada has somewhat more mobility than the US, while Sweden and the US have similar mobility rates.

However, while the Swedish estimates average 20 to 31 years of father earnings, the US estimates average nine years, and the Canadian estimates average just five years. Chen, Ostrovsky, and Piraino (2017) found a Canadian IRA of 0.27 when they averaged 10 to 21 years of father earnings.[42] Meanwhile, Dahl and DeLeire (2008), averaging 36 years of father earnings, report IRAs for the US ranging from 0.29 to 0.40. Dropping the one estimate of theirs (out of seven) that is based on methodological choices that are the least comparable to these other studies, the range is from 0.29 to 0.32.

Three other studies look at Swedish men. Two use fewer years of father earnings and come to correspondingly more optimistic conclusions about Swedish mobility.[43] But in an unpublished paper, Richter (2016) attempts to analyze comparable Swedish and US samples, averaging up to 16 years of father earnings, and finds the IRA lower in Sweden (0.25, versus 0.36 in the US).

There are enough comparability problems in the existing studies that strong conclusions are unwarranted, but most of the evidence seems consistent with the Canadian, Swedish, and American father–son earnings IRA all falling between 0.26 and 0.32 when measured similarly, with Canada and Sweden perhaps having somewhat higher mobility than the US. My preferred US estimates from Part One of this primer suggest that true lifetime male earnings mobility is lower than this range implies, but that seems likely to be true in all three countries.[44]

The evidence for Norway also seems consistent with this conclusion. Three studies find father–son earnings IRAs between 0.20 and 0.24, but they average no more than 10 years of father earnings.[45] Comparing the most similar estimates, the 0.20 to 0.23 range for Norway from Schnelle (2015) is similar to the Corak, Lindquist, and Mazumder (2014) estimate for Canada (0.24). The Norwegian estimate of 0.23 from Markrussen and Roed (2017) compares with the 0.22 reported by Bjorklund and Jantti (2016) for Sweden.

Unpublished results suggest that Denmark may have somewhat higher levels of male earnings mobility. Results from data used in Landerso and Heckman (2017), obtained from the authors for this review, indicate a Danish IRA of 0.20, averaging nine years of father earnings. With additional years of father earnings, that IRA would likely rise. The data obtained from Landerso and Heckman also suggest higher IRAs when fathers' and sons' total individual incomes are compared in Denmark, ranging from 0.24 to 0.27, depending on whether taxes and transfers are taken into account.

Italy's male earnings IRA is unlikely to be lower than in these countries. Comparing fathers' and sons' total individual income, Acciari, Polo, and Violante (2017) report an IRA of 0.23. However, it is based on averaging just two years of father income.

Consistent with the Corak, Lindquist, and Mazumder (2014) American estimate, Grawe (2004a) reports a male earnings IRA of 0.25 to 0.34 for the US, but he finds an IRA of just 0.11 for Germany. The sons in his German data were, however, primarily in their twenties.

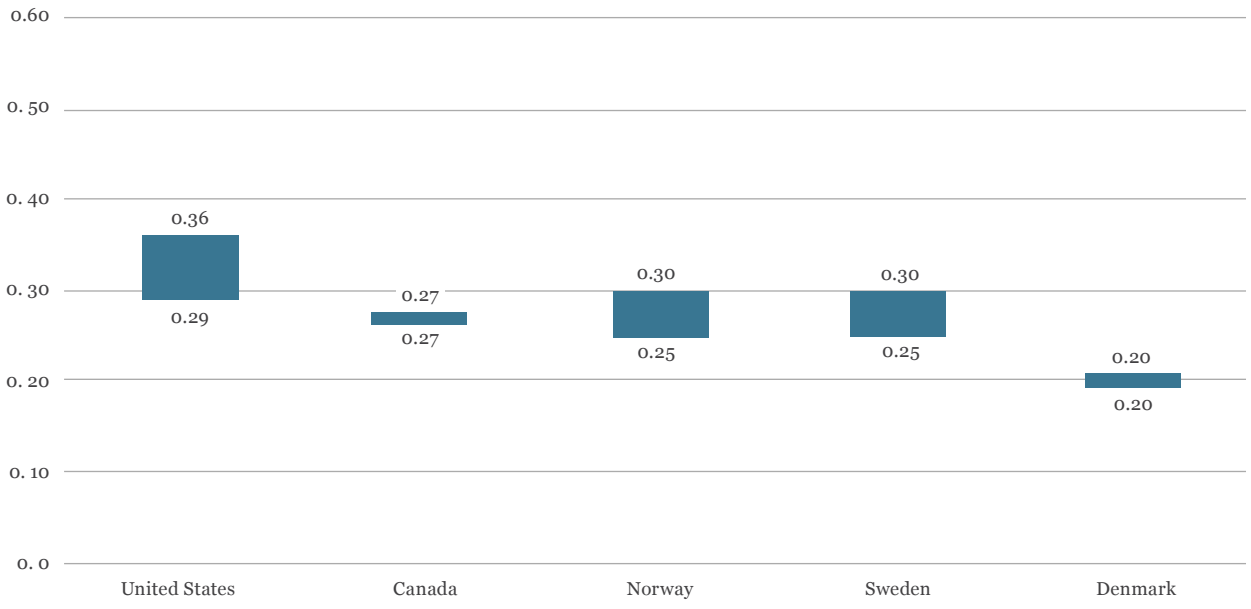
Summarizing the male earnings evidence, the Scandinavian countries and Canada may have somewhat higher mobility than the US. But the difference between these countries' IRAs appears no larger than 0.05 or 0.06 when measured similarly. That is equivalent to the gap between the richest and poorest children narrowing by an additional five or six percentiles in adulthood. Given all the comparability issues discussed in the introduction, strong claims about lower relative mobility in the US are unwarranted, at least when the focus is male earnings. **Figure 5** summarizes the literature on male earnings IRAs.

COMBINED PARENT INCOME VS. SON EARNINGS

Other research compares parental family income to sons' earnings or income. Markrussen and Roed (2017) estimate a Norwegian IRA between combined parental earnings and sons' earnings of 0.21 to 0.24, consistent with the Norwegian estimates comparing father and son earnings. Heidrich (2017) estimates a corresponding IRA for Sweden of 0.24—also consistent with the male earnings IRAs. Gregg, Jonsson, Macmillan, and Mood (2017) estimate an IRA as high as 0.26 for Sweden.

The latter paper finds the IRA for Great Britain is 0.34 to 0.35, and the US has a slightly higher IRA (0.35 to 0.39). According to Gregg, Macmillan, and Vittori (2017), the British IRA ranges from 0.18 to 0.35, with the range for the more recent of two cohorts analyzed between 0.30 and 0.35. Belfield et al. (2017) provide estimates of 0.23 for the earlier cohort and 0.32 in the more recent one. However, the British estimates in these papers only use one or two years of parental income and examine sons' *monthly* earnings. Both of these issues are likely to lead

Figure 5. Summary of Cross-National Differences in Relative Male Earnings Mobility (Intergenerational Rank Association)



Notes: Based on author's review of the literature. Bars indicate the point estimate or range of estimates that best characterize male earnings IRA. The US estimates are selected from studies that use the methodological decisions most typical of the research from other countries, rather than the best available US estimates. Often, these estimates are from studies that attempt to use harmonized methods and data to compare the US to its peers.

to an IRA that is lower than the IRA comparing permanent parent family income to sons' annual earnings.

If we are willing to compare parental family income to sons' individual total income rather than their earnings, there are estimates for several other countries. Results for a number of them are similar. In Finland, Sirnio, Kauppinen, and Martikainen (2017) estimate the IRA at 0.19 to 0.23, but they use a single year of parent income. Harding and Munk (2017) estimate it at 0.16 to 0.25 for Denmark (five years of parental income). Connolly et al. (2016) report a range for Canada of 0.22 to 0.26, using US percentiles rather than Canadian ones. Acciari et al. (2017) give the estimate as 0.25 for Italy. The Canadian and Italian estimates are similar to the male earnings IRAs in those countries.

For Sweden, Bjorklund and Jantti (2012) estimate a similar IRA of 0.22 (averaging seven years of parental income and comparing it to sons' individual income). Before concluding that all of these countries (save Great Britain) have IRAs roughly in the range of 0.16 to 0.25, however, we should note that Nybom and Stuhler (2017) average 28 years of parent income and find a Swedish IRA of 0.26 to 0.27—similar to the 0.26 to 0.30 range in Corak, Lindquist, and Mazumder (2014) for male earnings, but higher than Bjorklund and Jantti's 0.22 (comparing parental income to sons' income) and Heidrich's 0.24 (comparing parental income to sons' earnings). Averaging more years of income would likely result in somewhat higher IRAs outside Sweden too.

Nevertheless, that would not change the conclusion that American men probably have lower relative mobility when parental family income is the baseline. The above estimates may be contrasted against American IRAs comparing parental family income to sons' earnings. The three available estimates are 0.35 to 0.39 (from Gregg, Jonsson, Macmillan, and Mood, 2017), 0.31 (from Chetty et al., 2014), and 0.43 to 0.47 (from Part One of this primer). The Chetty et al. figure is similar to the male earnings IRA from Dahl and DeLeire, and my estimate is of the same magnitude as the male earnings IRA I estimate.

While the evidence is sparse—and harmonized estimates nearly nonexistent—there appears to be lower relative mobility for American sons than for those in a number of other nations, comparing their earnings or total individual income to their parents' family income. That conclusion is consistent with the transition matrix research described above (though that research suggests the US is worse primarily in terms of *upward* mobility). There are not obviously substantial differences between Norway, Sweden, Finland, Canada, and Italy. It seems reasonable to think that the British IRA may be higher than in these countries and as high as or higher than in the US.

PARENT FAMILY INCOME VS. SON FAMILY INCOME

Finally, four papers compare parent family income to sons' family income in countries outside the US. Bratberg et al. (2017) estimate the IRA as being 0.23 for Norway and for Sweden, 0.20 for West Germany, and 0.40 for the US, though there are inconsistencies in the data used across these countries.[46] Corak (2017) estimates an IRA of 0.25 for Canada (using 5 years of parental income). Connolly et al. (2016) report a Canadian IRA of 0.20 to 0.22, but they assign incomes to ranks based on the US distribution of income rather than the Canadian distribution. They subsequently show transition matrix results pooling sons and daughters indicating somewhat higher downward mobility but substantially lower upward mobility when Canadian ranks are used instead of American ones. The British IRA is estimated by Belfield et al. (2017) at 0.19 to 0.20 in the older of two cohorts and 0.30 to 0.34 in the more recent cohort.

Mazumder (2016) reports the American family income IRA to be roughly between 0.40 and 0.50 for the most reliable of his estimates. My own preferred estimates in Part One of this primer range between 0.47 and 0.60. The US estimates from Chetty et al. (2014) are lower, at 0.33 to 0.34, and more comparable to those in Bratberg et al.

Regardless, it would appear from the limited evidence available that if sons' family income is compared to that of their parents, US mobility is lower than in Norway, Sweden, Germany, and Canada. That reinforces the transition matrix results showing higher mobility in Sweden, Canada, and Finland.

Daughters

American rank mobility appears similar to Sweden and Norway comparing fathers' earnings or parental income to daughters' earnings. Heidrich (2017) reports

a father–daughter earnings IRA of 0.17 for Sweden, and Markrussen and Roed (2017) find the Norwegian IRA to be 0.16. Similarly, the Italian estimate comparing fathers' and daughters' total individual income is 0.17 (Acciari et al., 2017). Dahl and DeLeire (2008) report an American father–daughter earnings IRA of 0.08 to 0.23, while my preferred range from Part One of this primer (less comparable) is 0.22 to 0.26.

Most of the studies comparing parent family income to sons' individual earnings or income also look at the incomes of daughters. Focusing on daughters' earnings, Markussen and Roed (2017) report an IRA of 0.17 to 0.26 for Norway, and Heidrich (2017) estimates an IRA of 0.21 for Sweden. Those are slightly higher than the estimates in those studies comparing father and daughter earnings. The same is true in Acciari et al. (2017), where the Italian IRA comparing parental family income to daughter individual income is 0.21. In Finland, Sirnio, Kauppinen, and Martikainen (2017) find that IRA to be 0.16 to 0.22, while Harding and Munk (2017) report it at 0.13 to 0.25 in Denmark. Connolly et al. (2016) estimate the Canadian IRA comparing parental family income to daughter individual income to be between 0.19 and 0.25 (but using American percentiles rather than Canadian ones).[47]

In comparison, for the US, Chetty et al. (2014) found an IRA comparing parent family income to daughter earnings of 0.25—similar to these other estimates. Part One of this primer, using methods less comparable to most of these studies, reported a preferred range of 0.29 to 0.44.

Bratberg et al. (2017) report IRAs comparing parent family income and daughters' family income of 0.22 for Norway, 0.20 for Sweden, 0.29 for Germany, and 0.40 for the US. Corak (2017) estimates the Canadian IRA comparing parental family income to daughter family income to be 0.23. That is similar to the Connolly et al. (2016) estimated range of 0.19 to 0.22 (using American percentiles rather than Canadian ones). In Chetty et al. (2014), the range for the US is 0.34 to 0.35. My less comparable results in Part One range from 0.54 to 0.65.

As for men, if family income is the outcome of interest, daughters' mobility may be lower in the US (at least compared with these four other countries).

Sons and Daughters Combined

COMBINED PARENT INCOME VS. CHILD EARNINGS OR INDIVIDUAL INCOME

Several studies—most of them analyzing Denmark—compare parental family income to child earnings or individual income after pooling sons and daughters.[48] Landerso and Heckman (2016, 2017), using nine-year averages of parent family income, report results for child earnings and find the IRA in Denmark to be 0.21. They report the American IRA as 0.32, but when years without parental income or child earnings are excluded from averaging, the difference narrows to 0.21 versus 0.23. When they focus on child individual total market income, the Denmark–US gap is 0.27 versus 0.25 or 0.36 (depending on whether or not zeroes are excluded). Shifting to child post-transfer income, the gap is 0.25 versus 0.30 to 0.37. Further shifting to post-tax and -transfer income, the IRA for Denmark is 0.23. (No estimate was available for the US.)

Boserup et al. (2013), cited in Chetty et al. (2014), find a Danish IRA of 0.18 comparing parental family income to child individual income, and Boserup, Kopczuk, and Kreiner (2014) revise this downward to 0.14. Chetty et al. (2014) compare the earlier estimate to the US IRA comparing parental family income to child family income, which was 0.34, but elsewhere they show the American IRA comparing parental family income to child *individual* income is 0.29. The magnitude of the Denmark–US gap is similar to that in Landerso and Heckman when zeroes are included in income averages (as they are included in Chetty et al.). But the Landerso and Heckman results suggest that if zeroes were excluded, the entire gap could be closed. (Given that many daughters have years without individual income due to child-bearing and -rearing, there is a strong case to be made for dropping zeroes when pooling men and women.)

The comparison in Chetty et al. also favors Denmark in that the Danish estimate is based on three years of parental income while the US estimate is based on five years. Landerso and Heckman average nine years for both Denmark and the US, which explains why their Danish IRA estimates are larger than Boserup's.

Consistent with Landerso and Heckman, studies by Harding and Munk (2017) and Munk (2015) report

higher Danish estimates—0.21 and 0.19 to 0.27, respectively—using no more than five years of parent family income. The range of Danish IRA estimates comparing parent family income to child *individual* income is, then, between 0.14 and 0.27. These estimates all suggest less mobility in the US than in Denmark, though the Landerso and Heckman (2016, 2017) results suggest that the gap might be smaller (or nonexistent) if years with no income are excluded from averaging.

Chetty et al. (2014) also contrast their American IRA estimate comparing parental family income to child individual income against a Canadian estimate for *male earnings* that they derive from Corak and Heisz (1999), which they report as 0.17. But Connolly et al. (2016) show that the IRA in Canada comparing parental family income to child income is between 0.20 and 0.25—closer to Chetty et al.'s 0.29 estimate for the US (and Connolly et al. use American percentiles rather than Canadian ones, which pulls the Canadian IRA downward).

Acciari et al. (2017) gives the Italian IRA comparing parent family income to child individual income as 0.20 to 0.26, but the study uses just two years of parental income, so this range is likely too low.

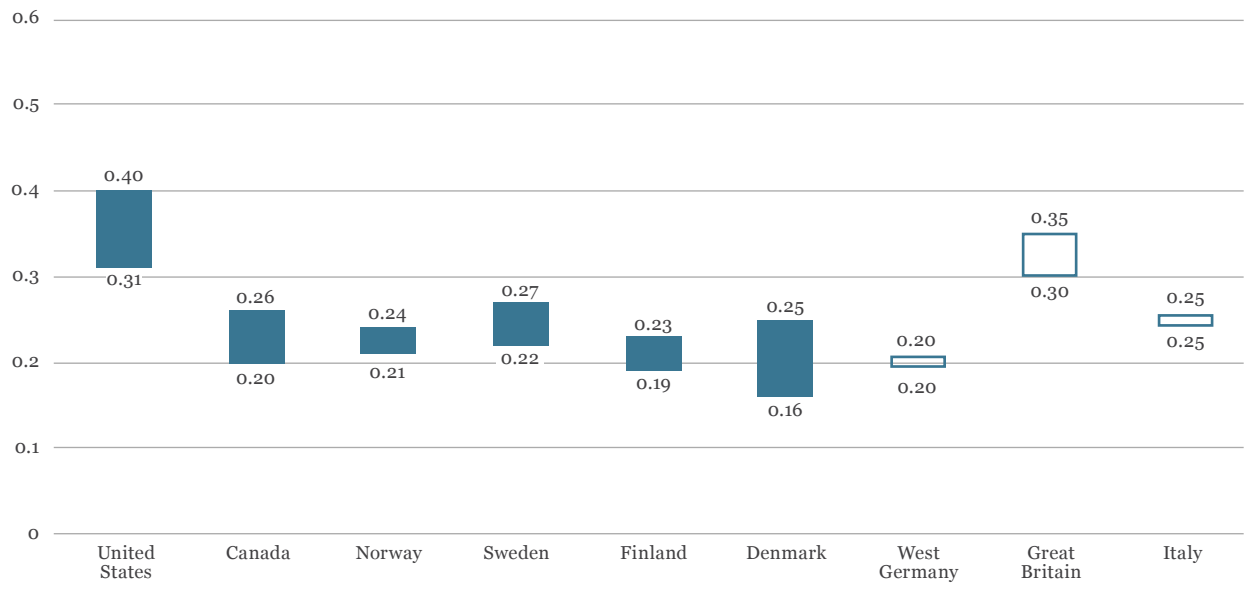
PARENT FAMILY INCOME VS. CHILD FAMILY INCOME

Turning to IRAs comparing parent and child family incomes, Connolly et al. (2016) report a range for Canada from 0.19 to 0.22. However, as noted above, those estimates use American percentile ranks rather than Canadian ones. Other analyses in the paper suggest that using Canadian percentile ranks would show lower mobility.

An Australian study (Murray, Clark, Mendolia, and Siminski, 2017) estimated IRAs for parent–child family income comparisons ranging from 0.22 to 0.32. Attempting to create comparable US estimates, they obtained a range from 0.32 to 0.39.

Pooling sons and daughters, Bratberg et al. (2017) estimate a family income IRA of 0.22 for Norway and Sweden, 0.25 for Germany, and 0.40 for the US. When the authors restricted the sample to married children (not possible in Sweden), the IRAs were 0.26 for Norway, 0.25 for West Germany, and 0.34 for the US. Chetty et al. (2014) estimate an IRA of 0.34 for the US, which dropped to 0.29 if the sample was restricted to

Figure 6. Summary of Cross-National Differences in Relative Mobility Comparing Parental Family Income to Sons' Outcomes (Intergenerational Rank Association)



Notes: Based on author's review of the literature, including studies comparing parental family income to sons' earnings, individual income, and family income. Bars indicate the point estimate or range of estimates that best characterize the IRA comparing parental family income to sons' outcomes. Bars are shown as outlines when the research on a country is inconclusive or of potentially limited comparability. The US estimates are selected from studies that use the methodological decisions most typical of the research from other countries, rather than the best available US estimates. Often, these estimates are from studies that attempt to use harmonized methods and data to compare the US to its peers.

married parents. (My less comparable preferred estimates from Part One ranged from 0.51 to 0.54.)

These results, taken together, suggest that if the US has lower family income mobility than Norway, Sweden, and Germany (and possibly Australia and Canada), differences in marriage patterns may explain a significant part of the gap. That would be one way to square the evidence that mobility in the US is comparable to that elsewhere when child earnings is considered with the finding that mobility is worse here looking at parent or child family income. Moreover, the Danish results from Landerso and Heckman suggest that studies that retain years of zero earnings or income in averages may understate US family income mobility relative to other countries.

Figure 6 summarizes the evidence on IRAs comparing parental family income to the earnings, individual income, or family income of sons. Pooling these studies together allows for a reasonably reliable picture to emerge about cross-national differences, particularly given that the results looking at sons' earnings are similar to those looking at sons' family income.

This section has reviewed the research on relative mobility across developed countries. Relative mobility in terms of male or female earnings appears quite similar across a range of countries, especially when the analyses are harmonized within a single study. Evidence suggests that the US has lower relative mobility than its peer nations when child outcomes are compared to parental family income. Even that conclusion, however, is tempered by results from Landerso and Heckman (2016, 2017) suggesting that many studies understate American relative family income mobility. The mobility literature focused on parental income is also less well-developed than the research on male earnings mobility.

The fact that the US compares more favorably to other countries in terms of relative earnings mobility than it does in terms of family income mobility may also point to cross-national differences in marriage and single parenthood as driving the family income mobility differences. Americans may face the same relationship between father earnings and their own outcomes as their international counterparts, but greater single parenthood in the US might mean that parental family incomes are more strongly related to child outcomes than in other countries. That hypothesis is consistent with the finding that the US looks worse primarily in terms of upward mobility from the bottom—rather than downward mobility from the top—when using parental family income. This is a fruitful direction for future research to pursue.

3. Absolute Economic Mobility

Most mobility research has involved studies of absolute mobility. Conventionally, "absolute mobility" has referred to a specific distributional measure—the share of adults whose incomes exceed those of their *parents*. However, few such studies have been conducted, and almost none outside the US. In contrast, scores of studies have been conducted using the intergenerational elasticity, or IGE. Typically, the IGE is referred to as a measure of relative mobility, but as discussed in Part One of this primer and below, it actually summarizes absolute mobility. Other summary measures of absolute mobility include the intergenerational correlation, or IGC, and the sibling correlation.

Table 1 attempts to summarize the cross-national literature on absolute mobility, showing the measures and countries most commonly analyzed. The male earnings IGE is the measure most often estimated. Table 1 displays the range of IGEs I find in my review as well as the point estimates offered by the leading previous review (Corak, 2016).

DISTRIBUTIONAL MEASURES OF ABSOLUTE MOBILITY—SURPASSING PARENTAL INCOME

Very little evidence exists regarding distributional measures of absolute economic mobility. Studies of the US typically focus on the share of adults whose income exceeds that of their parents (after adjusting for inflation). I am aware of just one study of non-American mobility using this measure. Ostrovsky (2017) divides couples' income in half and then compares adults (and their partners) to their parents. The share with greater income than their parents ranged from 59 to 67 percent

Table 1. Cross-National Differences in Summary Measures of Absolute Mobility

	Intergenerational Elasticities			Intergenerational Correlations		Sibling Correlations	
	Father-Son Earnings		Father-Daughter Earnings	Family Income	Father-Son Earnings	Brothers	Sisters
	My Review	Corak (2016) Review					
United States	0.45-0.55	0.47	0.30-0.55	0.40-0.70	0.20-0.55	0.30-0.60	0.15-0.40
Canada	0.30-0.35	0.19	0.20-0.25	0.20-0.30	0.15-0.25		
Norway	0.30-0.35	0.17	0.15-0.25	0.20-0.25	0.10-0.15	0.15-0.40	0.10-0.15
Sweden	0.25-0.30	0.27	0.15-0.25	0.20-0.30	0.10-0.25	0.20-0.30	0.10-0.25
Finland	0.25-0.30	0.18	0.05-0.30	0.25?	0.15-0.20	0.20-0.40	0.10?
Denmark	0.05-0.25	0.15	0.10-0.30	0.25?	0.10?	0.15-0.30	0.10-0.20
West Germany	0.35-0.45	0.32	0.15?	0.20-0.50	0.20-0.45	0.35-0.50	0.25-0.40
Great Britain	0.45-0.55?	0.50	0.35-0.40?	0.20-0.50?	0.10-0.25?		
Australia	0.30-0.35?	0.26					
Italy	0.45-0.55?	0.50					

Source: Authors' review of the cross-national literature on intergenerational absolute mobility. The US estimates are selected from studies that use the methodological decisions most typical of the research from other countries, rather than the best available US estimates. Often, these estimates are from studies that attempt to use harmonized methods and data to compare the US to its peers. The evidence on Germany typically involves West Germany specifically, and the research on the United Kingdom rarely includes Northern Ireland with Great Britain.

over nine cohorts born between 1970 and 1984. Comparing the five most recent cohorts—1979 to 1984—to the same American cohorts in Chetty et al. (2016, 2017), upward absolute mobility rates in Canada were 64 to 66 percent, versus 56 to 65 percent in the US.[49] Without dividing couple incomes in half, the Canadian and American rates are even more similar—51 to 55 percent in the former, and 50 to 54 percent in the latter.[50] And American absolute mobility was higher than in Canada for the 1970 to 1977 cohorts, even after adjusting couple incomes (64 to 71 percent, compared with 59 to 67 percent in Canada).

Otherwise, we have no data for other countries on the extent to which people surpass their parents in absolute terms. Very rough estimates of absolute upward mobility may be derived from some studies that estimate the intergenerational elasticity of child and parent incomes, under the assumption that logged parent and child incomes have a bivariate normal distribution. But the estimates cannot reliably be compared.[51]

OTHER DISTRIBUTIONAL MEASURES OF ABSOLUTE MOBILITY

Bjorklund and Jantti (1997) create groups based on multiples and fractions of median earnings. They find that in the US, 40 percent of sons below half the median as children end up below half the median as adults. In Sweden, that was true of just 25 percent of sons starting below half the median. These numbers were identical looking at the share of sons whose fathers' earnings were at least 1.5 times the median that remain above that threshold. Blanden and Gibbons (2006) present analogous estimates for Great Britain. There are no corresponding US figures against which to compare their estimates.

Corak, Lindquist, and Mazumder (2014) display the mean absolute gain of men whose rank exceeds that of their father, conditional on father's quantile. Sons in the US have smaller absolute gains (in US dollars) than do sons in Sweden, who have smaller gains than Canadian sons. American men have larger absolute losses

than Canada and Sweden, conditional on having a lower rank than their father and on their father's quantile. Losses are smallest in Sweden. Note that these are not the mean absolute changes conditional on experiencing absolute mobility—they are conditioned on experiencing *relative* mobility.

Belfield et al. (2017) provide British estimates giving the average earnings and income of men raised by parents in the top or bottom fifth of post-tax and -transfer family income.

Acciari (2017) displays the percentage of Italian sons whose individual income exceeds that of their father by at least 50 percent, for each percentile of father income. This percentage is higher in Italy for sons growing up below the 30th percentile, but otherwise higher for Americans. However, no source is given for the American estimates.

In Winship (2017b), I discuss results of a recent poll sponsored by the Archbridge Institute asking men whether their "opportunities to succeed" had improved relative to those of their fathers. I found that in six nations, majorities thought they had done better (Sweden, Portugal, the Netherlands, the United Kingdom, Hong Kong, and Singapore). Close behind were Austria, Germany, and Taiwan. Below them were the US and five other countries (Japan, Spain, Belgium, Italy, and Canada). Men in France and South Korea felt worst about how they'd done. Of course, perceptions of upward mobility may not correspond with actual upward mobility, and the disparity between the two may differ across countries. Further, respondents may interpret "opportunities to succeed" in terms of relative mobility rather than absolute mobility.

SUMMARY MEASURES OF THE PERSISTENCE OF ABSOLUTE ECONOMIC INEQUALITY—THE INTERGENERATIONAL ELASTICITY

The IGE is technically the coefficient on logged parent income when the logged incomes of adult children are regressed on those of their parents. It tells us roughly how much richer, in percentage terms, one adult typically is versus another if she grew up in a household that was richer than that of the other by some percentage. In other words, it summarizes the extent to which initial absolute inequality diminishes by adulthood. An IGE of zero indicates that adult child incomes are unpredictable from the linear relationship between child and parental incomes. Unlike the IRA, the IGE is not bounded by 1 or -1, but in practice, it is nearly always positive and well under 1. Low IGEs indicate that absolute childhood inequalities shrink in adulthood, while an IGE greater than 1 would indicate that childhood inequalities widen. An IGE of 0.20 signals (roughly) that a child with 10 percent more parental income than another child will typically end up just 2 percent richer than the other child in adulthood—a large reduction compared with the childhood inequality between them.

The IGE is affected by the patterns of absolute mobility across children that it summarizes. Absolute childhood inequalities might be reduced in adulthood due to people changing ranks (relative mobility). But if the incomes accruing to people at different ranks become more or less spread out between childhood and adulthood, that can either limit or increase inequality reduction, depending on how the income distribution changes.

Not all absolute mobility reduces childhood inequality. If everyone ends up 20 percent better off than their parents, the IGE will not change. But if upward absolute mobility changes more for poor children than it does for rich children, childhood inequality will tend to decline by the time those children reach adulthood, and the IGE will be correspondingly lower.

The cross-national literature on IGEs is vast. Part One of this primer covers the research on the United States. Here I summarize the evidence for other countries, organized by the kind of parent–child comparisons being made.

Sons

FATHER EARNINGS VS. SON EARNINGS

Most studies estimating IGEs focus on the relationship between father and son earnings. For each country, I provide a "preferred" range for the IGE, based on my assessment of which studies are methodologically superior. However, it is not at all clear how comparable these preferred ranges are across countries. For some nations, where the research is limited or not sufficiently compa-

rable to research on other countries, I indicate lower confidence in the preferred range. In other countries, the research is of insufficiently high quality to offer a preferred range at all.

The conclusion from the review below is that the US does, indeed, have a higher IGE—indicating that absolute childhood inequalities decline less in percentage terms by adulthood—than those of other countries. However, the differences between the US and other nations are probably smaller than has been portrayed, since more-recent and more-sophisticated studies have tended to push up the IGEs of a number of the US's peer nations.

Canada—Preferred IGE of 0.30–0.35

Nearly all credible research on mobility in Canada has used administrative data from income tax records. The Canadian estimates of mobility have fallen over time (that is, the IGEs have risen over time) as measurement has improved. Corak and Heisz (1999) estimated earnings IGEs for men ranging from 0.13 to 0.23.[52] Using the same administrative data in 2001, when sons could be observed at older ages, Corak (2001) revised his estimate to 0.26.[53] Corak, Lindquist, and Mazumder (2014) also reported a Canadian IGE of 0.26.[54] The most recent Canadian study, by Chen et al. (2017), is the most careful to date. Averaging 10 to 21 years of father earnings and up to five years of son earnings, they reported an IGE of 0.32.[55]

In an influential review of the cross-national mobility literature as it then stood, Corak (2006) concluded that a "permissible range [for the Canadian IGE] from the literature could be from 0.19 to 0.23." This range excluded Corak's own 0.26 estimate from 2001. Corak chose as his preferred point estimate the 0.19 IGE estimated by Grawe (2004a). Grawe's estimate, however, measured sons' earnings at younger ages than most other studies.[56] Corak's 2016 review used 0.19 again, ignoring not only his own higher estimate from 2001, but the higher estimate from his 2014 paper with Lindquist and Mazumder.[57]

That paper, Corak, Lindquist, and Mazumder (2014), was the study that most carefully compared Canadian and American IGEs. It found that using methods as consistent as possible for both countries, the Canadian IGE was 0.26 and the American IGE was 0.40. Grawe (2004a) compared his young Canadian sample (IGE of 0.15) against two US samples, which yielded IGEs of 0.20 and 0.38. Blanden (2005) reported IGEs of 0.19 for Canada and 0.29 to 0.33 for the US.

Other American estimates from the past 15 years, reviewed in Appendix Two of Part One of this primer, tend to be significantly higher than Chen et al.'s (2017) Canadian estimate of 0.32—generally above 0.45 and sometimes exceeding 0.70. My own preferred estimates from Part One run from 0.44 to 0.78. There are potential issues with the Canadian administrative data that could affect the estimated IGEs, but it seems likely that Canada's distribution of absolute mobility produces a bigger decline in childhood inequality than does that in the US.[58]

Norway—Preferred Estimate of 0.30–0.35

Norwegian estimates come from administrative data, generally comprised of multiple linked public registers and tax and other government records. Initial estimates of the male earnings IGE in Norway were very low. Bratberg, Nilsen, and Vaage (2005) reported a range from 0.12 to 0.15, and Jantti et al. (2006) put it at 0.15. Bratsberg et al. (2007) estimated an IGE of 0.14, but that rose to 0.24 if sons with father earnings under $3,000 were dropped.

These studies all underestimated the IGE, either by using too few years of father earnings or by measuring father earnings at older ages. Hansen (2010) found an IGE of 0.13 using an older sample, as in Bratberg et al. (2005). But when she used a sample that only included father earnings observed around age forty, the IGE rose to 0.19. Using a sample in which fathers all had five years of earnings, she found an IGE of 0.27. Nilsen, Vaage, Aakvik, and Jacobsen (2012) moved the IGE higher still. When up to 15 or 25 years of father earnings were averaged, the IGE was between 0.29 and 0.34. The only study since, Pekkarinen, Salvanes, and Sarvimaki (2017) also looks at older fathers (or relies on "Two Sample Two-Stage Least Squares," or TSTSLS), finding IGEs ranging between 0.06 and 0.23.

Corak (2006, 2016) used a preferred estimate for Norway of 0.17, a scaled-up version of the 0.12 estimated by Bratberg, Nilsen, and Vaage (2003), which preceded their 2005 paper. None of these studies compares the American male earnings IGE to that of Norway.[59] However, the magnitude of the estimates in the literature on the US point toward Norway's mobility being higher. It should be mentioned, though, that the

Norwegian "earnings" measures generally include benefits related to employment, such as unemployment and sickness benefits.

Sweden—Preferred Estimate of 0.25–0.30

As in Norway, the Swedish mobility research generally relies on public registers and administrative data. Of the seven most recent studies, four estimate male earnings IGEs of 0.25 or higher: Lindahl (2008, 0.28 to 0.31), Corak, Lindquist, and Mazumder (2014, 0.25), Richter (2016, 0.27), and Heidrich (2017, 0.25). Two of the others feature Anders Bjorklund as an author and find IGEs of 0.13 to 0.17 (Bjorklund, Roine, and Waldenstrom, 2012) and 0.16 (Bjorklund and Jantti, 2016), but they average fewer years of father earnings than all of the four studies above but Lindahl (2008). The final paper is a TSTSLS study estimating an implausibly low IGE of 0.10—Andrews and Leigh (2008, 2009).

Three earlier studies involving Bjorklund also estimated IGEs below 0.25 (Bjorklund, Lindahl, and Plug, 2006b, 0.21, Bjorklund et al., 2006a, 0.21, and Bjorklund and Chadwick, 2003, 0.24). Bjorklund and Jantti (1997), however, used TSTSLS methods and estimated an IGE of 0.28, and Jantti et al. (2006), on which Bjorklund was an author, found an IGE of 0.27.[60] Osterberg (2000) reported an IGE of 0.13, but he averaged only three years of father earnings and used an older sample of fathers.[61]

Corak (2006, 2016) used a preferred estimate of 0.27, scaled down from Bjorklund and Jantti (1997)'s 0.28.

Bjorklund and Jantti (1997) find the US has lower mobility (0.42 IGE) than Sweden, using TSTSLS estimates. Bjorklund et al. (2006b) and Bjorklund et al. (2006a) put the American figure at 0.34 (versus 0.21 in Sweden), Corak, Lindquist, and Mazumder (2014) estimate it at 0.40 (versus 0.24), and Richter (2016) puts it at 0.44 (versus 0.27). All the evidence indicates that Sweden has higher mobility (although it should be noted that the Swedish "earnings" measures generally include benefits related to employment, such as sickness benefits and child allowances).

Finland—Preferred Estimate of 0.25–0.30

Finnish mobility analyses rely on the quinquennial census linked to tax records. Five studies include Eva Osterbacka as an author. The best and most recent of these studies—Jantti et al. (2006) and Bratsberg et al. (2007)—find IGEs of 0.21 and 0.19, respectively. The latter rose to 0.25 when father earnings under $3,000 were dropped.[62] The two remaining studies included Sara Kerr as an author. Using five years of father earnings—more than in the Osterbacka studies—Pekkarinen, Uusitalo, and Kerr (2009) reported an IGE ranging from 0.26 to 0.30. Lucas and Kerr (2013) find a much lower IGE of 0.06 to 0.12. However, it compares relatively old fathers to relatively young sons.

Corak (2006, 2016) used a preferred estimate of 0.18, scaled up from the lower-bound estimate in Jantti and Osterbacka (2000).

No studies directly compare male earnings IGEs in Finland and the US.[63] However, the magnitude of the estimates in the literature on the US indicate that Finland's mobility is higher. Of note, however, Finnish "earnings" measures generally include taxable fringe benefits.

Denmark—Preferred Estimate of 0.15–0.30

Studies of mobility in Denmark generally rely on administrative registers. Five papers are authored by Martin Munk, Jens Bonke, and Azhar Hussain. The most recent one—Bonke, Hussain, and Munk (2016)—reports an IGE of 0.18. The earliest paper—Bonke, Hussain, and Munk (2005)—dropped the top and bottom percentiles of earnings in each generation and estimated an IGE of 0.24, though it is unclear whether the earnings measure is the same in the two papers.[64]

Three Danish studies were authored by Tor Eriksson, Bernt Bratsberg, and Oddbjorn Raaum. The first—Eriksson, Bratsberg, and Raaum (2005)—estimated an anomalously large 0.29, using a longitudinal survey of students and controlling for hours worked. Of the other two (both also involving Markus Jantti, Knut Roed, and Robin Naylor), Bratsberg et al. (2007) estimated a much lower 0.12 (0.17 dropping fathers with under $3,000), and Jantti et al. (2006) found an IGE of 0.07 (using only one year of father earnings, versus the Bratsberg paper's two and the five of Bonke et al., 2016).

None of these eight Danish papers average more than five years of father earnings. However, estimates provided to me by Landerso and Heckman (2016, 2017) average nine years of father earnings, finding a surprisingly low IGE of 0.06. However, they also report an IGE of 0.28 to 0.29 comparing fathers' and sons' gross

individual income excluding transfers. For comparison, the IRAs were 0.20 for earnings and 0.27 for individual income excluding transfers. It, therefore, appears that the 0.06 IGE estimate for earnings is too low.

In his review, Corak (2006, 2016) used a preferred estimate of 0.15, scaled up from Bjorklund et al. (2003), an earlier version of Jantti et al. (2006). As is the case for Norway and Finland, only two studies have attempted to estimate comparable American and Danish IGEs, but they used parent family income rather than father earnings for the US (Jantti et al., 2006 and Bratsberg et al., 2007). Nevertheless, given how large American male earnings IGE estimates tend to be, it is very likely that Denmark's are lower.

West Germany—Preferred Estimate of 0.35–0.45

Nearly all of the mobility studies of "Germany" use the German Socio-Economic Panel (GSOEP) and are restricted to children raised in West Germany. There are seven German studies directly comparing fathers' and sons' earnings, with estimates ranging from 0.26 to 0.44. Of these, the most recent is easily the best (Schnitzlein, 2016). It uses up to 10 years of earnings for fathers and up to eight for sons, and it measures earnings around age 40 for both. The range is from 0.32 to 0.44, and 0.40 seems the best single estimate. Other studies use fewer years of father earnings, assess sons' earnings when young, or have other shortcomings.[65]

Six studies use indirect methods to estimate male earnings IGEs for West Germany ranging from 0.12 to 0.52. Most estimate IGEs of between 0.29 and 0.52. In fact, that is the range of estimates reported in both of the two most recent studies of the five—Cavaglia (2016), using TSTSLS, and Chau (2012), who models lifetime earnings using a dynamic model of hourly wages.[66] Cavaglia (2016) is the only study to include any East Germans, but it only includes those who studied in West Germany.

Corak (2006, 2016) uses a preferred estimate of 0.32, which scales up the 0.10 estimate from Grawe (2004a).

Several comparative studies looking at West Germany and the United States find them to have similar mobility levels.[67] The most recent research suggests lower mobility in the US. Chau (2012) contrasts Germany's 0.29-to-0.52 IGE with the American range of 0.39 to 0.67, for instance. But two studies complicate this conclusion. Schnitzlein (2016) estimates a range of 0.43 to 0.49 for the US, compared with 0.32 to 0.44 in West Germany. However, after dropping observations with under $9,600 or €9,600, the IGEs are 0.43 and 0.44 for the US and Germany, respectively. Cavaglia (2016) estimates a range of 0.29 to 0.45 for Germany (including East Germans who studied in West Germany) and 0.46 to 0.55 for the US. But both countries have an IGE of around 0.50 for the most recent cohorts. Particularly given the ambiguity inherent in comparing "Germany" (effectively, West Germany) with the US (which might be said to include, for example, "South US"), it remains plausible that the two countries may have similar mobility levels.

Great Britain—Preferred IGE of 0.45–0.55 (Lower Confidence)

Cross-national mobility studies often refer to the United Kingdom, but in truth British mobility studies, due to data constraints, almost always have excluded Northern Ireland. Estimates of male earnings mobility are available from two data sources: the National Child Development Study (NCDS) and the merged British Household Panel Survey and Understanding Society studies (BHPS). The NCDS represents members of the 1958 birth cohort. It includes a number of features that make cross-national comparisons of economic mobility very difficult.

Father earnings are reported as falling in one of twelve ranges rather than as the actual amount of earnings received. And instead of actual annual gross earnings, the NCDS provides the "usual" weekly or monthly earnings after taxes. For grown children, the NCDS records "usual" gross take home pay for those currently in a job (which may be reported on a weekly, biweekly, monthly, or annual basis) and information on deductions from paychecks. Father income is available in the NCDS only at age 16, so it is impossible to average multiple years of income. Sons' incomes are available in only a few years, most of which occur when they are young. Self-employment income is measured poorly for fathers and sons alike. Finally, attrition from the original sample has been considerable; according to Blanden, Gregg, and Macmillan (2011), just 23 percent of sons in the NCDS have parental income at age 16 and earnings at age 33.

With these caveats, there are three NCDS studies estimating male earnings IGEs. Bratsberg et al. (2007)

reported an estimate of 0.45—more than double the 0.22 from the first British study twenty years earlier (Dearden, Machin, and Reed, 1997). Dearden, Machin, and Reed (1997) also estimated an IGE of 0.59 using TSTSLS techniques, which is very close to the 0.58 estimated by Grawe (2004a) (also using TSTSLS). The Bratsberg et al. (2007) paper is the only one of the three published after an additional year of sons' earnings became available, incorporating earnings not just at age 33, but at 41. All of these estimates would be higher if it were possible to average more years of father earnings and (probably) if annual gross earnings rather than weekly or monthly father after-tax earnings were available.

The BHPS asks about usual pay of those currently in a job, which may be reported on a weekly, biweekly, monthly, or annual basis. Annual pay is imputed based on the responses to the current earnings questions in the survey and in the previous wave, monthly employment information, and other sources. The BHPS asks about annual self-employment income. Because the survey began relatively recently, the earlier studies that used it were only able to measure sons' earnings at younger ages.[68] The most recent study, Cavaglia (2016), used TSTSLS techniques and estimated a male earnings IGE ranging from 0.31 to 0.43 (including Northern Ireland along with Britain). Bidisha, Das, and McFarlane (2013) found an IGE of 0.33 for native-born British sons, also using TSTSLS techniques. Both studies looked at monthly earnings, however. Nicoletti and Ermisch (2007) report TSTSLS-based IGEs ranging between 0.20 and 0.30 for earlier birth cohorts but between 0.30 and 0.55 for more recent cohorts.

Corak (2006, 2016) used an estimate of 0.50 as his preferred one, scaled down from Grawe (2004a). That is a defensible one from the available literature, but there are no British studies that measure permanent earnings for fathers or sons nearly as well as the American studies finding high IGEs. Of the studies comparing Britain to the US, Grawe (2004a) reports two US estimates, one (0.55) slightly lower than his British estimate, the other, at 0.25, implausibly low. Both are based on annual earnings, weakening their comparability to the British estimates. Jantti et al. (2006) compare US annual family income to weekly son earnings to try to achieve better comparability with Britain, finding an American IGE of 0.46 compared with 0.31 for Britain. But annual parent family income is different than the weekly father earnings used for the British data. Cavaglia (2016) finds the IGE to be higher in the US (0.46–0.55) than in the UK (0.31–0.43), though the reliance on TSTSLS methods for both countries and the imputation of annual earnings in the British estimates are potentially problematic for comparisons.

There seems little basis for concluding that British mobility is higher or lower than that in the US.

Australia—Preferred IGE of 0.30–0.35 (Lower Confidence)

The little research that has been done on Australian economic mobility has typically used the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA, however, does not include direct observations of parental income, so researchers must resort to TSTSLS approaches. All five studies estimating male earnings elasticities in Australia use that approach, including four based on HILDA.

The most recent studies that include annual earnings estimates, Fairbrother and Mahadevan (2016) and Huang, Perales, and Western (2016), estimate IGEs of 0.16 and 0.24, respectively. Leigh (2007) reports an IGE of 0.16. These are lower than many estimates using hourly wages, which are generally between 0.20 and 0.33.[69] Corak (2016) uses an estimate of 0.26, which was taken from the hourly pay estimates of Leigh (2007).[70]

Leigh (2007) is the only study comparing Australian and American annual earnings IGEs, finding a considerably higher IGE in the US (0.33, versus 0.18 in the comparable Australian sample). Similarly, Mendolia and Siminski (2016) estimate the US male hourly earnings IGE to be 0.31, higher than the 0.23 they estimate for Australia. However, Andrews and Leigh (2008, 2009) find lower mobility in Australia (0.33 hourly earnings IGE, versus 0.24 in the US). These all compare estimates produced using TSTSLS.

The relatively low US estimates in these three studies hint that the Australian estimates are also low. Combined with the imprecision in the TSTSLS estimates and the absence of true intergenerational longitudinal data in Australia, strong conclusions about how it compares to the US are not warranted.

Italy—Preferred Estimate of 0.45–0.55 (Lower Confidence)

Four studies using the Bank of Italy Survey on Household Income and Wealth and TSTSLS techniques estimate a male earnings IGE of between 0.32 and 0.60. Roccisano (2013) and Cavaglia (2016) are able to use more recent waves than Piraino (2007) and Mocetti (2007). Roccisano (2013) estimates an IGE of 0.44, while Cavaglia's estimates range from 0.39 to 0.60, depending on the cohort (with recent cohorts ranging from 0.50 to 0.55). The Cavaglia range compares with 0.46 to 0.55 for the US (with recent cohorts around 0.50).

Corak (2016) uses a preferred IGE of 0.50 (from Mocetti, 2007). There is not enough evidence to determine whether Italy has higher or lower mobility than the US.

Summary of Male Earnings IGEs

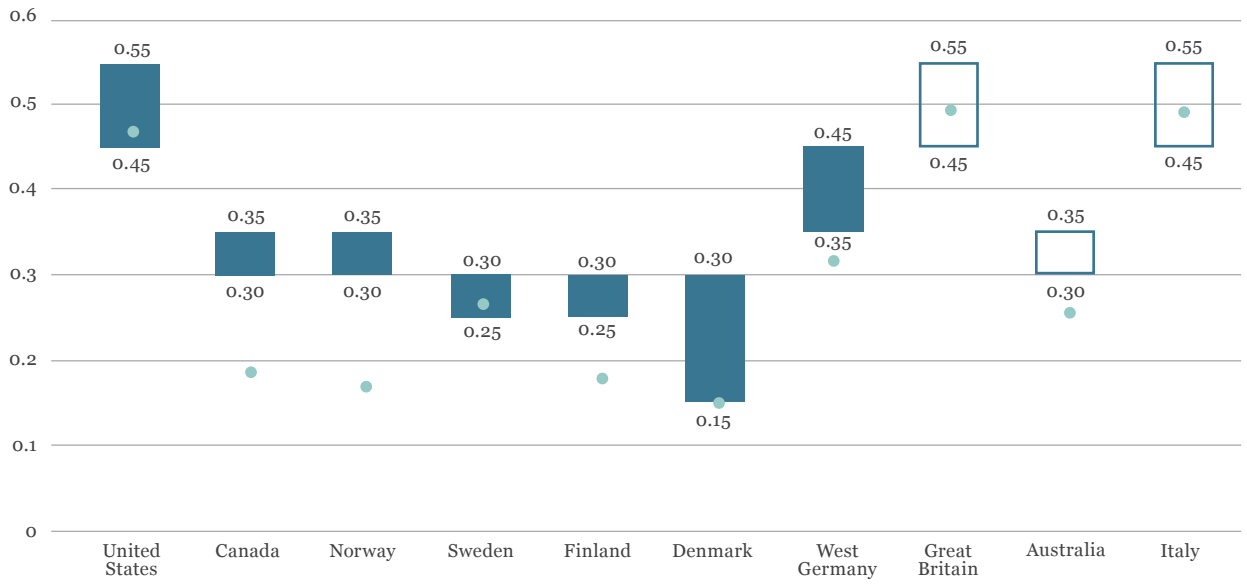
This review of the evidence on male earnings IGEs demonstrates that the estimates presented by Corak (2006, 2016) are out-of-date for several countries. His given point estimate falls within my preferred range for Sweden, Great Britain, and Italy. However, his estimates likely understate the IGE for Canada, Norway, Finland, Denmark, West Germany, and Australia.

A reasonable range of estimates for the US that are comparable to the estimates reviewed above is 0.45 to 0.55, which encompasses Corak's point estimate of 0.47. In the appendix of Part One of this primer, my review of the literature indicated a range of 0.32 to 0.79 for studies published since 2004. My preferred range for the US in Part One was 0.44 to 0.78. The high upper bound reflects the fact that IGE estimates are higher when more years of earnings are averaged over a long age span centered on age 40. Research estimating the IGE of other nations has not mimicked the approach I take in Part One, which is inspired by Mazumder (2016).

Once such estimates are produced, it seems reasonable to think that they will be higher than the estimates reviewed above.

Nevertheless, in contrast to the male earnings IRA estimates, which are fairly similar across countries, the US

Figure 7. Summary of Cross-National Differences in Absolute Male Earnings Mobility (Intergenerational Elasticity)



Notes: Based on author's review of the literature and Corak (2016). Green dots represent the preferred estimate from Corak's review. Bars indicate the point estimate or range of estimates that best characterize male earnings IGE. The US estimates are selected from studies that use the methodological decisions most typical of the research from other countries, rather than the best available US estimates. Often, these estimates are from studies that attempt to use harmonized methods and data to compare the US to its peers. The evidence on Germany typically involves West Germany specifically, and the research on the United Kingdom rarely includes Northern Ireland with Great Britain.

has a higher male earnings IGE than Canada, Norway, Sweden, Finland, and Denmark, and there is no reason to think that it has a lower IGE than West Germany, Great Britain, Australia, or Italy. In the US, absolute childhood inequalities decline less in percentage terms by adulthood than they do in other nations. **Figure 7** displays a summary of this evidence.

While this review leaves significant ambiguity about country rankings, the evidence on IGEs looking at combined parental income or parental family income (rather than father earnings) and on IGEs for daughters or pooling sons and daughters is far messier. There are fewer of these studies and for fewer countries; many of them were published in the period before recent methodological advances became widely understood. In the following sections, I summarize the remaining research on IGEs and attempt to draw conclusions from it where I can.

COMBINED PARENT INCOME VS. SON EARNINGS

There are nine studies comparing the US to one or more other nations and focused on the IGE relating combined parental income to sons' earnings (with a number of other papers focusing on single countries). Six of the nine studies are over a decade old, and several have potential data comparability problems across countries. Many of them do not reflect the methodological advances of recent years. In particular, most of these studies use only one or two years of parental income, meaning that IGEs are likely to be biased downward (showing more mobility). It seems likely that the IGEs comparing parent income and sons' earnings would be similar to those comparing father and son earnings if they were of equal methodological sophistication.

Blanden (2005), using the BCS, estimates an IGE of 0.17 to 0.21 for Canada, comparing parental income less welfare payments to sons' earnings.[71] That is roughly the same as the male earnings IGE she estimates. Her US estimates range from 0.31 to 0.38. She also estimates IGEs ranging from 0.21 to 0.29 for Great Britain, though those are based on usual weekly income and earnings. In her study, the direct comparisons of the British and US estimates—the latter based on *annual* income and earnings—are ambiguous as to which country's IGE is higher.[72] Blanden averages five years of parental income in Canada and the US and just two years in Great Britain. Blanden, Haveman, Smeeding, and Wilson (2014) use the BCS and compare the British IGE (0.29) to the American one (0.39). If sons' income rather than just their earnings are used, the estimates are 0.32 and 0.38. Again, these compare weekly British estimates to annual estimates for the US, and the British data have other comparability issues discussed in end note 23. One of these is that the BCS allows only two years of parental income to be averaged. Using a single year of parental income, Belfield et al. (2017) find the IGE in the BCS to be 0.36 (versus 0.22 in the earlier NCDS). Blanden and Machin (2007, 2008) report the BCS IGE as either 0.33 or (using TSTSLS) 0.50, and they give the NCDS IGE as either 0.21 or 0.33.

A fifth study using the BCS, Gregg, Jonsson, Macmillan, and Mood (2017), estimates the British IGE to be between 0.32 and 0.45, the US IGE to be from 0.37 to 0.43, and the Swedish IGE to range from 0.21 to 0.27. When the authors average 16 years of parent income, they obtain a Swedish IGE of 0.33. Using that to scale the British and American estimates (which average only two years of parent income), the IGEs rise to 0.55 for Britain and 0.60 for the US.

Three studies involving cross-national comparisons with the US include the same six coauthors (with a seventh added to the earliest one). Jantti et al. (2006) compare combined parental earnings to sons' earnings and find estimates similar to the male earnings IGEs for three Scandinavian countries: 0.13 for Norway, 0.20 for Sweden, and 0.22 for Finland. These compare with an American estimate of 0.52 (using parental *family income*, however). They provide a British IGE as well, using weekly parental income and son earnings, obtaining an estimate of 0.31. Jantti et al. compare that to an American range—0.46 to 0.53—derived from weekly son earnings but continuing to use annual parent family income. The Jantti et al. study, however, uses only one or two years of parental earnings or income.

In related work, Bratsberg et al. (2007) report estimates of 0.14 to 0.22 for Norway, 0.23 for Finland, 0.36 for Great Britain, and 0.54 to 0.56 for the US. The non-American estimates are all roughly the same magnitude as the corresponding male earnings IGEs. However, Raaum et al. (2007), in a paper published later that year, find that the Scandinavian patterns are better characterized by a nonlinear relationship between combined parental earnings and sons' earnings. They report higher

estimates at the median of parent earnings for Norway (0.27) and Finland (0.28), a higher linear IGE for Great Britain (0.42) and a somewhat reduced linear estimate for the US (0.48).[73] Both of these papers use only one or two years of parental income.

Bratsberg et al. (2007) and Raaum et al. (2007) also provide Danish estimates, reporting IGEs of 0.20 and, at the median parent earnings, 0.26. Both of these studies show similarly sized Danish male earnings IGEs. In a final study comparing the US and Denmark, Landerso and Heckman (2016, 2017) report a very low Danish IGE of 0.09, compared with 0.29 for the US. The estimates average nine years of parental income, but it appears that this IGE is too low given that the Danish IRA for men and women together is 0.21, the IRA for men and women pooled together using income before transfers is 0.27, and the IGE for men and women pooled together using income before transfers is 0.35.

These studies comparing combined parent income and earnings to sons' earnings indicate higher IGEs for the US. While the research is sparse and has important limitations, it is consistent with both the relative mobility results in the previous section and the male earnings IGE research. American estimates from other research summarized in the appendix of Part One of this primer range from 0.29 to 0.59, and my own preferred estimates ranged from 0.64 to 0.87.

PARENT FAMILY INCOME VS. CHILD FAMILY INCOME

Only eight studies have compared parental family income to sons' family incomes (four of them a decade old or more), and only one compares another country to the US. Raaum et al. (2007) compare combined parent earnings to the combined earnings of sons and their partners. They report IGEs for Norway (nonlinear model, IGE at median parental earnings of 0.24), Finland (0.25 at median), Denmark (0.25 at median), and Great Britain (linear model, weekly earnings, 0.37). They compare these to an IGE for the US comparing parent family income to son family income (0.43). These are all similar to the IGEs the authors estimate comparing sons' earnings to parent family earnings or income. The Raaum et al. study only uses one or two years of parental income, however, suggesting that the IGEs it estimates overstate mobility in these countries (as in the US).

Blanden, Goodman, Gregg, and Machin (2004) and Blanden and Machin (2017) report British IGEs of 0.16 and 0.26 (using the NCDS) and 0.30 and 0.41 (using the BCS). Belfield et al. (2017) give corresponding figures of 0.20 and 0.37 comparing sons' pre-tax and -transfer income to their parents' post-tax and -transfer income and 0.16-0.17 and 0.28-0.31 using post-tax and -transfer income for both generations. When they include men who do not work, those estimates drop to 0.08 and 0.11 for the two cohorts. These estimates also use no more than two years of parental income.[74]

For Canada, Connolly et al. (2016) report an IGE ranging from 0.25 to 0.31, and Corak (2017) finds an estimate of 0.21. Both studies average five years of parental income data. Hirvonen (2008) reports an IGE for Sweden of either 0.27 (using family income for both generations) or 0.30 (using the combined earnings of husbands and wives). Either way, only two years of parental income are used. None of these studies include male earnings IGEs or IGEs comparing parental family income to sons' earnings.[75]

The evidence reviewed in the appendix to Part One of this primer indicated that the IGEs produced from studies focused on the US range from 0.43 to 0.71. The preferred range of the estimates I produced ran from 0.47 to 0.60. The dearth of comparable studies for other countries is perhaps the most glaring research gap in the field of mobility research.

Daughters

The literature on intergenerational elasticities for daughters is much smaller than for sons. The studies that have been conducted often fail to note whether they include years with no reported income in multi-year averages. This decision affects daughters' IGE estimates much more than it does sons' (especially when daughters are compared with mothers). That is because women are more likely than men to take time out of the labor force to start or raise a family (especially the daughters' mothers).

Nearly 20 studies compare fathers' earnings to daughters' earnings. Jantti et al. (2006) report IGEs of 0.11 to 0.12 for Norway, 0.19 to 0.20 for Sweden, 0.08 to 0.10 for Finland and 0.03 for Denmark. The IGEs are very similar when daughters' earnings are compared to combined parental earnings. The authors compare

these against an American range of 0.28 to 0.31, comparing parental family income to daughters' earnings. They also estimate an IGE based on weekly father and daughter earnings for Great Britain—0.33.

More recent Norwegian estimates are higher (0.14 to 0.23), with the highest estimate coming from the best study (Nilsen et al., 2012, which averaged up to 25 years of father earnings).[76] Newer Swedish estimates generally range from 0.18 to 0.24.[77] Finnish estimates run from 0.04 to 0.28.[78] Three additional studies estimate Danish IGEs, ranging from 0.11 to 0.27.[79]

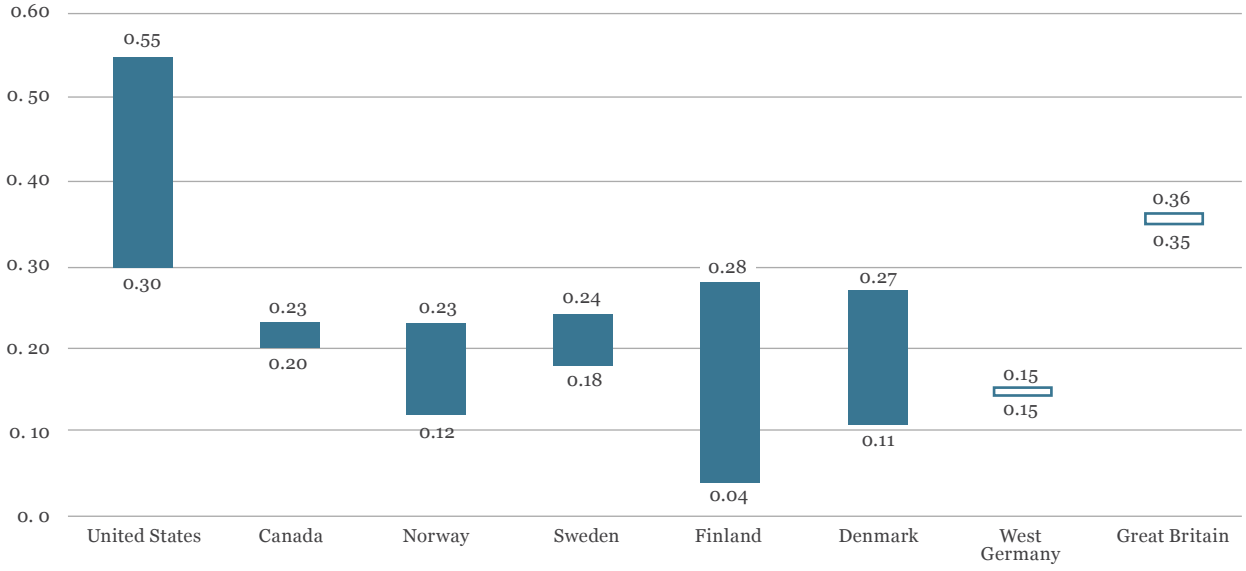
Two other British studies find IGEs of 0.35 to 0.36 (Dearden, Machin, and Reed, 1997 and Bidisha et al., 2013, the former using weekly earnings, the latter the annual earnings of fulltime workers). The Dearden, Machin, and Reed paper also reports an estimate of 0.70 using TSTSLS methods.[80]

Three Canadian estimates range from 0.20 to 0.23, while the range comparing fathers' and daughters' individual incomes is from 0.23 to 0.29.[81] Ermisch et al. (2006) report a father–daughter monthly earnings IGE of 0.15 for West Germany.

Figure 8 summarizes this research comparing fathers' and daughters' earnings. Several of these studies also estimate mother–daughter earnings IGEs, which are substantially lower than father–daughter elasticities.[82]

Just six studies estimate family income IGEs for daughters. Raaum et al. (2007) compare combined parent earnings to the combined earnings of daughters and their partners, reporting IGEs of 0.21 for Norway, Finland, and Denmark (at median parent earnings). In Great Britain, they estimate the IGE at 0.33. Blanden et al. (2004) report an IGE of 0.22 to 0.31 for Britain, comparing parent income to daughters' family income (both weekly). Two Canadian studies report IGEs of 0.19 to 0.29.[83] Hirvonen (2008) finds a Swedish IGE of 0.23 to 0.25, and Ermisch et al. (2006) report an IGE of 0.21 for West Germany. Only the Ermisch et al. study looks at both father–daughter earnings IGEs and family income IGEs for daughters; the IGE is higher for family income. The Ermisch study averages ten years of parental income, and the Canadian studies average five years, but the other family income IGEs in the literature are based on just one or two years.

Figure 8. Summary of Cross-National Differences in Absolute Father–Daughter Earnings Mobility (Intergenerational Elasticity)



Notes: Based on author's review of the literature. Bars indicate the point estimate or range of estimates that best characterize the father–daughter earnings IGE. Bars are shown as outlines when the research on a country is inconclusive or of potentially limited comparability. The US estimates are selected from studies that use the methodological decisions most typical of the research from other countries, rather than the best available US estimates. Often, these estimates are from studies that attempt to use harmonized methods and data to compare the US to its peers. The evidence on Germany typically involves West Germany specifically, and the research on the United Kingdom rarely includes Northern Ireland with Great Britain.

Studies that compare American IGEs for daughters to those in other countries tend to conclude the US has higher IGEs. As noted, Jantti et al. (2006) find a higher American IGE comparing parent family income and daughters' earnings than the father–daughter earnings IGEs for Norway, Sweden, Finland, Denmark, and Great Britain. Comparing combined parental earnings to daughter earnings, Landerso and Heckman (2016, 2017) find a higher IGE in the US than in Denmark (0.25 versus 0.07). Raaum et al. (2007) find that the IGE in the US comparing parental family income to daughter earnings (0.25) is higher than the IGEs for Norway, Finland, and Denmark comparing combined parental earnings to daughter earnings (evaluated at the median parental earnings). The US estimate is similar to the British estimate in that study using weekly combined parent earnings (0.27). Similarly, Blanden et al. (2014) found equal IGEs in Great Britain and the US (0.37 versus 0.35, respectively) comparing averaged parent incomes to daughter earnings (both of them weekly in Britain but annual in the US). However, they found a lower IGE in Britain (0.30 versus 0.47 in the US) looking at daughter income.

The two best American papers report widely ranging father–daughter earnings IGEs: 0.45 to 0.85 (Mazumder, 2016) and from less than 0.00 to 0.27 (Dahl and DeLeire, 2008). Mitnik, Bryant, Weber, and Grusky (2015) find a range of 0.33 to 0.54 comparing parent family income to daughter earnings. Torche (2016) and Davis and Mazumder (2016) report family income IGEs of 0.37 and 0.52, respectively. My preferred estimates from Part One of this primer are from 0.44 to 0.46 comparing fathers' and daughters' earnings, 0.27 to 0.58 comparing mothers' and daughters' earnings, 0.64 to 0.82 comparing parent family income to daughter earnings, and 0.62 to 0.83 comparing parent family income to daughter family income. These estimates are likely not to be comparable to the figures that have been estimated for other countries.

Sons and Daughters

Ten studies pool sons and daughters and estimate IGEs. Because women are more likely than men to spend time out of the labor force to care for children, their earnings profiles tend to differ from those of men. It therefore makes little sense to pool sons and daughters if looking at their individual earnings or income if years with no income are included in averages. Looking at their family income avoids this problem, though because single mothers strongly outnumber single fathers, pooling may still introduce complications.

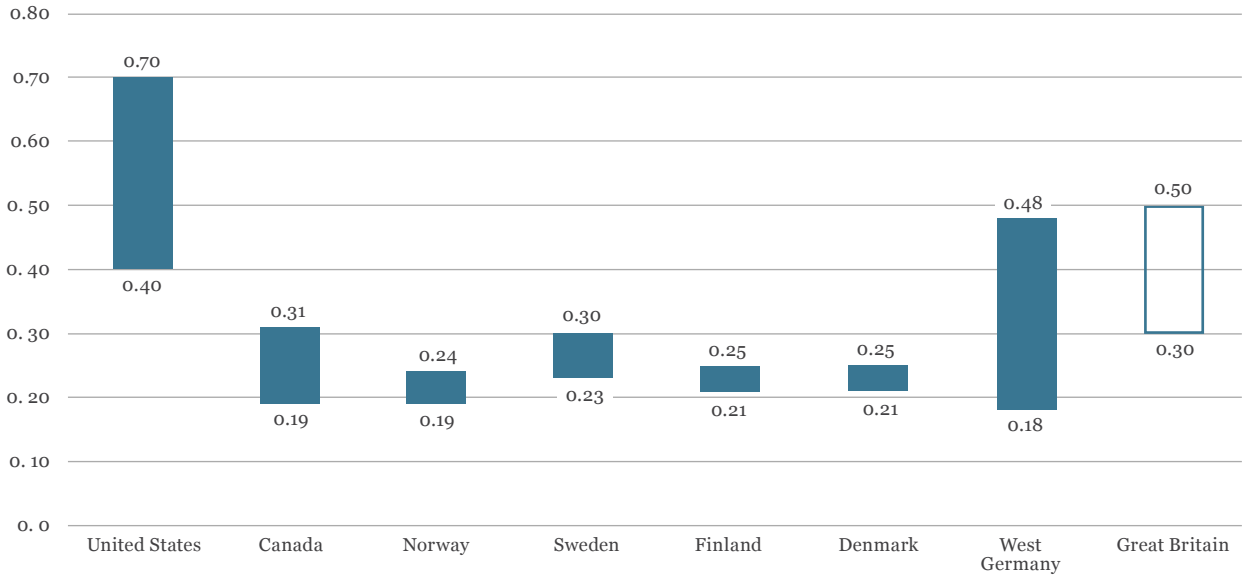
Comparing father earnings to child earnings, Osterbacka (2001) finds an IGE of 0.12 for Finland, and Bjorklund et al. (2006b) report an estimate of 0.24 for Sweden. Holmlund (2006) estimates a Swedish IGE of 0.18 comparing parent family income to individual child income. Munk (2015) reports corresponding Danish IGE estimates ranging from 0.15 to 0.26. Landerso and Heckman (2016, 2017) find a similarly low level for Denmark comparing combined parent earnings to child earnings (0.08 or 0.14, depending on whether or not low incomes are bottom-coded at $1,000). However, they find higher IGEs comparing combined pre-tax and -transfer incomes of parents and individual income of children (0.49 or 0.35), combined post-transfer incomes of parents and individual post-transfer income of children (0.29 or 0.27), or combined post-tax and -transfer incomes of parents and individual post-tax and -transfer income of children (0.25 or 0.22).

Comparing parent family earnings to the family earnings of children, Bratberg et al. (2017) report IGEs of 0.19 for Norway, 0.23 for Sweden, and 0.31 for West Germany. Eberharter (2014) puts the family income IGE for West Germany at 0.48, and she finds a corresponding IGE for Great Britain of 0.50. Finally, Connolly et al. (2016) and Corak (2017) report Canadian family income IGEs of 0.25 to 0.30 and 0.20, respectively.

As for US comparisons, Bratberg et al. (2017) find a higher family income IGE for the US (0.43) than the family earnings IGEs for Norway, Sweden, and West Germany. Eberharter (2014) reports a higher family income IGE in the US (0.68) compared with West Germany or Great Britain. And Connolly et al. (2016) compare their Canadian results to the American estimates of Chetty et al. (2014), finding higher IGEs in the US (0.34 to 0.41).

Landerso and Heckman (2016, 2017) also report higher IGEs in the US comparing combined parent earnings to child earnings (0.21 or 0.29, depending on whether or not earnings are bottom coded at $1,000, versus 0.08 or 0.14 in Denmark). But the US fares better than Denmark when looking at pre-tax and -transfer income (0.22 or 0.31 in the US, versus 0.49 or 0.35 in Denmark), and the

Figure 9. Summary of Cross-National Differences in Absolute Family Income Mobility (Intergenerational Elasticity)



Notes: Based on author's review of the literature. Bars indicate the point estimate or range of estimates that best characterize the family income IGE. Bars are shown as outlines when the research on a country is inconclusive or of potentially limited comparability. The US estimates are selected from studies that use the methodological decisions most typical of the research from other countries, rather than the best available US estimates. Often, these estimates are from studies that attempt to use harmonized methods and data to compare the US to its peers. The evidence on Germany typically involves West Germany specifically, and the research on the United Kingdom rarely includes Northern Ireland with Great Britain.

ranking is ambiguous using post-transfer income (0.18 or 0.45 in the US, versus 0.29 or 0.27 in Denmark). These estimates all compare combined parental income to individual child income.

As discussed in the appendix of Part One, the best American studies find family income IGEs of 0.45 to 0.71 when sons and daughters are pooled. Estimates comparing family income to child earnings are similar. My preferred estimates from Part One range from 0.58 to 0.83. **Figure 9** summarizes the evidence on family income IGEs, incorporating information from studies on sons, daughters, and pooled children.

SUMMARY MEASURES OF THE PERSISTENCE OF ABSOLUTE ECONOMIC INEQUALITY—THE INTERGENERATIONAL CORRELATION

As discussed in Part One of this primer, the intergenerational correlation (or IGC) also summarizes the extent to which absolute mobility is inequality-reducing over a generation. It is technically the IGE multiplied by the ratio of the standard deviation of logged parental income to the standard deviation of logged grown child income. In Part One, I interpreted it as the extent to which absolute mobility patterns reduce initial childhood inequalities after taking account of the change in point-in-time inequality between generations. Roughly, it assesses the absolute mobility (in percentage terms) that is caused by people changing ranks and ignores the absolute mobility that occurs because point-in-time inequality grows or shrinks. Another technical definition of the IGC is that it is the IGE after "standardizing" logged parental and child incomes (subtracting them from the generational mean and dividing by the generational standard deviation). The IGC may also be thought of as measuring how well parental income predicts grown child income.

The ICG ranges from -1 to 1, where 0 indicates that parental income has no linear relationship to grown child income. An IGC of 1 or -1 indicates that the linear relationship between parent and child income perfectly predicts the latter. If negative, the IGC indicates that childhood inequalities are reversed in adulthood, so that richer children end up poorer than low-income

children. In practice, the IGC typically is less than 0.60, and almost always positive. It is even more sensitive to attenuation bias than the IGE, because classical measurement error in both the parent and the grown child income measures will bias the correlation downward, while only error in parent income will lead to attenuation of the IGE.

SONS

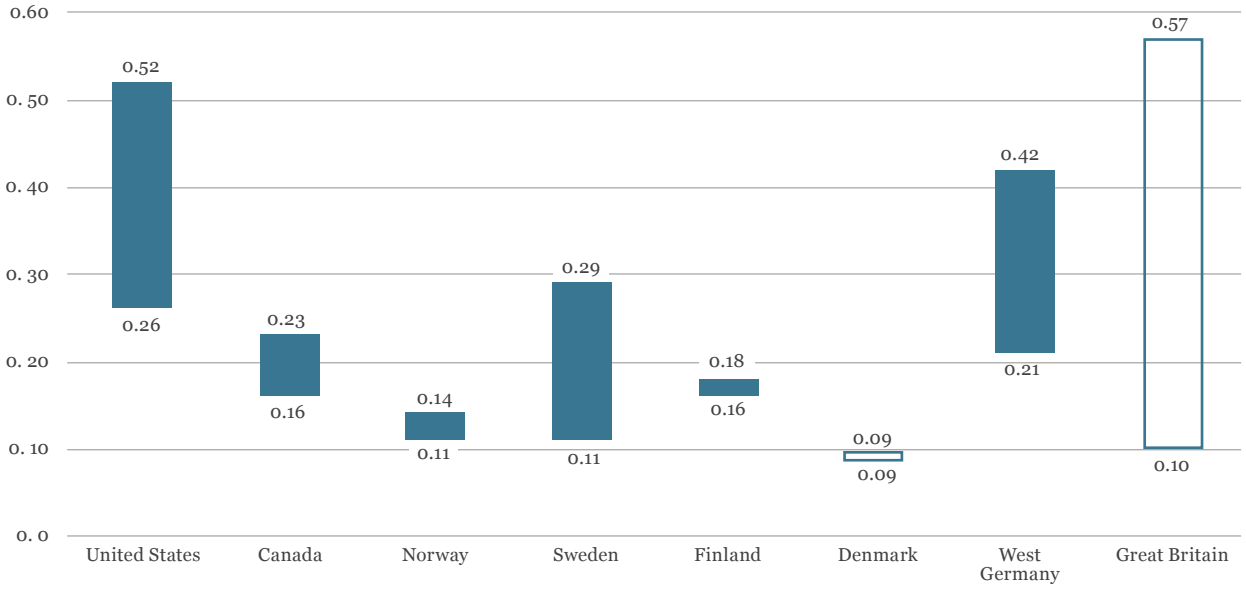
FATHER EARNINGS VS. SON EARNINGS

The starting point is once again the Corak, Lindquist, and Mazumder (2014) study, which reported IGCs of 0.26 for the US, 0.23 for Canada, and 0.16 to 0.21 for Sweden. Blanden (2005) used the Canadian administrative data (when the sons were younger) and compared it with estimates from similarly aged men in American survey data. She found a bigger gap between the two countries, reporting IGCs of 0.16 in Canada and 0.34 to 0.36 in the US. These estimates may be less comparable to those in Corak, Lindquist, and Mazumder (2014), given Blanden's American figures do not come from administrative data. Further, Blanden averages fewer years of Canadian sons' earnings than do Corak, Lindquist, and Mazumder (2014).

Blanden (2005) also reports a lower IGC for adults raised in the former West Germany (0.25 to 0.28) than those in the US, though the German estimates use monthly earnings. Sons raised in West Germany have higher mobility than the US in Brenner (2007)—0.21 to 0.42 versus 0.41 to 0.52—but not in Dunn and Couch (2000), where the range is 0.33 to 0.40 for West Germany and 0.30 to 0.40 in the US.[84] Both of these studies use annual earnings. The latter study, however, measures father and son earnings in the same calendar years, so the fathers are unusually old when their earnings are observed.

Dunn and Couch (2000) report IGCs ranging from -0.07 to 0.57 in Great Britain. More recently, Nicoletti and Ermisch (2007) reported a range of 0.10 to 0.25 (using TSTSLS methods).[85]

Figure 10. Summary of Cross-National Differences in Absolute Male Earnings Mobility (Intergenerational Correlation)



Notes: Based on author's review of the literature. Bars indicate the point estimate or range of estimates that best characterize the male earnings IGC. Bars are shown as outlines when the research on a country is inconclusive or of potentially limited comparability. The US estimates are selected from studies that use the methodological decisions most typical of the research from other countries, rather than the best available US estimates. Often, these estimates are from studies that attempt to use harmonized methods and data to compare the US to its peers. The evidence on Germany typically involves West Germany specifically, and the research on the United Kingdom rarely includes Northern Ireland with Great Britain.

Jantti et al. (2006) provide estimates suggesting very high mobility in the Scandinavian countries: 0.14 for Norway, 0.14 for Sweden, 0.16 to 0.18 for Finland, and 0.09 for Denmark. These estimates are generally confirmed by other studies, including the Swedish figure from Corak, Lindquist, and Mazumder (2014).[86]

However, one Swedish study that averages more years of father income than any except for Corak, Lindquist, and Mazumder (2014) found an IGC of 0.29 for Sweden (Nybom and Stuhler, 2017). That study looked at fathers' and sons' individual income instead of just earnings, which could account for how much higher it is than the Corak, Lindquist, and Mazumder (2014) estimate. However, other studies that look both at earnings and income in Sweden find only slightly higher IGCs using income.[87] More relevant may be the fact that Nybom and Stuhler (2017) also average 39 years of sons' income, while Corak, Lindquist, and Mazumder (2014) average only 11 years.

Other American estimates generally range between 0.20 and 0.42.[88] Part One of this primer reported a preferred range of 0.38 to 0.51. It appears, then, that the US has a higher IGC than the Scandinavian nations, but otherwise, strong conclusions are unwarranted, particularly given how few studies average many years of both father and son earnings.

The IGCs estimated here are generally lower than the IGE estimates summarized above, but that may have to do with the small number of studies that use the most methodologically sophisticated approaches and with the greater attenuation bias in the IGCs. **Figure 10** summarizes the IGC evidence comparing fathers' and sons' earnings.

COMBINED PARENT INCOME VS. SON EARNINGS

The IGC literature comparing combined parent earnings or family income to sons' earnings primarily concerns Great Britain, Sweden, and Finland. The research on Britain almost exclusively relies on two studies, the National Child Development Study (NCDS), which followed members of the 1958 birth cohort, and the British Cohort Study (BCS), tracking children born in 1970. Blanden (2005) compared BCS estimates for Britain to mobility estimates for Canada, for children who grew up in West Germany, and for the US. The best figures she reported, which averaged five years of parent income and were comparable across three of the countries (excluding Britain), indicated the IGCs comparing parent income to son earnings were 0.18 in Canada, 0.15 to 0.20 in West Germany, and 0.35 to 0.39 in the US. The West German figures, however, used monthly parent income and son earnings.

Averaging two years of income, Blanden found that Britain and the US had similar mobility levels (0.27 versus 0.26 to 0.29). However, these estimates are based on annual income in the US but weekly income in Britain. Perhaps the most reliable conclusion from Blanden (2005) is that Canada may have a lower IGC than the US.[89]

Blanden has updated her British estimates in a series of papers over the past 12 years.[90] Her most recent IGC estimates are from Blanden et al. (2014), which look at men in the BCS when they are older than in her earliest papers. She and her coauthors report an IGC of 0.28, compared with 0.30 in the US (again, comparing estimates based on weekly income to those based on annual income). Comparing parent income to sons' individual income, she estimated an IGC of 0.24 in Britain and 0.33 in the US.

The only IGC estimate for Britain that is more recent comes from Bjorklund et al. (2017), who report a range from 0.24 to 0.26.[91] That compared with 0.15 to 0.18 for Sweden. However, Mood (2017) reports a range for Sweden from 0.23 to 0.27.[92] (Again, however, the British estimates are based on weekly income.)

Jantti et al. (2006) estimated IGCs comparing combined parent earnings to sons' earnings. They reported correlations of 0.12 for Sweden, 0.13 for Norway, and 0.19 for Finland. The Finnish estimate is close to the 0.20 estimated by Osterbacka (2001). Jantti et al. (2006) also report estimates for Britain and the US, comparing parent family income to sons' earnings—0.20 and 0.36, respectively. The authors try to assess the importance of using weekly income for the British data by looking at American sons' weekly earnings (dividing annual earnings by weeks worked), obtaining a correlation of 0.35. However, the parent income measure for the US was still annual.

In Part One of the primer, I report a preferred range for the US of 0.43 to 0.47. The Jantti et al. (2006), Blanden (2005), and Blanden et al. (2014) studies are the only other ones that provide a US estimate.

PARENT FAMILY INCOME VS. SON FAMILY INCOME

A single non-American study compares parent family income to sons' family income. Blanden et al. (2004) report IGCs for Britain of 0.12 (NCDS) and 0.26 (BCS).[93] Previous American estimates, reviewed in Part One, range from 0.30 to 0.43. My preferred estimates range from 0.45 to 0.55.

Daughters

Only one study compares father–daughter earnings IGCs across countries—Jantti et al. (2006). The Scandinavian IGCs are very small, nearly indicating no relationship at all between the earnings of fathers and daughters. In Norway, the estimate was 0.08 to 0.09, in Sweden, 0.10, in Finland, 0.07 to 0.09, and in Denmark, 0.05. The other available single-country studies also focus on Scandinavia, and are generally consistent with the Jantti et al. (2006) figures.[94] American estimates, reported in Part One of the primer, range widely from 0.02 to 0.42. My original preferred estimates in Part One range from 0.29 to 0.32.

Scandinavian IGCs also appear to be close to zero comparing mothers' and daughters' earnings. Osterberg (2000) finds a range between -0.04 and 0.05 for Sweden, and Osterbacka (2001) reports an IGC of 0.04 for Finland. Elsewhere, Dunn and Couch (2000) estimate the British IGC at -0.16 to 0.10, the West German IGC at 0.02 to 0.28, and the US correlation at 0.18 to 0.27. The study measures earnings over the same calendar years for both generations, however, so the mothers are observed when they are older than in most studies. Other American studies, reviewed in Part One of the primer, range from 0.01 to 0.28. My own estimates from Part One ranged from 0.35 to 0.42.

Jantti et al. (2006) compare combined parent earnings to daughter earnings and find IGCs of 0.09 in Norway and Sweden and 0.10 in Finland. They contrast these estimates to IGCs for the US comparing parent family income to daughter earnings (0.16) and for Britain comparing weekly parent family income to weekly daughter earnings (0.14). These estimates use only a year or two of earnings, however. Osterbacka (2001) puts the Finnish IGC at 0.16. Bjorklund, Jantti, and Nybom (2017) report a Swedish IGC comparing parent family income to daughter earnings ranging from 0.13 to 0.18. Mood (2017) puts it higher, at 0.27.[95]

Blanden et al. (2014) look at Britain and the US. They find similar IGCs comparing parent family income to daughter earnings (0.22 for Britain, and 0.24 for the US), but when they compare parent family income to daughter individual income, the US estimate rises to 0.44 while the British estimate increases only to 0.24.[96] In Part One of the primer, I report a range from 0.31 to 0.37 for the US comparing daughter earnings to parent family income.

Blanden and her colleagues (2004) estimated IGCs comparing parent and daughter family income. They reported an IGC of 0.14 to 0.22 for Britain. Breen, Mood, and Jonsson report an IGC of 0.15 for Sweden (but they don't log income). The preferred American family income IGCs reported in Part One of this primer ranged from 0.54 to 0.59.

Sons and Daughters Combined

A few studies combine sons and daughters and estimate IGCs. Osterbacka (2001) reports an IGC of 0.14 for Finland, comparing father earnings to child earnings. Landerso and Heckman (2016, 2017) compare combined parent earnings to child earnings. They find the IGC to be either 0.12 or 0.08 in Denmark, depending on whether or not low incomes are bottom-coded at $1,000, and either 0.21 or 0.26 in the US. They also compare parent family income to child individual income. Using post-transfer income (convention in the literature), Denmark's IGC is either 0.20 or 0.21, compared with 0.20 or 0.32 in the US. When they switch to pre-transfer (market) income, the IGCs are 0.25 or 0.20 in Denmark and 0.22 or 0.27 in the US. Finally, Jonsson, Mood, and Bihagen (2011) estimate an IGC for Sweden of 0.17 to 0.20. My preferred US estimates from Part One of this primer range from 0.51 to 0.52.

The Landerso and Heckman study challenges the idea that the US has higher income correlations than Scandinavia. More harmonized studies would be invaluable for assessing whether the finding recurs comparing the US to Denmark and to other countries.

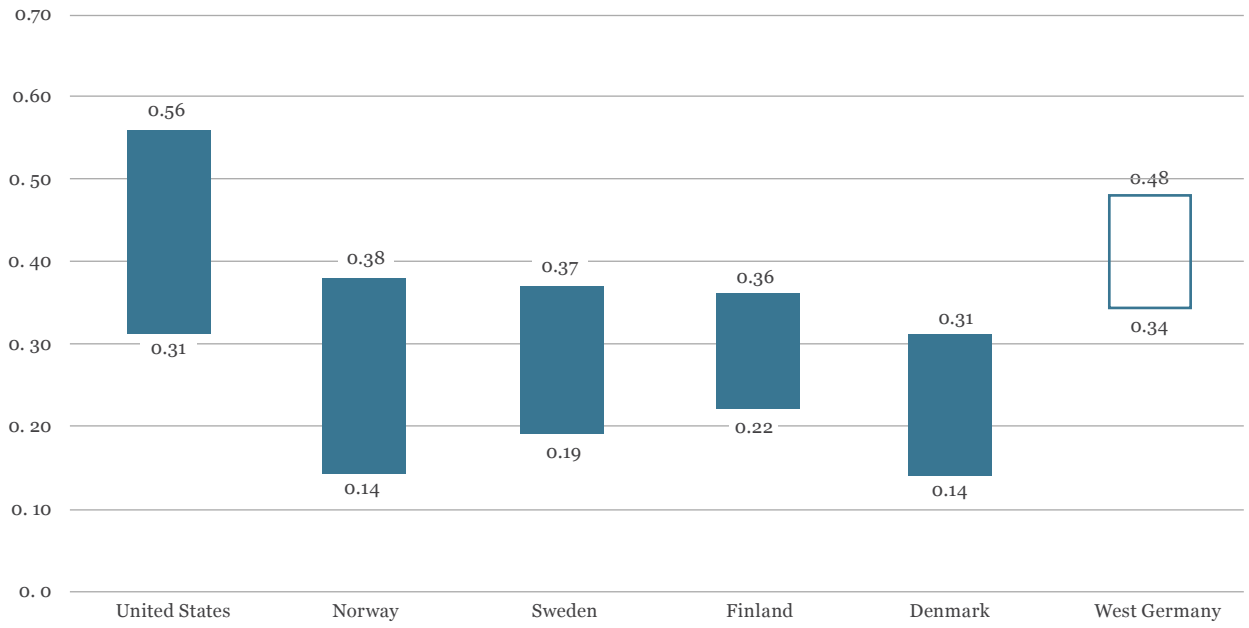
SUMMARY MEASURES OF SIBLING SIMILARITY IN TERMS OF ABSOLUTE INCOME—THE SIBLING CORRELATION

As discussed in Part One of this primer, the correlation between sibling incomes is a measure of intergenerational mobility in that it captures the extent to which the influences shared between siblings produce similar incomes for them in adulthood. It is only an indirect measure of the intergenerational association of incomes, because rather than compare parent and child incomes, it compares the incomes of two children raised by the same parents. The shared influence of parental income on sibling incomes is behind the sibling correlation. But so, too, is everything else that siblings have in common—genes, home and neighborhood environments, schools, intersecting peer groups, and a variety of other shared influences. In this way, the sibling correlation is a broader measure of the extent to which "family background" affects grown-child income (though family background factors not shared by siblings can also affect income, so the sibling correlation does not fully capture the effects of family background). A higher sibling correlation indicates that brothers' or sisters' incomes are more similar, meaning that family background is more important.

A disproportionate amount of sibling correlation research has been conducted comparing brothers. Two studies estimate brother earnings correlations across multiple countries, including the US. Bjorklund et al. (2002) report correlations of 0.39 to 0.56 for the US, compared with 0.14 to 0.19 for Norway, 0.23 to 0.28 for Sweden, 0.22 to 0.36 for Finland, and 0.14 to 0.31 for Denmark. Schnitzlein (2011, 2014) estimates an American correlation ranging from 0.45 to 0.50, a Danish correlation between 0.16 and 0.20, and a West German correlation between 0.34 and 0.43. The sparse literature on individual countries is largely consistent with these results.[97]

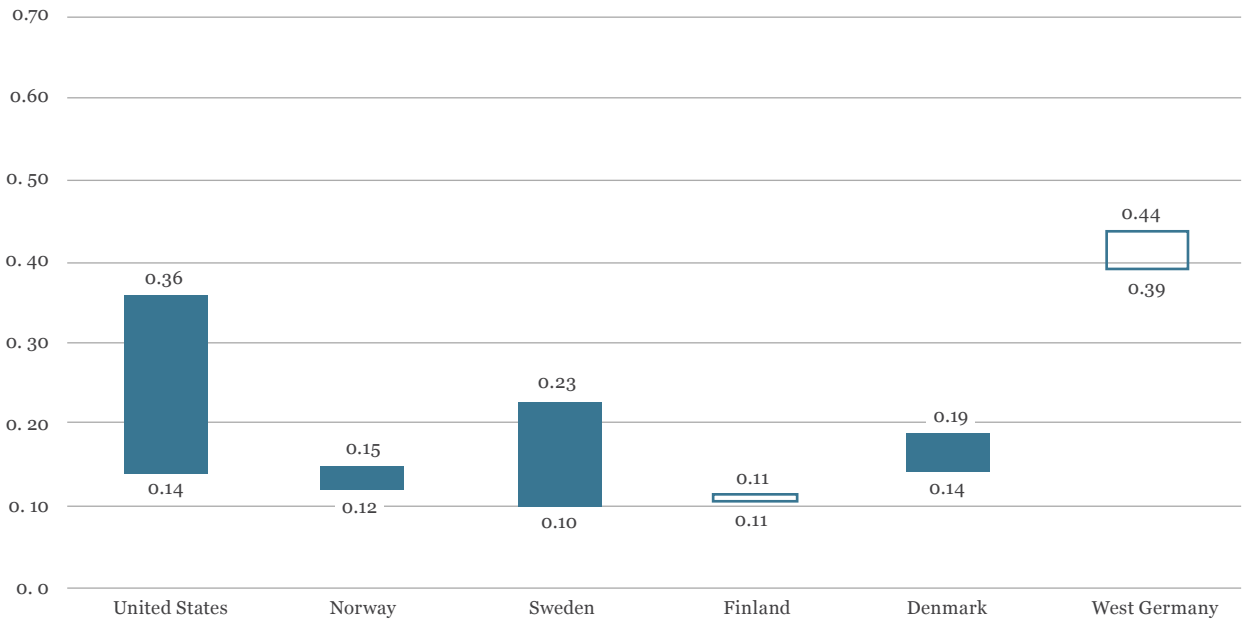
Schnitzlein (2014) also estimates sister earnings correlations. He finds that the US has a higher correlation than Denmark (0.22–0.29 versus 0.15–0.19) but a lower correlation than West Germany (0.39–0.40).[98]

Figure 11. Summary of Cross-National Differences in Brother Income Similarity (Sibling Correlation)



Notes: Based on author's review of the literature. Bars indicate the point estimate or range of estimates that best characterize the correlation between brother incomes. The literature on sibling correlations is sparser than the literatures on other mobility measures. The evidence on Germany typically involves West Germany specifically.

Figure 12. Summary of Cross-National Differences in Sister Income Similarity (Sibling Correlation)



Notes: Based on author's review of the literature. Bars indicate the point estimate or range of estimates that best characterize the correlation between sister incomes. The literature on sibling correlations is sparser than the literatures on other mobility measures. The evidence on Germany typically involves West Germany specifically.

Two studies report a sister earnings correlation of 0.11 for Finland (Bjorklund, Eriksson, Jantti, Raaum, and Osterbacka, 2004 and Osterbacka, 2001). Bjorklund et al. (2004) also report correlations for Norway (0.12) and Sweden (0.15).[99]

As reviewed in the appendix to Part One of this primer, other American estimates in studies since 2000 range from 0.31 to 0.51 for brother earnings correlations and from 0.14 to 0.36 for sister correlations. My preferred estimates produced for Part One ranged from 0.27 to 0.45 for brothers and from 0.22 to 0.46 for sisters. The evidence, then, suggests that sibling correlations are higher in the US than in our peer nations, but there is considerable overlap across countries in the generally wide-ranging estimates within countries.[100] **Figures 11 and 12** summarize the literature on brother and sister correlations, respectively.

4. Other Evidence on Cross-National Mobility Differences

While this report cannot offer a complete treatment of the research on cross-national comparisons of other dimensions of intergenerational mobility, before concluding, it is worth a brief discussion of this literature.

A number of researchers have compared educational mobility across countries. This literature does not consistently show the United States as having especially low mobility. One the one hand, Naranyan et al. (2018) find that the US ranks 17th to 21st (out of 23 peer nations) on five different absolute mobility measures.[101] Hertz et al. (2007) found that in cohorts from the late 1960s and early 1970s, the US had relatively low absolute educational mobility compared with 12 other European and Anglosphere countries, in that the pattern of individual absolute mobility tended to reduce the educational inequality between the children of high- and low-educated parents by less in the US.[102]

On the other hand, Chevalier, Denny, and McMahon (2003) found the US to be above average in terms of absolute mobility (intergenerational transitions across educational categories). Among 26- to 35-year-olds, de Broucker and Underwood (1998) reported that, relative to other countries, the US has high upward absolute mobility among children with low-educated parents and low downward absolute mobility among children with highly educated parents. That is, high educational attainment is more likely in the US among disadvantaged *and* advantaged children than in other countries. That results in adult children having relatively similar educational inequality levels as their parents had.

Turning to relative educational mobility, several studies find the US a laggard. Most recently, Narayan et al. (2018) found the US ranked 15th to 22nd (out of 23 peer nations) on four measures of mobility.[103] The OECD (2014) examined the relative odds that children of low-educated parents will be in post-secondary education vs. children of highly educated parents. The study found that the US had lower relative odds (less mobility) than all of its peer countries except Italy. Chevalier, Denny, and McMahon (2003) found the US to be worse than every country but Canada on the same type of measure. In a later version of the paper (Chevalier, Denny, and McMahon, 2009), the US had less relative mobility than every country but Germany and Italy in terms of the rank association between fathers' and children's educational attainment (Canada being excluded from the later paper).

However, American relative mobility was in the middle of the pack using the measure in the original Chevalier et al. paper (but a different model). Similarly, Pfeffer (2008) ranked the US behind Finland, Northern Ireland, New Zealand, Denmark, and Great Britain in relative educational mobility, but ahead of Canada, Sweden, Ireland, Italy, Norway, Switzerland, Belgium, and Germany.[104] And de Broucker and Underwood (1998) found that the US is in the middle in terms of the gap between children of high- and low-educated parents in the likelihood of obtaining a post-secondary education. Relative mobility was higher in the US than in Australia, New Zealand, Sweden, Canada, and Belgium, lower than in Switzerland, Ireland, and the Netherlands, and roughly the same as in the UK.

Nor is the US obviously low in terms of occupational mobility. Jonsson et al. (2011) found that occupational mobility between job classes, holding the distribution of parent and child occupations constant across countries, was higher or no lower in the US than in Germany, Sweden, or Japan. Similarly, Erikson and Goldthorpe (1992) concluded that the US is a high-mobility country compared with its European peers.[105] In another study, compared with nine European countries, the US had higher "occupational status" mobility than all but Finland.[106] Breen, Mood, and Jonsson (2016) suggest the consensus is that Germany, Italy, and Ireland are low-mobility nations (with low "social fluidity," holding constant the distribution of occupations across countries); Sweden, Israel, and the Netherlands high-mobility ones; and that the US lies in or near the high-mobility group.

Other research characterizes American occupational mobility as being more in the center of the pack. Breen and Jonsson (2005) characterize American occupational mobility as lying between the low-mobility pole represented by Germany, France, and Italy and the high-mobility pole of Scandinavia.[107] Curtis (2015) reports that Americans are less likely to have the same occupational class as their father than adults in Canada, Denmark, Belgium, Germany, Spain, Switzerland, Japan, Korea, and Taiwan but more likely than adults in Norway, Sweden, Finland, Australia, and New Zealand. Even these studies, however, contradict the claim that American intergenerational mobility levels are especially low.

A variety of other studies have considered cross-national differences in the relationship between parental education or income and a variety of outcomes, including test scores.[108] These tend to find that disadvantaged children in the US have worse outcomes than advantaged children and that this difference is large relative to its peer nations. These studies are also subject to many of the same concerns that plague the intergenerational income mobility literature—inconsistencies between methods and data sources across countries, and an absence of panel data that follows children into adulthood.

5. Conclusion

The importance of accurately assessing levels of intergenerational mobility for purposes of developing better public policies can hardly be exaggerated. There are three separate issues at play. First, it is important to be clear about what it is that should be measured. That means distinguishing between intergenerational mobility and intragenerational mobility, and between economic mobility and educational or occupational mobility. And it means being specific about whether one is concerned about absolute mobility or relative mobility. Focusing on earnings, the US is not an outlier in terms of relative mobility, even if absolute mobility patterns tend to reduce childhood inequalities less here than in other countries (as indicated by IGEs).

This is an important distinction, because commentators and researchers often claim to be concerned about relative mobility—transcending initial position or rank—even as they point to IGEs, which summarize absolute mobility patterns. IGEs look higher, and so "mobility" lower, when grown children have more contemporary inequality versus the cross-sectional inequality their parents experienced. But the fact that the income gap between the upper middle class and the poor has grown says nothing about whether it has become harder for a poor child to become an upper-middle-class adult.

One illustration of this point is a finding from Bjorklund et al. (2006a). Using a simple model of the relationships between paternal educational attainment and earnings, sons' educational attainment and earnings, and fathers' and sons' earnings, they find that the US and Sweden would have roughly the same IGE if they had the same returns to education. Because the returns to education are greater in the US—and increased more between generations—the IGE is higher. This higher IGE reflects changing cross-sectional earnings inequality, not a lower ability to move from bottom to top.

This point is crucially important for assessing what is the most heralded study of cross-national mobility differences—Alan Krueger's Great Gatsby Curve (Krueger, 2012). Krueger plotted the cross-sectional disposable household income inequality levels of ten countries against those countries' male earnings IGEs. The "curve" is just the best-fitting straight line between these ten points. The Great Gatsby Curve indicates that countries with more inequality have higher IGEs. But the Bjorklund et al. (2006a) paper—on which Krueger was a coauthor—reminds us that the IGE is partly a measure of inequality (or of change in inequality). Hold constant the returns to education—which can be thought of as the degree of cross-sectional inequality a country is prepared to accept—and the Great Gatsby Curve would be flatter.[109]

Clarity about measurement also means distinguishing between earnings mobility and family income mobility. The US has rates of relative father–son and father–daughter earnings mobility similar to other countries. However, it appears to compare poorly in terms of relative family income mobility. Why might this be? As discussed above, it may be that differences in parental marital status between the US and other countries that do not affect the relationship between father earnings and child outcomes do affect the relationship between parental family income and child outcomes.

For instance, Chetty et al. (2014) reported that the family income IRA in the US fell from 0.34 to 0.29 when the sample was restricted to married parents. (Intriguingly, when Bratberg et al., 2017, restricted their sample to married *children*, the family income IRA rose in Norway, was unchanged in West German, and fell in the US.) However, since it appears that parental family income is also more strongly related to grown-child *earnings* in the US, its impact on grown-child marital status cannot be anything like the whole story.

It is also important to be clear about the distinction between absolute mobility, relative mobility, and "opportunity." In Section Four of Part One of this primer, I argue that relative mobility measures accord better with most conceptions of opportunity than do absolute mobility measures (including the IGE). (Relative mobility measures also have practical advantages over absolute mobility measures, as discussed in that section.)

In addition to clarity over what to measure, a second issue in assessing cross-national differences in intergenerational mobility involves the technical details of how well-measured some mobility concept is in some country. This review has highlighted the importance of addressing attrition and lifecycle biases by averaging multiple years of income and assessing income when it

best reflects lifetime resources. It also has questioned the reliability of mobility estimates that do not derive from panel data following adolescents into adulthood.

Assessing differences in mobility across countries involves a third issue—the importance of analyzing comparable estimates. Not only can data quality differ between countries, but different studies of single nations may use incomparable methodological choices. Different income concepts can also weaken cross-country comparisons. Social insurance benefits tied to employment may be included as "earnings" in some countries but not others. Self-employment income may be treated differently, either as earnings, as capital income, or as a mix of both. The treatment of public transfers in family income may differ between countries.

Finally, apart from the accuracy of cross-national comparisons of intergenerational mobility, it is also necessary to keep in mind that other economic and social outcomes compete for priority with mobility. In Winship (2017b), men in the US and in its wealthy peer nations perceived less upward absolute mobility than men in developing countries like Bangladesh. These perceptions may or may not be accurate—it would be unsurprising if they were, however, given the path economic development tends to take—but the pattern highlights the point that higher absolute upward mobility is not obviously preferable to high living standards. It may not be better to be richer than one's parents versus being poorer than one's parents but rich. In the US, studies routinely find that children who grow up poor are more likely to exceed parents' incomes than children who grow up rich, but one suspects that most children who grow up rich struggle a lot less than most of those upwardly mobile poor children, even if they have not done better than their parents.

The evidence indicates the US holds its own when it comes to relative earnings mobility, whether looking at sons or daughters. It also tells us that when parental family income is the basis for assessing mobility, relative mobility looks lower in the US than elsewhere. And, reflecting the higher levels and growth of inequality in the US, absolute inequalities between children tend to diminish less in the US by adulthood than they do in other countries, whether looking at earnings or family income. As the relative mobility literature continues to grow more sophisticated, it would not be surprising to see more studies using parental income that find smaller cross-national differences, following the trajectory of the relative earnings mobility research. And even research estimating IGEs is likely to continue finding higher elasticities than the less-methodologically sound studies of the past, as has happened in the US as methods have improved.

Another way to assess the acceptability of contemporary American intergenerational mobility levels is to determine whether mobility in the US is higher or lower today than in previous generations. Part Three of this primer will turn to this question, which is fraught with many of the same methodological and data issues encountered in the cross-national literature.

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APPENDIX ONE: NOTES ON TWO-SAMPLE TWO-STAGE LEAST SQUARES

The insight behind two-sample two-stage least squares (TSTSLS) strategies is that father socioeconomic status affects father earnings, and through that effect, father earnings are associated with the earnings of children. It is that specific chain of correlations that a TSTSLS estimate of the IGE is supposed to reflect.

But paternal socioeconomic status can also affect child earnings in other ways that have nothing to do with fathers' own earnings—through their social networks, for instance, or through wealth transfers. When socioeconomic status is used to predict father earnings, and then child earnings are regressed on these predicted earnings, the IGE will reflect *all* of the ways in which paternal status is associated with child earnings (not just the ways that go through fathers' earnings). Because the association between paternal status and child earnings through father earnings is likely to be in the same direction (positive) as the association between paternal status and child earnings *conditional* on father earnings, the TSTSLS estimate of the IGE will tend to be biased upwards, indicating too little mobility.

For example, comparing observed father and son earnings in the US, Jerrim, Choi, and Simancas (2016) estimated a male earnings IGE of 0.57 using the Panel Study of Income Dynamics (PSID). They then produced an auxiliary dataset by repeatedly randomly drawing men from their PSID sample to get a "secondary" dataset of 500,000. They conducted TSTSLS analyses with five different sets of predictors of paternal earnings, obtaining IGE estimates ranging from 0.64 to 0.77. All of these estimates used measures of paternal earnings that averaged at least 15 years of observations, so it is notable that the TSTSLS estimates were still at least 15 percent higher than the initial IGE the researchers obtained.

If this issue were the only problem with TSTSLS analyses, then we could take TSTSLS estimates of the IGE as upper bounds, consistent with the claims of many researchers. However, Jerrim and his coauthors point out other issues with TSTSLS analyses that can bias IGE estimates downward. Most importantly, what is often predicted from socioeconomic status is a single year of paternal earnings rather than lifetime earnings. When Jerrim and his coauthors used a single year of earnings in the model predicting father earnings from father status (rather than earnings averaged over multiple years), three of the resulting IGEs were higher than 0.57 but two were lower. (The lowest was 0.41.)

In addition, the sample used to estimate the relationship between father status and father earnings usually represents a different population than the fathers of the grown children under study. Rather than looking at fathers who are in the same age range as the fathers of the children under study (and who are observed in the years when children were living at home), researchers often estimate the relationship between status and earnings by looking at men who are not necessarily fathers nor in the right age range. And if they are in the right age range, it might not be at the time when observed sons were growing up. In that case, lifecycle bias is still potentially a problem.

For example, when there is no secondary dataset available, the relationship between the status and earnings of grown children is assumed to be the same as the relationship between paternal status and paternal earnings, and paternal earnings are predicted from son-reported paternal status. However, non-fathers are typically included and sometimes men in the wrong age range. More to the point, the grown children are necessarily from more recent birth cohorts than their unobserved fathers. The discrepancy between the appropriate pop-

ulation and the population represented when predicting earnings from status can bias TSTSLS estimates of the IGE upward or downward.

Another problem when no secondary dataset is present is that the measure of paternal status is usually child-reported paternal status, so the relationship between child-reported paternal status and the paternal earnings fathers would report must be assumed to be the same as both (1) the relationship between child status and earnings (both reported by children themselves) and (2) the true relationship between father status and earnings (both reported by fathers).

Even when there is a second dataset from which to obtain an estimate of the relationship between status and earnings, if men's earnings are predicted from self-reported status, then it may not be appropriate to assume this relationship is the same as that between *child-reported* paternal status and father-reported earnings. Jerrim et al. tried estimating IGEs by applying the relationship between "father" status and "father" earnings in the secondary dataset they created to sons' actual reports of father status in the PSID. The resulting IGEs were even more overstated than before, when the "father" status-earnings relationship was used with "father-reported" status to estimate father earnings. However, when the authors predicted a *single* year of earnings from "father-reported" status, rather than a multiyear average, and then applied that relationship to son-reported paternal status to get father earnings, the resulting IGE was 0.35—lower than the 0.41 obtained when the relationship was applied to "father" reports of their own status.

Notably, intergenerational correlations (IGCs) appear somewhat less sensitive to the methodological challenges of TSTSLS analysis, and TSTSLS estimates of IGCs are biased downward. In Jerrim et al., the IGC from actual father and son earnings (each averaged over 15 years or more) was 0.32. The IGCs estimated using TSTSLS ranged from 0.18 to 0.31. Unfortunately, TSTSLS studies do not typically report IGCs.

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END NOTES

[1] Four of them—Macao, Luxembourg, Brunei Darussalam, and San Marino—have fewer than one million people each. Three of the eight remaining are Arab oil-fueled monarchies (Qatar, Kuwait, and United Arab Emirates). The remaining five are Singapore, Norway, Ireland, Switzerland, and Hong Kong. GDP per capita and population estimates are from 2016 and come from the World Bank DataBank, World Development Indicators (http://databank.worldbank.org/data/home.aspx). The available estimates for 2017 indicate the US had higher GDP per worker than United Arab Emirates, Switzerland, and Hong Kong.

[2] For Gini coefficients based on disposable household income, see estimates from the LIS Cross-National Data Center (http://www.lisdatacenter.org/wp-content/uploads/files/access-key-workbook.xlsx). For estimates of the top one percent's share of pre-tax and -transfer income, see Winship (2014), Figure 6, which displays comparable figures from the World Wealth & Income Database (http://wid.world).

[3] In 2004, when comparable estimates from the Luxembourg Income Study were available for the greatest number of countries, only tiny Luxembourg had a higher median. Granting the imprecision in comparing income figures across countries, the US lies within a stratum including Switzerland, Austria, Norway, Denmark, and Canada. See Winship (2014), Figure 4.

[4] Chetty (2016).

[5] Friedman (2016).

[6] Frum (2011).

[7] Winship (2014), Figure 5.

[8] For earlier reviews of the literature, see Bjorklund and Jantti (2000), Solon (2002), Corak (2006), d'Addio (2007), Bjorklund and Jantti (2011), Black and Devereux (2011), Corak (2016), Blanden (2013), and Jantti and Jenkins (2015). The current paper would have been incalculably more difficult absent these reviews. As in Part One of this primer, I ignore the literature on intra-generational mobility, which affects measured intergenerational mobility but is secondary from the perspective of equality of opportunity.

[9] See Schneider (2013).

[10] Fishback (2010).

[11] Hertz (2007).

[12] These countries include a number analyzed by Andrews and Leigh (2008, 2009), including Spain, Cyprus, Czech Republic, Slovakia, Hungary, Latvia, Poland, Russia, New Zealand, and Chile; five analyzed by Grawe (2004a) (Malaysia, Nepal, Pakistan, Ecuador, and Peru); and many analyzed by Narayan et al. (2018) (Albania, Austria, Belarus, Belgium, Benin, Bolivia, Bosnia and Herzegovina, Columbia, Czech Republic, Democratic Republic of Congo, Croatia, Ecuador, Arab Republic of Egypt, France, Ghana, Greece, Guatemala, Guinea, Ireland, Jordan, Kazakhstan, Kenya, Kyrgyz Republic, Latvia, Luxembourg, Macedonia, Madagascar, Malawi, Mali, Mongolia, Morocco, Netherlands, Nigeria, Panama, Portugal, Romania, Rwanda, Slovak Republic, Slovenia, Spain, Sri Lanka, Switzerland, Tanzania, Timor-Leste, Tunisia, Uganda, and Uzbekistan).

They also include Cyprus (Christofides, Kourtellos, Theologou, and Vrachimiset, 2009), Japan (Lefranc, Ojima, and Yoshida, 2008, 2014; Ueda, 2009, 2013a; Ueda, 2015), South Korea (Ueda, 2013a, 2013b; Kim, 2017), Vietnam (Dang, 2015, 2016; Doan and Nguyen, 2016; Lam and Cuong, 2017), Taiwan (Chu and Lin, 2016; Kan, Li, and Wang, 2015; Sun and Ueda, 2015), Singapore (Ng, 2007, 2012; Ng, Shen, and Ho, 2009), China (Gong, Leigh, and Meng 2012; Yuan, 2017; Fan, 2016), India (Hnatkovska et al., 2013), Ethiopia (Haile, 2016), South Africa (Hertz, 2001; Piraino, 2015; Finn, Leibbrandt, and Ranchhod, 2017), Mexico (Torche, 2010), Brazil (Dunn, 2004, 2007; Ferreira and Veloso, 2006; Pero and Szerman, 2008; Ribeiro, 2017), and Argentina (Jimenez and Jimenez, 2009).

Estimates for France may also be found in Lefranc (2018); Lefranc and Trannoy (2003, 2005); Lefranc, Ojima, and Yoshida (2008, 2010) Lefranc, Pistolesi, and Trannoy (2009); and Lefranc (2011). For additional Swiss estimates, see Bauer (2006). Spain estimates are also available from Sanchez Hugalde (2004) and Cervini-Pla

(2015). Gibbons (2010) also studies New Zealand, but only adults born in Dunedin, the country's fourth largest city. Lillard and Kilburn (1995) also analyze Malaysia, using retrospective reports of lifetime earnings rather than TSTSLS strategies. Chile estimates are also available from Nunez and Miranda (2010) and Sapelli (2011). Javed and Irfan (2012) also provide an estimate for Pakistan.

Narayan et al. (2018) also provide estimates for Denmark, Finland, Germany, Italy, the United Kingdom, and the US. Comi (2004) covers a number of countries but looking at very young adults. They include Denmark, Germany, the United Kingdom, Austria, Italy, Spain, France, Greece, Portugal, Ireland, Belgium, and the Netherlands.

[13] Rather than looking at annual or weekly earnings, Leigh (2007) examined transition matrices in terms of hourly wages for Australia. He reported that 27 percent of sons starting in the bottom fifth of father hourly wages remained there, and 28 percent experience immobility at the top. These estimates rely on father wages imputed through TSTSLS techniques and should therefore be considered less reliable than estimates that do not depend on imputations. There are no comparable US estimates against which the Leigh results may be compared.

[14] Excluding fathers or sons with no earnings, the rates were 35 percent in Norway and Finland, 36 percent in Denmark, and 37 percent in Sweden. Excluding zeroes and using two-year averages of father earnings, in Norway, Sweden, and Finland the shares starting at the bottom who stayed there were 29, 27, and 28 percent, and the shares starting at the top who stayed there were 36, 37, and 35 percent.

[15] The Pew study used the Panel Study of Income Dynamics (PSID) and five-year averages of father and son earnings. Dahl and DeLeire relied on the same data as Mazumder (2005a)—Social Security Administration records linked to the 1984 Survey of Income and Program Participation—but averaged 36 years of father earnings.

[16] However, the "intergenerational rank association"—a summary measure of relative mobility—was similar in the two papers (and similar to the Corak, Lindquist, and Mazumder associations for Canada and Sweden).

Fertig (2003) includes quintile-based transition matrix estimates of father-son earnings mobility that show lower mobility than in Corak, Lindquist, and Mazumder, but it relies on ordered probit modeling rather than descriptive results, and we lack equivalent estimates for Canada and Sweden. The Fertig results for women are implausible—suggesting that nearly all daughters starting in the bottom or top fifth end up somewhere else. This leads me to further discount her results for men.

[17] Corak and Heisz (1999) found that in Canada, 33 percent of sons raised in the bottom fourth of father earnings remained in the bottom fourth as adults, while 35 percent raised in the top remained there. Bingley, Corak, and Westergard-Nielsen (2012) report estimates of 35 and 37 percent, as do Corak and Piraino (2016). These estimates indicate slightly more mobility than in Corak, Lindquist, and Mazumder (2014), where the corresponding quartile-based figures are 36 percent and 38 percent. But the Corak and Heisz, Bingley et al., and Corak and Piraino results should be considered less comparable to Swedish and American estimates than the set of estimates in Corak, Lindquist, and Mazumder. The estimates from Fortin and Lefebvre (1998)—26 to 29 percent in the bottom fourth remaining there, and 32 to 33 percent at the top—are that much less comparable, as they are derived from TSTSLS techniques.

Bjorklund, Roine, and Waldenstrom (2012) report that of Swedish men starting in the bottom fourth of earnings, 33 percent remained there in adulthood, while 44 percent starting in the top fourth remained there. The figures were the same using market income. In Corak, Lindquist, and Mazumder (2014) the corresponding figures (for earnings) were 35–37 percent and 42–44 percent.

The Canadian and Swedish estimates in Corak, Lindquist, and Mazumder that are from decile-based transition matrices indicate less mobility than those in Corak and Heisz (1996, 1999) for Canada and in Osterberg (2000) for Sweden, though the relative immobility rates in those studies yield the same conclusion about how Canada ranks against Sweden. The Osterberg estimates average only three years of father earnings. And it should be emphasized that these studies are not harmonized to any US estimates.

[18] Nybom and Stuhler (2017) report that the share of bottom-fifth sons who end up in the top fifth was 10 percent for Sweden—the same as the US share reported by Dahl and DeLeire (2008). However, the Nybom and Stuhler paper looks at total individual father and son income rather than just earnings. The Pew Charitable Trusts

(2012) study reports a lower share for the US—4 percent—but its methods are less comparable to the Nybom and Stuhler (2017) paper than are those of Dahl and DeLeire (2008).

Pekkarinen et al. (2017) report that in Norway 26–29 percent of sons starting in the bottom fifth of earnings remain there (versus 28 percent in Jantti et al.), while 31–34 percent who start in the top remain in the top (versus 35 percent). These estimates are similar to the Norwegian ones in Jantti et al. (2006)—28 and 35 percent. (In a master's thesis, Schnelle (2015) finds idiosyncratic values—10–14 percent and 49–52 percent. These seem likely to be wrong. Rieck (2008) includes transition matrices for Norway, but separately for intact and various types of disrupted families.)

The US figures from Corak, Lindquist, and Mazumder (2014) are 32 and 38 percent; the corresponding ones from Dahl and DeLeire (2008) are 29 and 41 percent. It might appear that Norway, then, has somewhat higher mobility than in the US, at least in terms of downward mobility from the top. However, the Pekkarinen et al. (2017) estimates come from analyses in which fathers' earnings are averaged late in their career. Other analyses in the paper, using the intergenerational rank association, indicate that Norwegian mobility would be lower if the transition matrices relied on earnings averages earlier in fathers' careers.

The American estimates based on quartiles indicate somewhat less mobility than the estimate for Norway in Bratberg et al. (2005), where 34 percent of sons starting in the bottom fourth remain there in adulthood and 38 percent of sons starting in the top fourth remain there. That Norwegian estimate also indicates more mobility than the estimate for Norway in Jantti et al. (2006). Again, absent careful harmonization of methods and data, comparing estimates across studies is less warranted than comparing estimates for countries within a study. Since the US and Swedish estimates in Corak, Lindquist, and Mazumder appear similar, and the Norwegian and Swedish estimates in Jantti et al. (2006) do, the best conclusion as to the US–Norway comparison is that the two have very similar relative mobility rates.

The conclusion that American mobility is similar to Scandinavia's is reinforced by the fact that "earnings" in Norway and Sweden include taxable benefits such as unemployment insurance and sick leave that are tied to work, which presumably attenuate the correlation between fathers' and sons' annual earnings.

[19] Landerso and Heckman also provided estimates comparing the gross income excluding transfers of fathers and sons. The upward immobility and downward immobility figures are 32 percent and 36 percent. Bingley et al. (2012) report immobility within the bottom and top quartiles of 30 and 38 percent in Denmark. As noted above, the best corresponding estimates for the US are 36 to 38 percent for upward immobility and 43 to 44 for downward immobility. But the Denmark estimates only average five years of father earnings, and they assess sons' earnings at a relatively young age (30).

[20] Cavaglia (2016) uses TSTSLS techniques and ordered logit modeling and finds that Germany (including East Germans who studied in West Germany) and the US have similar upward immobility out of the bottom fifth (31 percent and 30 percent, respectively, remaining there), but that Germany has less immobility out of the top fifth (27 percent versus 39 percent). These estimates should be discounted relative to the Schnitzlein ones, given that they model parental income rather than using observed parental income.

[21] Using the NCDS, Jantti et al. (2006) reported that 30 percent of sons raised in the bottom fifth of weekly father earnings remained there as adults, and the same share of sons raised in the top fifth were immobile. Dearden, Machin, and Reed (1997), using the same dataset, found that 34 percent of sons raised in the bottom fourth were immobile, as were 52 percent of sons raised in the top fourth.

[22] An early study, Zimmerman (1992) reported quartile-based transition matrices for annual earnings and for hourly wages in the US. It found upward immobility from the bottom was roughly 25 percent lower and that downward immobility from the top was roughly 25 percent higher when hourly wages were considered rather than annual earnings.

[23] The NCDS parental income question places respondents in one of 12 ranges of incomes rather than asking for a specific amount. It also asks for only three types of parental income (father earnings, mother earnings, and other household income), so the analyst must somehow combine three income ranges to obtain a measure of parental household income. Further, for the three income categories, the NCDS asks not about annual parental income before taxes, but "usual" weekly or monthly income after taxes. The NCDS also records "usual" take home or gross pay for grown children currently in a job, which may be reported on a weekly, biweekly, monthly,

or annual basis. It records the amount of the last payment for other types of income that the respondent or a partner or spouse was currently receiving. Parental income is available in the NCDS only at age 16, so it is impossible to average multiple years of income.

A second dataset, the British Cohort Study (BCS), also records parental income in terms of categories (seven of them when measured at age 10, 11 when measured at age 16). It includes estimates of weekly household income before taxes and other deductions (not annual income) at age 10 and of either weekly or annual income of parents (not total household income) at age 16. Father earnings are unavailable. The BCS records take home or gross pay for grown children currently in a job, which may be reported on a weekly, biweekly, monthly, or annual basis. It records the amount of the last payment for other types of income that the respondent or a partner or spouse was currently receiving. Parental income is available only at ages 10 and 16, so it is impossible to average more than two years of income.

Both the NCDS and the BCS suffer from substantial attrition. According to Blanden, Gregg, and Macmillan (2013), just 23 percent of sons in the NCDS have parental income at age 16 and earnings at age 33, and just 21 percent of sons in the BCS have parental income at age 16 and earnings at age 30. Furthermore, both suffer from poorly measured self-employment income.

The dataset with the most recent cohorts is the British Household Panel Survey (BHPS), which was merged into the Understanding Society Survey, includes data from 1991 to 2010, so if a son was living at home in 1991 at age 17, he will only be 36 in 2010, and if a son was seven years old in 1991, he will only be 26 in 2010. Thus, grown children are not really old enough to estimate mobility in terms of lifetime income. The BHPS asks about usual pay of those currently in a job, which may be reported on a weekly, biweekly, monthly, or annual basis. Annual pay is imputed based on the responses to the current earnings questions in the survey and in the previous wave, monthly employment information, and other sources. The BHPS asks about annual self-employment income.

[24] It is worth noting, however, that the American men appear to be older than the Canadian men in the Blanden dissertation. While Canadian sons' earnings are measured when they are 28 to 31 years old, it looks like the age range is something like 30–46 for Americans. The description of the expanded American sample used by Blanden is ambiguous, but it suggests that their earnings were measured in 1998 or 2000, and she reports they were born between 1954 and 1970.

[25] Blanden updated her British results several times in the ensuing years; they remained consistent with those in her dissertation. Blanden and Machin (2007) and Blanden and Machin (2008) found that in the BCS, rates of upward and downward immobility from the bottom and top quartiles were 37 percent and 45 percent (when sons were three years older than in the earlier study). Blanden and Machin also included estimates from the NCDS. The NCDS data compares the usual weekly household income of parents to weekly child earnings. It indicated more mobility for a cohort born 12 years before the BCS cohort, with 30 percent and 35 percent of sons being upwardly immobile and downwardly immobile, respectively.

These results also updated those in Blanden et al. (2004) and in Blanden, Gregg, and Macmillan (2007). Blanden et al. (2004) found upward and downward immobility rates of 39 and 42 percent in the BCS and 31 and 34 percent in the NCDS. Blanden, Gregg, and Macmillan (2007) reported rates of 37–38 percent and 40–42 percent in the BCS, versus 31 and 35 percent in the NCDS. Sons' earnings were assessed at age 30 in the BCS in the three earlier papers, while in the 2008 paper they were assessed at 34.

Later, in Blanden, Gregg, and Macmillan (2013), she reported quintile-based transition matrix results, finding upward immobility of 34 percent in the BCS and downward immobility of 37 percent, while the corresponding figures for the NCDS were 27 percent and 30 percent. Once again, we lack comparable estimates of weekly income mobility for the US.

[26] In Jantti et al. (2006), for example, the quintile-based rates of upward and downward immobility in the US were 40-42 percent and 36 percent. But when the Jantti team switched to using sons' weekly earnings, the rates fell to 36 and 32 percent. Those were close to the rates of 30 percent for both upward and downward immobility they reported for Great Britain, using a second British survey, the National Child Development Survey (NCDS). (The US estimates still relied on annual parental income.) The other idiosyncrasies of the British data, detailed in end note 23, also suggest caution in drawing strong conclusions.

[27] Note, however, that parental family income is different from combined parental earnings, in that it includes

earnings from other household members and household income from capital ownership, transfer payments, and retirement savings. (Some social insurance benefits are included in "earnings" in Norway and Sweden.)

[28] The Jantti et al. results for Norway are consistent with a subsequent study by Hansen (2010). She found upward and downward immobility rates of 29 and 34 percent when comparing sons' earnings to combined parental earnings. Sirnio (2016) finds that 21 percent of Finnish sons starting in the bottom fifth of parental income remain in the bottom fifth of individual income, while 48 percent of sons starting in the top fifth are immobile in adulthood. Sirnio, Kauppinen, and Martikainen (2017) and Sirnio (2016) include decile-based transition matrices for Finland. Those studies report that 11 to 15 percent of Finnish sons who start in the bottom tenth remain there, and that 32 to 37 percent of Finnish sons starting in the top tenth remain immobile. Mazumder (2005b) estimates US figures of 22 and 26 percent looking at male earnings, and in the appendix tables of Chetty et al. (2014), the American estimates are 20 and 26 using family income. However, Hertz (2005) reports estimates of 32–37 and 27–30 looking at family incomes. These all suggest lower upward mobility in the US but higher downward mobility than in Sweden and Finland, though we lack US estimates comparing parental family income to sons' earnings.

[29] The Chetty estimates come from Online Data Table 1 and are averages across ten parental centiles of the share in the bottom or top ten child centiles.

[30] From his online Appendix Table 6.

[31] See Auten, Gee, and Turner (2013); Chetty et al. (2014); Mazumder (2008); Hertz (2006); Isaacs, Sawhill, and Haskins (2008); Pew Charitable Trusts (2012); Bengali and Daly (2013); Eberharter (2014); Acs, Elliott, and Kalish (2016). Appendix Two of Winship (2017a) summarizes this literature.

[32] The Norwegian estimates are in line with Hansen (2010), who reports upward and downward immobility rates (comparing combined parent earnings and daughter earnings) of 25 percent and 33 percent. Sirnio (2016) reports estimates for Finland (comparing parent household income to daughter individual income) of 35 and 20 percent. Sirnio, Kauppinen, and Martikainen (2017) and Sirnio (2016) report Finnish estimates for immobility out of the bottom and top deciles of 16 to 22 percent and 10 to 14 percent (comparing parental income to daughter income).

[33] Other studies of father–daughter earnings mobility across quantiles include Bratberg et al. (2005) and Osterberg (2000). Bratberg et al. report that 29 percent of Norwegian daughters with fathers in the bottom fourth end up in the bottom fourth, while 36 percent with fathers in the top fourth remain there. These are similar to the American estimates reported by Peters (1992)—31 and 32 percent. Osterberg finds that 12 percent of daughters raised in the bottom decile of father earnings remain in the bottom decile, and that 22 percent of those starting in the top decile end up at the top. These immobility rates are similar if daughter earnings are compared to mother earnings—10 percent and 21 percent.

[34] Dearden, Machin, and Reed (1997) report that 37 percent of daughters beginning in the bottom fourth of weekly father earnings remain in the bottom fourth, while 48 percent starting in the top fourth stay there. Blanden et al. (2004) compare combined parent income to daughter earnings and report immobility rates out of the bottom and top fourth of 33 and 39 percent in the BCS and 27 and 34 percent in the NCDS.

[35] From his online Appendix Table 7.

[36] The study, however, appears to exclude children who are not living with a married or cohabiting household head for four consecutive years as adolescents.

[37] Heidrich (2017) reports that 26 percent of Swedish children raised in the bottom fifth of combined parents' earnings were in the bottom fifth of *child earnings*. At the top, 35 percent starting there remained there.

[38] These come from Online Data Table 1 and are averages across ten parental centiles of the share in the bottom or top ten child centiles.

[39] In addition to the studies cited in this section, Acciari et al. (2017) displays expected individual child income ranks by parent income centile for Italy.

[40] Pekkarinen et al. (2017) find a bit more relative mobility in Norway when father and son earnings are compared than when sons' and daughters' family incomes are compared to parent family incomes (as in Bratberg et al.).

Comparing parent combined earnings to sons' or daughters' earnings, Markrussen and Roed (2017) find less relative mobility. I know of no American estimates to compare these studies against.

Heidrich (2017) finds less relative mobility in Sweden than Bratberg et al., whether father earnings or combined father–mother earnings are compared to sons' earnings. However, Bratberg et al. pool sons and daughters and look at family income in each generation.

41 While the US estimates compare the family income of grown children to one parent's family income (with that parent's family sometimes changing over time), the Danish estimates compare the individual income of grown children to the average of their biological parents' individual income (married or not). Capital income is included in the US estimates but not in the Danish estimates. The Canadian estimates compare fathers' and sons' earnings and do not include self-employment income.

Two studies also provide summary measures describing transition matrices. Jantti et al. (2006) present four summary indices to describe the relative mobility in each nation's transition matrix. They indicate lower mobility in the US than in Scandinavia and Great Britain but should be discounted for the comparability issues discussed above. Erikson and Goldthorpe (2010) provide various measures summarizing transition matrices in Great Britain.

42 Chetty et al. (2014) derive a Canadian male earnings IRA from the decile-based transition matrix in Corak and Heisz (1999), reporting it as 0.17. But Corak and Heisz use only a single year of father earnings. Grawe (2004a) reported an IRA of 0.09, but using just four years of father earnings. That compared with IRAs of 0.03 and 0.36 for two US datasets, using four or five years of father earnings.

43 The other Swedish estimates in the literature range from 0.22 (Bjorklund and Jantti, 2016, averaging seven years of father earnings) to 0.24 (Heidrich, 2017, using 13 to 17 years).

44 My US estimates averaged up to 15 years of father earnings over a 31-year span. They ranged from 0.44 to 0.52. That is clearly higher than the Canadian and Swedish estimates, but it is also higher than previous American estimates, which are more comparable to those for the other two countries. My estimates begin with earnings around age 40 and work outward, rather than just averaging as many years as possible regardless of the point in the lifecycle.

45 Schnelle (2015), Markrussen and Roed (2017), and Pekkarinen et al. (2017).

46 The Norwegian data pertain to parent family earnings and include only married parents. The Swedish and German data are for parent household income. As noted above, the Norwegian and Swedish estimates are based on administrative data, while the American and German ones come from surveys. Attrition from those surveys is a concern, as are imputation of missing data (for West Germany) and item nonresponse (for the US).

47 Heidrich (2017) also estimates the mother–daughter earnings IRA for Sweden, which is 0.15. The preferred range from Part One of this primer is 0.31 to 0.40; again, this is unlikely to be comparable to the Swedish estimate.

48 Two studies look at individual parent income. Acciari et al. (2017) pool sons and daughters, look at fathers' and children's individual total income, and estimate an Italian IRA of 0.20. Murray et al. (2017) compare individual parent earnings to child earnings in Australia (pooling sons and daughters, and averaging the earnings of married parents when both work). They report an IRA of 0.26 (and an IRA of 0.21 using individual total income instead).

49 The US estimates are from the supplementary estimates to the Chetty et al. paper, which include a series in which combined incomes are divided by the number of adults. See http://www.equality-of-opportunity.org/data/absolute/table4_robustness_by_cohort.xlsx.

50 The Chetty et al. estimates are in their supplementary material: http://www.equality-of-opportunity.org/data/absolute/table1_national_absmob_by_cohort_parpctile.xlsx.

51 Berman (2017) shows that under such circumstances, the share of adults with a higher income than their parents is given by the cumulative distribution function of the standard normal distribution, evaluated at $\frac{\mu_c - \mu_p}{\sqrt{\sigma_p^2(1-2\beta)+\sigma_\varepsilon^2}}$, where the μ terms are the child and parent income means, the σ terms are the standard deviations, and β is the intergenerational elasticity of child and parent incomes.

A subset of these studies include the information necessary to estimate absolute upward mobility in this way. Note that the equation requires either means and standard deviations paired with the bivariate regression coefficient or means and standard deviations conditional on any regressors (such as age) paired with the IGE conditioned on those regressors. Many studies provide the unconditional means and standard deviations and IGEs conditioned on adult or parent age.

These estimates are "very rough" because the joint distribution of logged parent and child incomes may not be bivariate normal, and the extent to which it approximates a bivariate normal distribution may vary by country. Further, the mean and standard deviations are reported in tables describing samples that may not always correspond exactly with the sample on which the IGE is estimated. Small differences in the absolute mobility estimates cannot reliably be assumed to be real. Further, since absolute mobility may rise or fall, and differently in different countries, comparing estimates across countries from different birth cohorts is unwise. The same goes for comparing estimates when outcomes are measured in different calendar years or at different ages. And because adult children are more likely to out-earn their parents the older they are, absolute mobility estimates will depend on the ages at which the incomes of adult children and parents are measured.

It is possible to obtain absolute upward mobility estimates from Couch and Dunn (1997) (for the US and West Germany), Corak, Lindquist, and Mazumder (2014) (for the US, Canada, and Sweden), Hussain, Munk, and Bonke (2009) (for Denmark), and Ebertharter (2014) (for the US, West Germany, and Great Britain). I computed absolute mobility estimates from these studies, but the US estimates were wide ranging and did not match other American studies reviewed in Winship (2017a). Nor did the Canadian estimate obtained from Corak, Lindquist, and Mazumder (2014) match that in Ostrovsky (2017).

[52] Fortin and Lefebvre (1998) estimated IGEs between 0.30 and 0.35 for samples excluding young adults, but they relied on TSTSLS estimates of fathers' earnings. They use General Social Survey data rather than the income tax records.

[53] In his meta-analysis, Corak (2006) ignored this estimate. It appears he may have misinterpreted his 2001 results. Table 1 in the 2001 paper shows an IGE of 0.21 when sons' earnings are compared with the combined earnings of both parents, but Corak (2006) claimed that the smaller estimate compared sons to their fathers and that the 0.26 estimate compared sons' earnings to combined parental earnings. The 2001 paper, however, clearly states, "Intergenerational elasticities tend to be lower when both paternal and maternal incomes are taken into account than when only the father's income is used." (p. 279)

[54] Corak and Piraino (2016) put the IGE at 0.22 to 0.25, but they measure sons' earnings at somewhat younger ages than Corak, Lindquist, and Mazumder (2014).

[55] Even the Chen et al. (2017) estimate may be too low, though, because the administrative data on which these Canadian estimates are based do not include self-employment income in earnings. My analyses of male earnings mobility in the US, using the PSID and the methods described in Part One of this primer, indicate that IGEs are consistently lower by roughly 0.10 when self-employment income is excluded from earnings. For instance, if I average the two highest IGEs from samples that include at least 50 father–son pairs, the point estimates are 0.57 when self-employment income is excluded and 0.66 when it is included. Among samples that included at least 50 father–son pairs, varying the number of years of earnings required for inclusion in a sample, the IGEs including self-employment income were nearly always higher than the IGEs excluding such income.

The higher earnings IGE estimates in Chen et al. (2017) than in Corak's research are mirrored in various estimates over the years comparing fathers' and sons' total individual income.In a series of papers—Corak and Heisz (1996), Corak and Heisz (1999), and Corak (2001)—the author estimates IGEs of 0.19 to 0.26, while Chen et al. (2017) put it at 0.34 to 0.36. Oreopoulis et al. (2008) compare father individual income to sons' earnings and estimate a range of 0.28 to 0.35.

[56] Grawe arrived at this estimate after increasing his original estimate of 0.15 to make it more comparable to a US estimate from the PSID. Grawe (2006) reported IGEs ranging from around 0.10 to roughly 0.23, using a single year of father and son earnings (and relying on another sample of young adult sons. Blanden (2005) also estimated a low male earnings IGE (0.19) using a sample that also looked at sons when relatively young.

Grawe (2004b) used spline regression to estimate elasticities for different ranges of father earnings. Bingley et al. (2012) estimate an IGE at the median of father earnings of 0.25, higher than that in Denmark by 0.07.

Andrews and Leigh (2008, 2009) use TSTSLS techniques and estimate a very low IGE of 0.15.

[57] Corak (2016).

[58] Until recently, the administrative data included children born 1963–1970 who were 16–19 in (1) 1982, having been matched to parents and having filed a tax return from home anytime between 1982 and 1986; (2) 1984, having been matched to parents and having filed a tax return from home anytime between 1984 and 1988; or (3) 1986, having been matched to parents and having filed a tax return from home anytime between 1986 and 1990. In the 1996 Canadian census, 96 percent of 16-year-olds and 81 percent of 20-year-olds lived with a parent, but only 21 percent of 16-year-olds and 73 percent of 20-year-olds received non-transfer income (Oreopoulos, 2003). Comparing the 1986 census to the administrative data from 1986, just 72 percent of youth are included in the latter. Corak and Heisz (1999) report that about half of Canadian men are excluded from the administrative data because they did not file taxes, could not be matched to fathers who were tax filers, or both. This group includes many sons of immigrants and sons of single mothers, who are generally excluded from all analyses of father–son mobility. But even accounting for these men, that leaves a sizable fraction of sons out of the Canadian sample. Corak and Heisz (1999) note there are good reasons to think that these omitted sons are poorer than the sons in the sample, though evidence suggests any bias is small (Corak and Heisz 1999, Oreopoulos 2003, Oreopoulos, Page, and Stevens 2008).

More recently, additional (more recent) birth cohorts were added (1972–1980 and 1982–1985).

As noted above, the Canadian data also excludes self-employment income from earnings, though it is in the data as one form of market income, while US studies typically include it (Blanden, 2005, being an exception).

[59] Jantti et al. (2006) and Bratsberg (2007) compare family income to son earnings for both countries, showing that the difference is just as large as when father earnings are used for Norway (but not the US). This does not mean that the difference would be as large if father earnings were used for both countries.

Andrews and Leigh (2008, 2009) provide instrumental-variables-based estimates for both countries, finding an IGE of 0.24 for both. This study is an outlier in estimating such a low IGE for the US, so it should be heavily discounted.

Bratberg, Nilsen, and Vaage (2007) provide quantile regression estimates of the elasticity.

[60] Bjorklund and Chadwick (2003) indicate that the male IGE using total individual income is similar to their estimate using earnings.

[61] Several studies suggest similar IGEs in Sweden when total individual incomes are compared rather than just earnings. Bjorklund and Jantti (1997) report an IGE of 0.36 using TSTSLS. Lindahl (2008) puts it between 0.27 and 0.32, while Bjorklund et al. (2012) estimate a range from 0.25 to 0.29.

[62] The earlier studies were Jantti and Osterbacka (2000, IGE of 0.14–0.18), Osterbacka (2001, 0.13), and Osterbacka (2003, 0.09).

[63] As they do for Norway, Jantti et al. (2006) and Bratsberg (2007) compare family income to son earnings for both countries, showing that the difference is just as large as when father earnings are used for Finland (but not the US). This does not mean that the difference would be as large if father earnings were used for both countries.

[64] The other papers include Hussain et al. (2009, IGE of 0.12–0.14), Hussain, Bonke, and Munk (2011, 0.18), and Munk, Bonke, and Hussain (2016, 0.17). The 2009 paper estimates an hourly wage IGE of 0.22. The 2011 paper and the two 2016 studies estimate an IGE of 0.24 for total individual income.

[65] These studies include Wiegand (1997, IGE of 0.32–0.34) and Blanden (2005, 0.28–0.30), who use monthly earnings. Ermisch et al. (2006) estimate an IGE of 0.40, but they also use monthly earnings and the sample is restricted to grown children who have cohabited with their partner for at least a year. Eisenhauer and Pfeiffer (2008) restrict the sample to fulltime workers and estimate an IGE of 0.28-0.36 (also using monthly earnings). Dunn and Couch (2000) estimate an annual-earnings IGE of 0.28–0.36, but they measure father and son earnings in the same calendar years, making the fathers relatively old. In Yuksel (2009), men have to have worked fulltime for at least one year; the IGE is 0.26, using annual earnings (and 0.23 using monthly earnings).

A number of earlier studies estimated much lower IGEs. These include Lillard (2001, IGE of 0.11), Grawe (2004a, 0.10), Couch and Lillard (2004, 0.17), and Grawe (2006, -0.08 to 0.18). These samples feature relatively young

sons.

[66] Vogel (2006) attempts to model lifetime earnings from age, education, and calendar year for both sons and fathers. He finds an IGE ranging from 0.31 to 0.45 (0.19–0.35 including self-employment income). Brenner (2007) uses a covariance structure model to estimate permanent father and son earnings, reporting an IGE of 0.31–0.40. Eisenhauser and Pfeiffer (2008) supplement their direct IGE with a TSTSLS estimate of 0.37. Andrews and Leigh (2008, 2009) is again the outlier, with an estimated IGE of 0.17.

[67] Dunn and Couch (2000), Lillard (2001), Grawe (2004a), Couch and Lillard (2004), Vogel (2006), Brenner (2007), Andrews and Leigh (2008, 2009).

[68] Dunn and Couch (2000) measured father and son earnings in the same calendar years, meaning that not only were sons young, but fathers were old. The samples were also very small, and the estimates ranged from less than 0 to 0.45. Ermisch and Francesconi (2004) look at sons when they were in their early twenties. Even when using TSTSLS, their IGE estimates are under 0.25.

[69] See Fairbrother and Mahadevan (2016, 0.20-0.22), Mendolia and Siminski (2016, 0.17–0.31), Huang et al. (2016, 0.11–0.30), Andrews and Leigh (2008, 2009, 0.33), and Leigh (2007, 0.16–0.26). Huang et al. (2016) estimate a weekly wage-and-salary IGE of 0.16-0.23.

[70] The 2016 paper does not list the sources he used for the additions since his 2006 paper, but he lists the sources at https://milescorak.files.wordpress.com/2012/01/references-for-intergenerational-earnings-elasticities.pdf.

[71] Consistent with this range, Corak (2001) presents an estimate of 0.21.

[72] In cross-sectional analyses, the British estimate is 0.28, compared with 0.26 to 0.29 in the US. In trend analyses, she finds an overall IGE (across years) of 0.21 for Great Britain using the NCDS and 0.29 using the BCS. The corresponding US estimates range from 0.28 to 0.37.

[73] Other British studies estimate IGEs using the BCS ranging from 0.27 to 0.65: Blanden et al. (2004, IGE of 0.30), Blanden, Gregg, and Machin (2005, 0.29), Blanden, Gregg, and Macmillan (2007, 0.32), Blanden and Machin (2008, 0.33), Blanden, Gregg, and Macmillan (2011, 2013, 0.28), Blanden and Macmillan (2014, 0.39), Gregg et al. (2017, 0.38–0.65), Blanden and Machin (2017, 0.35), and Bjorklund, Jantti, and Nybom (2017, 0.27–0.29). British studies using the NCDS report IGEs ranging from 0.18 to 0.37: Blanden et al. (2004, 0.18), Blanden, Gregg, and Macmillan (2007, 0.21), Blanden and Machin (2008, 0.21), Blanden, Gregg, and Macmillan (2011, 2013, 0.21), Blanden and Macmillan (2014, 0.29), Gregg et al. (2017, 0.21–0.37), and Blanden and Machin (2017, 0.27).

Hansen (2010) reports IGEs ranging from 0.20 to 0.25 for Norway. There are a number of additional estimates for Sweden, ranging from 0.17 to 0.32. Studies using combined parental earnings include Hirvonen (2008, IGE of 0.30) and Heidrich (2017, 0.32). Others use parental family income: Holmlund (2016, 0.22), Bjorklund and Jantti (2016, 0.27), and Bjorklund, Jantti, and Nybom (2017, 0.17–0.18).

Finally, Finnish studies include one using combined parental earnings—Osterbacka (2001, 0.16)—and two comparing parental household income to son's individual income—Sirnio, Kauppinen, and Martikainen (2017, 0.13-0.21) and Sirnio, Martikainen, and Kauppinen (2016, 0.23).

[74] Ermisch, Francesconi, and Siedler (2006) use more elaborate modeling to estimate the permanent family income IGE in Britain and West Germany, but only for sons and daughters who live with a partner.

[75] Ermisch, Francesconi, and Siedler (2006) provide estimates for West Germany and Britain, but only for sons living with partners.

[76] Hansen (2010) estimates a range from 0.14 to 0.21. She also estimates IGEs comparing combined parental earnings to daughters' earnings (0.20–0.26) and to daughters' individual income (0.22–0.33). Raaum et al. (2007) estimate an IGE of 0.19 at the median, comparing combined parental earnings to daughters' earnings.

[77] See Lindahl (2008, IGE of 0.20–0.24) and Heidrich (2017, 0.18). Earlier, Osterberg (2000) found an IGE of 0.07 to 0.08. Lindahl also reports an IGE comparing individual incomes (0.17 to 0.21). Heidrich also reports an IGE comparing combined parental earnings to daughters' earnings (0.28). That is higher than the corresponding IGEs estimated by Holmlund (2006) and Bjorklund, Jantti, and Nybom (2017) using parent family income—0.14 and 0.13-0.16, respectively.

[78] See Osterbacka (2001, IGE of 0.10), Pekkala and Lucas (2007, 0.07–0.28), Pekkarinen et al. (2009, 0.16), and Lucas and Kerr (2013, 0.04). Osterbacka also provides an IGE comparing combined parent earnings and daughters' earnings (0.13). That is lower than corresponding estimates from Sirnio, Kauppinen, and Martikainen (2017, 0.17–0.29) and Sirnio, Martikainen, and Kauppinen (2016, 0.31) using parental family income.

[79] See Bonke et al. (2005, 0.24), Eriksson et al. (2005, 0.27), and Hussain et al. (2011, 0.11). Hussain et al. report an IGE of 0.17 using individual income. Raaum et al. (2007) estimate an IGE of 0.19 at the median, using combined parental earnings. Landerso and Heckman (2016, 2017) estimate an IGE of 0.07 using combined parental earnings.

[80] Raaum et al. (2007) report an IGE of 0.27 comparing combined parent earnings to daughter earnings. Jantti et al. (2006) estimate an IGE of 0.33 comparing parent family income to daughter earnings, and Blanden and Machin (2007, 2008) estimate corresponding IGEs of 0.36 to 0.43 (0.55 to 0.63 using TSTSLS strategies). Comparing parent income to daughter earnings, Blanden et al. (2004) estimate IGEs ranging from 0.31 to 0.40. Averaging parent incomes and comparing the average to daughter earnings, Blanden et al. (2014) find an IGE of 0.37.

[81] The earnings studies are Fortin and Lefevbre (1998, IGE of 0.23), Corak (2001, 0.20), and Chen (2017, 0.23). Corak (2001, 0.23) and Chen et al. (2017, 0.24–0.29) include estimates for individual income.

[82] Swedish studies include Osterberg (2000, IGE of 0.03–0.04), Lindahl (2008, 0.04-0.09), and Heidrich (2017, 0.08). There are two studies of Finland: Osterbacka (2001, 0.02) and Lucas and Kerr (2013, 0.05–0.06). Hussain et al. (2011) report a mother-daughter IGE of 0.06 for Denmark. Dunn and Couch (2000) report IGEs of 0.02-0.20 for West Germany, -0.07 to 0.07 for Great Britain, and 0.18 to 0.27 for the US. There do not appear to be any other US-based studies against which to compare these. My own estimates in Part One of the primer ranged from 0.26 to 0.58.

[83] Connolly et al. (2016, IGE of 0.26–0.29) and Corak (2017, 0.19).

[84] See also, Couch and Dunn (1997).

[85] Two studies used TSTSLS methods to look at multiple countries. Andrews and Leigh (2008, 2009) find an IGC of 0.17 for the US, which indicates less mobility than in Canada, West Germany, Norway, and Sweden, but more than in Australia. Cavaglia (2016) finds the US has similar mobility to Germany (including East Germans who studied in Germany) and the United Kingdom (including Northern Ireland), and mobility at least as high as Italy. The US estimates range from 0.23 to 0.33, the German estimates from 0.21 to 0.33, and the UK estimates from 0.16 to 0.29.

[86] Bratberg et al. (2005) provide estimates ranging from 0.11 to 0.13 for Norway. (Rieck, 2008, also provides Norwegian estimates separately for intact and disrupted families.) Osterberg (2000) reports IGCs from 0.11 to 0.13 for Sweden, while Bjorklund and Jantti (2016) estimate the IGC at 0.13. Bjorklund et al. (2012) put it somewhat higher, at 0.19, as did Bjorklund and Jantti (1997) using instrumental variable methods (0.23). Similarly, Mood (2010) estimates a range of 0.17 to 0.23. (Her estimates are higher when, unconventionally, she examines earnings rather than logged earnings. Similarly, Breen, Mood, and Jonsson, 2016, do not log earnings and find a correlation of 0.30.) Osterbacka (2001) estimated an IGC of 0.16 for Finland.

Several Swedish studies indicate similar levels of mobility when fathers' and sons' individual total income is compared, including Bjorklund et al. (2012), Bjorklund and Jantti (2016), Bjorklund and Jantti (1997, TSTSLS), and Mood, Jonsson, and Bihagen (2012, income without logging). Mood (2010) also includes an IGC range comparing father earnings to son family income.

[87] Bjorklund et al. (2012), Bjorklund and Jantti (2016). Bjorklund and Jantti (1997) found the IGC rose from 0.23 to 0.29 when they switched from earnings to market income, but they used TSTSLS methods.

[88] Altonji and Dunn (1991), Peters, (1992), Reville (1996), and Fertig (2003). Couch and Dunn (1997) provide a range from 0.17 to 0.53.

[89] Blanden also reported separate estimates from the NCDS and BCS in a set of trend analyses. She found an IGC of 0.17 in the earlier British cohort, versus 0.29 in the more recent one. The corresponding figures for the US were 0.24 and 0.32. The weekly-annual income distinction is potentially an issue here too.

[90] A paper pre-dating Blanden (2005)—Blanden et al. (2004)—reported IGCs of 0.17 in the NCDS and 0.26 in the BCS. Other papers include Blanden Gregg, and Macmillan (2007, 0.17 and 0.26–0.29), Blanden and Machin (2007 and 2008, 0.17 and 0.30, 50 percent higher when using instrumental variable methods), Blanden, Gregg, and Macmillan (2013, 0.17 and 0.28, without using any age adjustment).

[91] Other British studies include Jantti et al. (2006), which estimates an IGC of 0.20, and Erkison and Goldthorpe (2010), which reports an IGC of 0.18 to 0.29.

[92] She also reports an estimate of 0.32 when she unconventionally looked at income levels rather than logged income. Mood (2010) and Breen, Mood, and Jonsson (2016) also report IGCs from income that has not been log-transformed.

[93] Mood (2010) and Breen, Mood, and Jonsson (2016) present corresponding IGCs for Sweden, though they do not log incomes first.

[94] Osterbacka (2001) finds an IGC of 0.12 for Finland, the Norwegian IGC is 0.08 according to Bratberg et al. (2005), and Osterberg (2000) reports an IGC of 0.07 for Sweden. Breen, Mood, and Jonsson (2016) find a higher IGC for Sweden—0.20—but they do not log earnings.

[95] Her estimate is lower if she doesn't log incomes (0.19 to 0.22). Breen, Mood, and Jonsson (2016) report an IGC of 0.20 for Sweden using incomes that have not been log transformed.

[96] Blanden and Machin (2007, 2008) report an IGC of 0.25, rising to 0.37 using TSTSLS. The NCDS estimates from the earlier cohort are 0.17 and 0.26.

[97] Four additional studies report Swedish brother earnings correlations. The various estimates generally range between 0.19 and 0.27. See Bjorklund et al. (2004, 0.19–0.20), Bjorklund, Lindahl, and Lindquist (2010, 0.25), Bjorklund and Jantti (2012, 0.22), and Lindahl (2011, 0.19–0.27). Bjorklund, Lindahl, and Lindquist (2010) and Lindahl (2011) use samples of brothers that grew up in Stockholm. Bjorklund, Jantti, and Lindquist (2009) report a brother correlation ranging from 0.31 to 0.37 in the most recent cohorts they examine, using individual total income.

Four Norwegian studies report brother earnings correlations. In three, the correlations range from 0.14 to 0.20. See Bjorklund et al. (2002, correlation of 0.14–0.19), Bjorklund et al. (2004, 0.14), and Raaum, Salvanes, and Sorenson (2006, 0.20). However, the most recent—Pekkarinen et al. (2017)—reports a range between 0.31 and 0.38 for the most recent birth cohorts they analyze (and as high as 0.46 in earlier cohorts).

Two Finnish studies find correlations of 0.24 (Bjorklund et al., 2004) and 0.26 (Osterbacka, 2001). Danish estimates are available from three other studies: Andrade (2016, 0.20), Bingley and Cappellari (2017, 0.15–0.27), and Bingley, Cappellari, and Tatsiramos (2017, 0.31). Schnitzlein (2014) includes separate results for West Germany indicating a brother earnings correlation of 0.48, a wage correlation of 0.46, and a family income correlation of (0.53).

[98] Andrade (2016) estimates a sister earnings correlation of 0.14 for Denmark. Schnitzlein (2014) reports separate West German estimates for earnings, wages, and family income (0.35, 0.44, and 0.39, respectively).

[99] Raaum, Salvanes, and Sorensen (2006) find a Norwegian correlation of 0.15. Three Swedish studies provide correlations ranging from 0.10 to 0.23: Bjorklund et al. (2010, 0.23), Lindahl (2011, 0.10–0.17), and Bjorklund and Jantti (2012, 0.16). The first two of those studies look only at sisters who grew up in Stockholm.

[100] Other sibling correlations studies include Lecavelier des Etangs-Levallois and Lefranc (2017, France), Eriksson and Zhang (2012, rural China, and Comi (2010), which looks at men very early in their careers and includes low estimates for Germany, France, Italy, Greece, Spain, Portugal, and Austria.

[101] Author's analyses of the Global Database on Intergenerational Mobility. I compare the US to various rich nations in Northern Europe, Western Europe, Central Europe, North America, and Oceana, as well as Israel. Estimates are for the 1980 cohort and compare sons and daughters (pooled) to the maximum of their parents' educational attainment. Outcomes include the equivalent of the IGE and IGC (using educational attainment), two measures of the probability of exceeding parental education, and the difference in schooling between a child and her parents (conditional on having parents in the bottom half).

[102] The measures used were the elasticity and correlation between parents' and children's educational attainment.

They are absolute measures in the same way that the IGE and IGC are absolute measures of economic mobility.

[103] Author's analyses of the Global Database on Intergenerational Mobility. Outcomes include the probability of ending in the bottom fourth conditional on starting in the bottom half, probability of ending in the top fourth conditional on starting in the bottom half, probability of ending in the bottom half conditional on starting in the top quarter, and the probability of ending in the top quarter conditional on starting in the top quarter.

[104] Pfeffer used log-linear models to analyze contingency tables. The resulting estimates are of relative mobility in that these models control for the change in the marginal educational distributions between generations.

[105] See also Ganzeboom, Luijkx, and Treiman (1989).

[106] These are unpublished correlation estimates from Ganzeboom and Treiman, cited in Bjorklund and Jantti (2000).

[107] See also Breen (2004).

[108] For example, Bradbury, Corak, Waldfogel, and Washbrook (2015); Ermisch, Jantti, and Smeeding (2012); Chmielewski and Reardon (2016); Causa and Johansson (2010).

[109] Of course, it is inappropriate to assume a causal relationship between inequality and mobility based on such a simple bivariate correlation. These two correlations are also imprecise in that they are based on only five countries each.

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