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Inequality and Mobility over the Past Half-Century Using Income, Consumption, and Wealth

Jonathan D. Fisher and David S. Johnson

Milton Friedman (1962) suggested that a society with a great deal of mobility could also demonstrate a high level of inequality in any particular year, and that this could be "a sign of dynamic change, social mobility, equality of opportunity." Corak (2013), in contrast, finds that countries with higher income inequality have lower intergenerational income mobility. This finding suggests that countries with higher inequality do not experience more social mobility or more equality of opportunity. The idea that there could be a trade-off between inequality and mobility could also apply to intragenerational inequality and mobility. As Friedman suggested, a high degree of inequality may be associated with a higher degree of churn in and out of the top or bottom of the distributions. Alternatively, higher inequality driven by technological change, returns to human capital, and increased invest-

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ment by parents in children may lead to less intragenerational mobility. The structural advantages that lead to higher inequality could also lead to lower intragenerational mobility.

Relying on income alone may not tell the whole story. First, the income, consumption, and wealth distributions inform our perceptions of economic well-being—both inequality and mobility. The Stiglitz report (Stiglitz, Sen, and Fitoussi 2009, 33) states: "the most pertinent measures of the distribution of material living standards are probably based on jointly considering the income, consumption, and wealth position of households or individuals." Yet most research on inequality and mobility limits analysis to just one of these variables, typically income. Examining income, consumption, and wealth and how they evolve over the life cycle can further highlight the relationship between inequality and mobility.

It does not need to be the case that the patterns observed for income inequality and mobility automatically transfer to consumption and wealth. It is informative if one measure changes and another remains constant or moves in the opposite direction. Krueger and Perri (2006) show that the increased availability of financial markets could suggest that increases in income inequality do not lead to increases in consumption inequality. These life-cycle trajectories of income and wealth affect the consumption path, and all impact the trends in inequality and mobility over time. Our purpose is to examine the relationship between inequality and mobility over individuals' life-cycle paths.

Understanding the relationship between inequality and intragenerational mobility requires more than a series of one-year snapshots of inequality and mobility. One-year snapshots may be misleading depending on the year used. Thus, it is necessary to use a panel of individuals and follow them over a long period of time. Multiple cohorts allow one to compare inequality and mobility at similar ages for different cohorts. This chapter combines these factors and is the first paper to examine income, consumption, and wealth to compare their level, inequality, and mobility across cohorts at the same age.

We use the Panel Study of Income Dynamics (PSID), which provides us with seven cohorts over fifty years, allowing us to compare at least four cohorts at any particular age during the working-age years. We find that younger cohorts have a higher level of resources at the mean, median, and 90th percentiles. However, there has been little or no improvement at the 10th percentile. This pattern in the level of resources implies higher inequality across cohorts, which we find with the Gini coefficient as well as with the 90:10 ratio. Lastly, we find intragenerational mobility that is no higher and is sometimes lower for younger cohorts. We measure intragenerational mobility using the rank-rank correlation at all observable 10-year periods (i.e., the rank-rank correlation using the rank at 26 years old and the rank at 36 years old). Putting these results together, we see evidence similar to Corak (2013), that higher inequality is associated with lower intragenerational

mobility, yielding what could be called an intragenerational Great Gatsby Curve.

While we are the first to put all of these components together, some individual pieces have been found in prior research. Chetty et al. (2017) find that 92 percent of children in the 1940 birth cohort had higher before-tax income than their parents, falling to 50 percent of children in the 1984 birth cohort. This matches our finding that younger cohorts have higher income than older cohorts, at least at the median. Gale and Harris (2020) find higher mean wealth for younger cohorts, at least before the Great Recession. No comparable cohort evidence exists for consumption.

Guvenen et al. (2018) find increasing earnings inequality across cohorts. But again, there is little evidence on cohort inequality in consumption or wealth. Most research shows there has been a large increase in income and wealth inequality (Piketty 2014; Saez and Zucman 2016; Wolff 2014). Fisher, Johnson, and Smeeding (2015) find that consumption inequality is about 80 percent as large as disposable income inequality and that the rise in consumption inequality was two-thirds that of income inequality in the United States from 1984 to 2011.

14.1 The Distribution of Income, Consumption, and Wealth

To measure household well-being over a lifetime, ideally we would have a measure of lifetime income, or permanent income. In a world of perfect information, with no borrowing or liquidity constraints, and with accurate surveys that measure both income and consumption, we could measure permanent income using consumption at one point in time. Consumption would contain all of the information needed to understand inequality, intragenerational mobility, and intergenerational mobility. Because perfect surveys do not exist, foresight is imperfect, and there are real-world constraints on both borrowing and liquidity; one year of consumption is insufficient. Researchers have turned to using income, consumption, *or* wealth to measure resources available to households.

However, using income, consumption, or wealth alone is imperfect. Given that consumers do not all follow the life-cycle, permanent-income hypothesis, the need to study income, consumption, and wealth for the same households can be demonstrated using the intertemporal budget constraint (Blundell 2014):

$$\sum_{k=0}^{T-t} Q_{t+k} C_{t+k} = \sum_{k=0}^{L-t} Q_{t+k} Y_{t+k} + A_{i,t},$$

where Q is a discount rate, C represents consumption, Y represents income, and A represents net wealth. Time T is death, and time L is retirement. In surveys, we observe snapshots of consumption, income, and wealth. Each

individual measure alone provides a noisy estimate of lifetime well-being at a point in time. A retired household may have high wealth, with consumption above income. Using income alone would make the household seem worse off, while wealth may overstate the household's well-being because they are drawing down wealth.

The joint distribution of all three provides more information about well-being over the lifetime. Blundell (2014) states in his presidential address: "These different dimensions capture different aspects of inequality, and analyzed together they can considerably enhance our understanding of inequality dynamics." The PSID has been the primary source to study income mobility in the US (see Bayaz-Ozturk, Burkhauser, and Couch 2013; Duncan, Boisjoly, and Smeeding 1996; Duncan, Smeeding, and Rodgers 1993; Dynan, Elmendorf, and Sichel 2012; Latner 2018; Mazumder 2018; Shin and Solon 2011). More recently, with the addition of wealth and consumption to the PSID, researchers have used the PSID to study wealth mobility (Charles and Hurst 2003; Pfeffer and Killewald 2015) and consumption mobility (Bruze 2018; Fisher and Johnson 2006; Jappeli and Pistaferri 2006).

Recent research has begun documenting the important interactions between income, consumption, and wealth. Fisher et al. (2016) are the first to use the PSID to examine the conjoint distribution of income, consumption, and wealth. They rely on the 1999–2013 PSID because wealth and consumption are not always available before those years. They find that intragenerational income and consumption mobility are about the same but that wealth mobility is lower. They also find that intragenerational income mobility is lower at the top and bottom of the wealth distribution, highlighting the role that wealth can play in income and consumption mobility.

Fisher and Johnson (2006) are the first to examine the intragenerational mobility of consumption in the US. Japelli and Pistaferri (2006) conducted a similar analysis for Italy and find that consumption mobility is higher than income mobility. In examining Spanish data, Gradín, Cantó, and del Rio (2008) also find that expenditure mobility is higher than income mobility. Attanasio and Pistaferri (2016) find a similar result for *inter*generational mobility and suggest that "as consumption is more equally distributed than income, there is also more intergenerational mobility when looking at consumption than income." Charles et al. (2014) also find intergenerational consumption mobility higher than income mobility. D'Ambrosio, Menta, and Wolff (2019) examine the volatility of income, consumption, and wealth, and find that the volatility of consumption is less than income, which is lower than wealth volatility. While volatility examines the absolute changes in resources, we examine relative mobility. Since the income distribution is more dispersed than the consumption distribution, changes in income that may not affect the *relative* position of a family in the income distribution may translate into smaller changes in consumption that yield less volatility

but that impact the family's relative position in the consumption distribution, yielding more mobility.

Japelli and Pistaferri (2006) provide a framework to examine the relationships between income and consumption mobility and the influence of other factors (such as wealth or education). They show that consumption mobility would be zero in a consumption insurance model where complete consumption smoothing is possible. Consumption mobility would be highest and similar to income mobility in a rule-of-thumb economy. Finally, in the permanent-income model, with partial consumption smoothing, consumption mobility would be between the two extremes. They also show that the presence of measurement error and/or taste shocks increases consumption mobility.

14.2 Data and Imputation

The PSID is a longitudinal survey of households and their individuals that began in 1968. It began with a representative sample of about 5,000 households in 1968 and continues to follow the individuals and households over time. From 1968 to 1997, families were interviewed each year. Beginning in 1999, interviews took place every other year. The PSID is a commonly used data set and others have provided a comprehensive overview of the PSID (see Brown, Duncan, and Stafford 1996).

The PSID attempts to follow individuals of the original family even as they form separate families and households. It attempts to follow both adults of a divorced family if they were both part of a 1968 PSID family. As a result, the PSID increased the number of families it followed from 4,802 in 1968 to 9,607 in 2017 (see PSID 2017). There are about 1,000 people who were reference persons or spouse/partners in 1968 and who were still in the survey in 2017.

Data are collected in the year of the survey; income is reported for the previous taxable year, wealth is reported for the time of interview (the survey year), and consumption is a mixture of time periods. In our analysis, we use the survey year to represent the year for the resource means. We adjust by family size using an equivalence scale given by the square root of family size, and we use the family level file, merge the individual file, and use longitudinal weights.[1]

Total Family Income is the sum total of taxable, transfer, and social security income of the reference person, spouse/partner, and other family units. Total household wealth is the sum total of eight asset variables minus debt. Asset variables are farm and business, checking and savings, other real estate (i.e., second home, land, rental real estate, or money owed on a land con-

1. We also compare the cross-section results using the family weights and results are qualitatively similar.

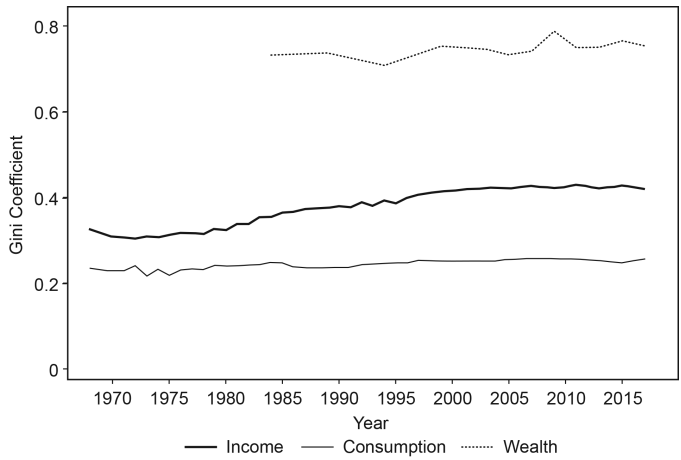

Fig. 14.1 Inequality in income, consumption, and wealth by year for all individuals

tract), stocks, vehicles, other assets (i.e., life insurance policy), annuity/IRA, and home equity. Until 2007, debt was total debt. Beginning in 2009, debt is the sum total of debt from farm or business, real estate, credit card, student loan, medical, legal, family loan, or other.

We impute consumption to the PSID using the Consumer Expenditure (CE) Survey. The imputation methodology is described in detail in the online appendix, http://www.nber.org/data-appendix/c14444/appendix.pdf. The appendix also includes measures of the quality of the imputation. Our measure of consumption includes the amount that the household actually spends for current consumption plus the estimated service flows from homeownership and vehicles. It includes expenditures for food, housing, transportation, apparel, medical care, entertainment, and miscellaneous items.[2]

Figure 14.1 shows the overall inequality for the entire sample over the 1968–2017 period. This figure shows the Gini coefficients and demonstrates the standard result that wealth inequality is higher than income inequality, which is higher than consumption inequality. All three measures demonstrate increases in inequality. Online appendix figure A6 (http://www.nber.org/data-appendix/c14444/appendix.pdf) compares the results to other measures of income, consumption and wealth inequality and confirms that our measures have similar trends to the others using other data sets.

We measure income and consumption using three-year moving averages to smooth out measurement error and some transitory shocks to resources. Because the PSID went from an annual to a biennial survey in 1997, we always average $t - 2$, t, and $t + 2$. Thus, 1970 income is the average of income

2. Excluded are expenditures for pensions and social security, savings, life insurance, principal payments on mortgages, and gifts to organizations or persons outside the consumer unit.

Table 14.1 **Cohort definition**

Birth years	First used observation in PSID	Age range at first observation	Sample size
1916–25	1970	45–54	423
1926–35	1970	35–44	525
1936–45	1970	25–34	818
1946–55	1980	25–34	2,244
1956–65	1990	25–34	2,927
1966–75	2001	26–34	2,732
1976–85	2011	26–34	3,836

in 1968, 1970, and 1972, making 1970 the first year and 2015 the last year in our results.

The PSID timing lines up well with typical conceptions of cohorts in the United States and with our ability to smooth out some year-to-year shocks by pooling across birth years. We create 10-year birth cohorts and center the cohorts around the first Baby Boom wave. Our oldest cohort was born between 1916 and 1925, and we observe them in the PSID when they are 45–54 years old in 1970. The first cohort we observe at the beginning of their working career is the second half of the Silent Generation, those born from 1936–1945, which we observe at ages 25–34 in 1970. Our youngest cohort captures the tail end of Generation X and the beginning of Millennials, those born between 1976 and 1985. Table 14.1 details the seven cohorts. We begin with the age profiles by cohort, inequality by cohort, and then mobility by cohort.[3]

14.3 Results

14.3.1 Age Profiles

Figures 14.2a–c show the age-income, age-consumption, and age-wealth profiles by cohort.[4] Income peaks in the late 50s, while consumption peaks at slightly older ages. The profiles exhibit a clear inverted U-shape for income, but the consumption profiles flatten out after the peak rather than making a distinct downturn, consistent with consumption smoothing in retirement (Fisher et al. 2008; Haider and Stephens 2007). Wealth, on the other hand, continues to increase with age until at least 70.

3. There is concern that imputation will understate the true variance in the distribution. Multiple imputation addresses at least some of the concerns that the distribution of imputed values from mean regressions will understate the dispersion in the true distribution. Multiple imputation adds noise, and calculating the dispersion measures correctly involves using all imputed values and adding the extra term for the uncertainty inherent in imputation (Rubin 1987).

4. For now, we have wealth only for 1984, 1989, 1994, and 1999–2017. We are also imputing wealth to every year of the PSID and will update results with those results in a future version of this research.

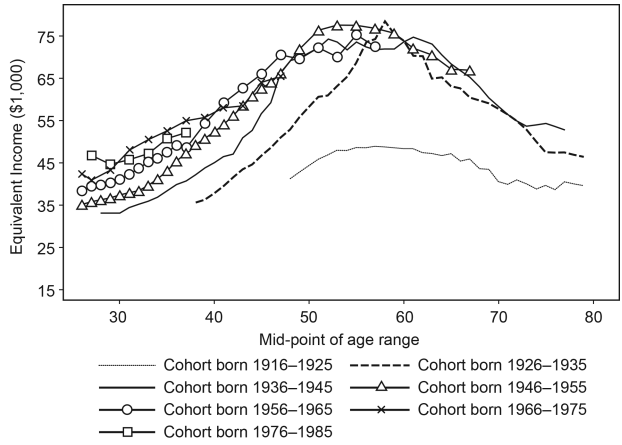

Fig. 14.2a Mean age-income profile by cohort

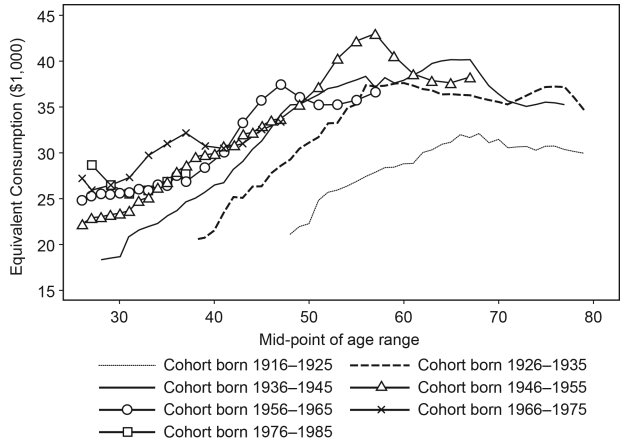

Fig. 14.2b Mean age-consumption profile by cohort

A clear pattern across the income, consumption, and wealth profiles is the increasing standard of living between our oldest cohort and the first Baby Boom cohort. From the first age we observe them until the peak in their income, each successive cohort experienced higher average equivalent income through those born between 1946 and 1955 (figure 14.2a). At age 51, our oldest cohort had $46,000 in equivalent income, increasing to $60,500 for our 1926–1935 cohort, $72,300 for the 1936–1945 cohort, and $76,400 for our first Baby Boom cohort. After age 55, it appears that there is little difference in mean income between the 1936–1945 cohort and the 1946–1955 cohort. A similar pattern across our four oldest cohorts is seen for consumption (figure 14.2b). At age 51, equivalent consumption increases from

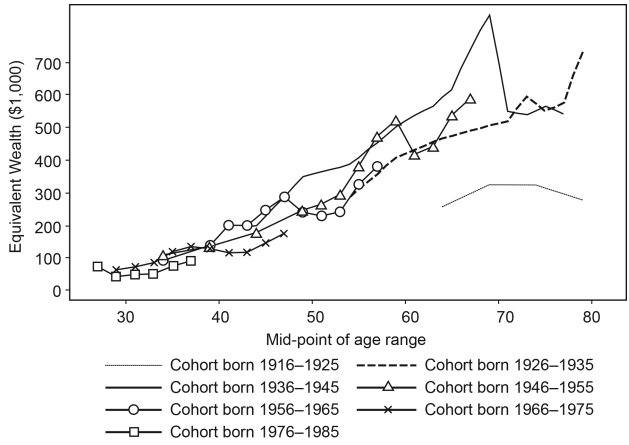

Fig. 14.2c Mean age-wealth profile by cohort
Source: Author's calculations using the 1968–2017 PSID.

$24,900 for our oldest cohort to $37,100 for the first Baby Boom cohort. Wealth does not follow the same pattern. We observe little difference in mean wealth for all but the oldest cohort. Because wealth is so skewed, it will make more sense to focus on percentiles of the wealth distribution across the cohorts rather than mean wealth.

After the 1946–1955 cohort, there are smaller gains in income and consumption when the cohorts were in their 30s. Younger cohorts experience higher income and consumption, but the improvements across cohorts are smaller for the younger cohorts. The improvements mostly disappear after age 40 for income and consumption. The large gains experienced by older cohorts were not experienced by the younger cohorts. The younger cohorts are not worse off than the older cohorts, but they are about the same at least in terms of mean income, consumption, and wealth at a given age.

We next turn to the age profiles at the 10th, 50th, and 90th percentiles of the distribution to help understand whether the patterns observed at the mean persist through the entire distribution. The increase in inequality over the past 40 years is driven by the top of the distribution (Piketty and Saez 2003; Saez and Zucman 2016), and our results are consistent with that finding. The largest and most consistent gains across cohorts occur at the 90th percentile (figure 14.3). All cohorts experienced higher income at the 90th percentile except for our youngest cohort. We do not observe our youngest cohort until 2011 and are thus those who entered the job market during the Great Recession or just after it, showing the scars at the beginning of the working life of the Great Recession even for the top of the income distribution. Consumption also shows increases across cohorts at the 90th percentile, while wealth shows little difference at the 90th percentile.

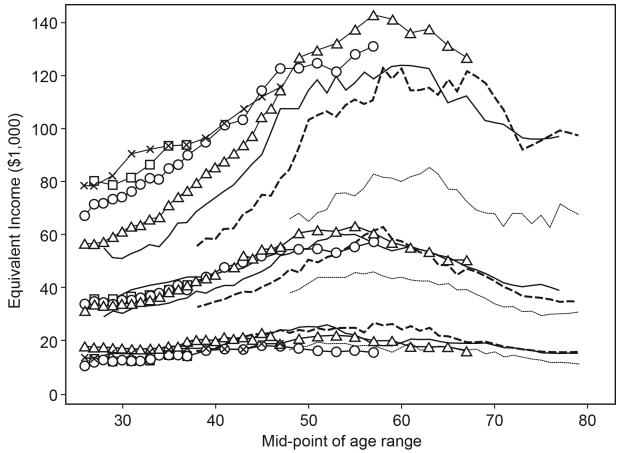

Fig. 14.3a Age profiles at 10th, 50th, and 90th percentiles for income

At the median, we observe smaller gains using income for the more recent cohorts, while there are more visible gains using consumption and visible losses for wealth. The gains in consumption are coming at the expense of wealth, suggesting the younger cohorts could have permanently lower wealth as they age without a change in behavior. At the 10th percentile, we can see that consumption often exceeds income within a cohort, and wealth is correspondingly negative.

While the patterns are similar, but not identical, for income and consumption across our cohorts, the wealth patterns are different. We see little differences in age-wealth profiles across cohorts using the 10th, 50th, and 90th percentiles (figures 14.3a–c).

14.3.2 Inequality by Cohort

We turn from individual points in the distribution to summary measures of inequality. Specifically, we use the Gini coefficient by cohort and age, presenting age-Gini profiles. The age-inequality profile for income shows clear increases in income inequality within all cohorts and across most cohorts (figure 14.4a), consistent with the patterns across the 10th, 50th, and 90th percentiles of the distribution (figures 14.3a–c). The increases in inequality across cohorts is most obvious at younger ages. The income Gini for the 1946–1955 cohort is around 0.28 when the cohort is in its late 20s, while the income Gini is 0.35 or higher for the three younger cohorts. After age 50, the differences in inequality across cohorts falls, but we still observe a general increase in inequality across cohorts.

Consumption inequality is higher for younger cohorts as it was for income (figure 14.4b), increasing from about 0.22 around age 30 for our two cohorts born in 1936–1955 to 0.25 for the next three younger cohorts. We also see

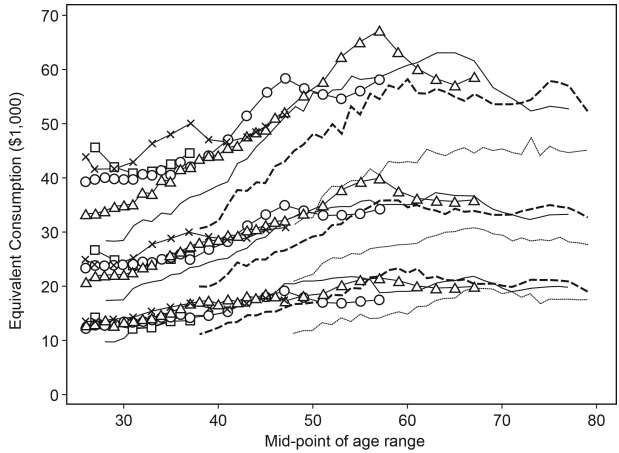

Fig. 14.3b Age profiles at 10th, 50th, and 90th percentiles for consumption

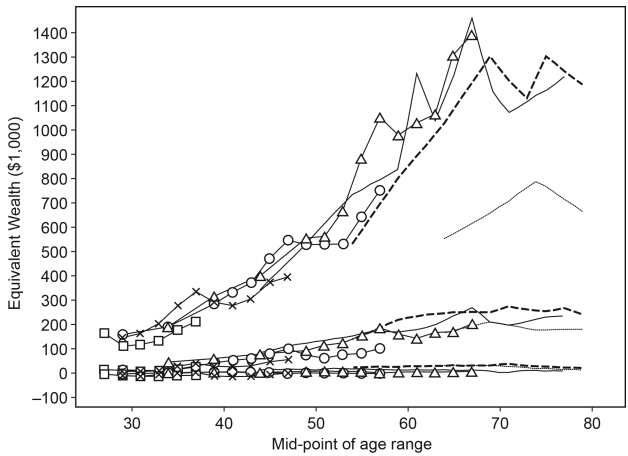

Fig. 14.3c Age profiles at 10th, 50th, and 90th percentiles for wealth

increasing consumption inequality within cohorts, at least after the cohorts turn about 40 years old, matching the results from Deaton and Paxson (1994), which found increasing consumption inequality within cohorts.

Wealth inequality increases substantially across cohorts (figure 14.4c). For our second oldest cohort, the Gini when the cohort is around age 60 is 0.6, while the Gini for our Baby Boom cohorts around age 60 is above 0.7. Wealth inequality is also higher at the youngest ages for our younger cohorts, with our three younger cohorts showing higher wealth inequality in their 30s than the first Baby Boom cohort.

Combined, we see relatively stagnant real income and consumption for

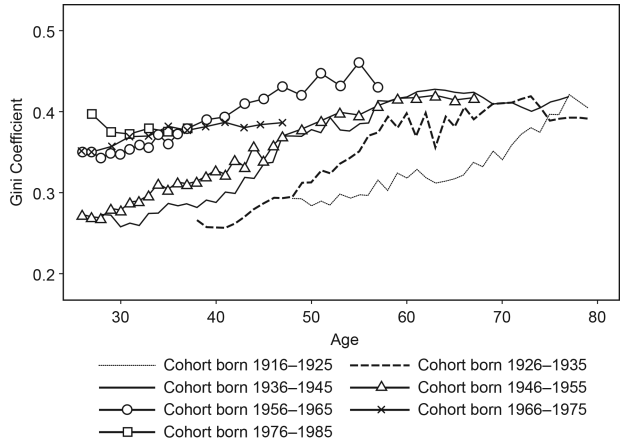

Fig. 14.4a Income inequality by cohort using Gini coefficient

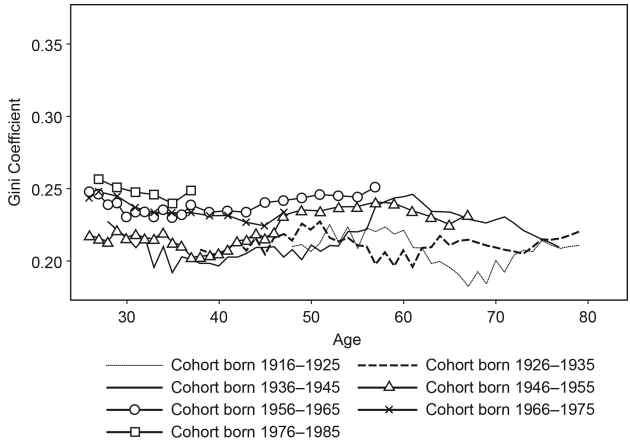

Fig. 14.4b Consumption inequality by cohort using Gini coefficient

our three youngest cohorts (figures 14.2a–c) but higher inequality for those cohorts (figures 14.4a–c). The median is staying the same, but the spread is increasing, driven by relatively little change at the 10th percentile and large improvements across cohorts at the 90th percentile (figures 14.3a–c).

14.3.3 Mobility Measures

One common measure of mobility is the rank-rank correlation. The sample sizes in our three older cohorts do not support using percentiles, as each of the older cohorts has less than 1,000 people (table 14.1). We take everyone in a given cohort who is 25–34 in a given year and rank them into the twenty vingtiles. We then do the same for the same cohort 10 years

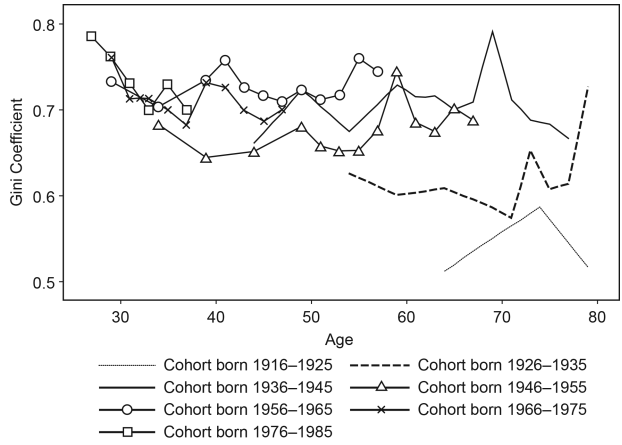

Fig. 14.4c Wealth inequality by cohort using Gini coefficient

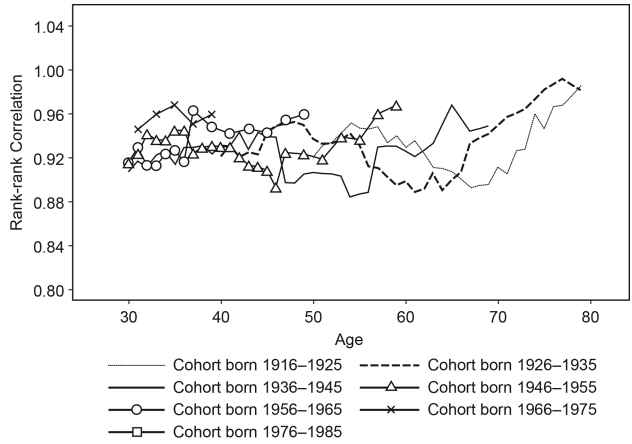

Fig. 14.5a Rank–rank coefficient for income by cohort

later when they are the 35–44 years old. We regress the rank when they are 35–44 years old on the rank when they were 25–34 years old and report the resulting coefficient. We repeat this exercise for every age. When the PSID switches to every other year, we use the observation 11 years later if we cannot use the measure 10 years later. For our youngest cohort, the first year we observe them at least 25 years old is 2011, and the last year of data is 2017. We measure mobility for this six-year period as our best proxy of the 10-year mobility, but caution should be used when comparing this youngest cohort to the older cohorts because the number of years between the two observations is different.

Figures 14.5a–c show the age-mobility profile using the rank-rank cor-

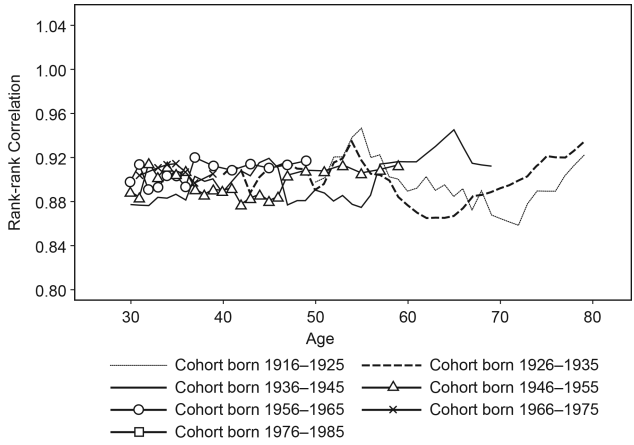

Fig. 14.5b Rank–rank coefficient for consumption by cohort

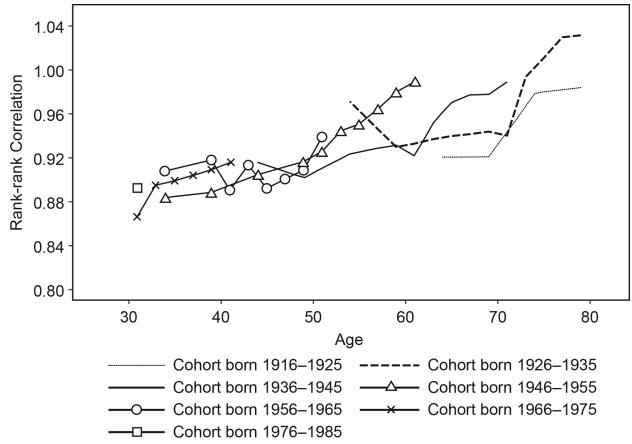

Fig. 14.5c Rank–rank coefficient for wealth by cohort

relation by cohort. Our Generation X cohort, those born between 1966 and 1975, have a higher income rank-rank correlation (0.94) around age 30 than the three older cohorts (0.92) we measure at age 30, indicating less income mobility for Generation X. For consumption and wealth, Generation X is in the middle of the two Baby Boom cohorts that just precede it.

No clear pattern across the life cycle emerges for income and consumption mobility (figures 14.5a–c). However, it does appear that the income rank-rank correlation is increasing over time (i.e., mobility is lower), as most cohorts see a higher rank-rank correlation in the last seven or eight observations that occur in the 2000s. Consumption mobility is relatively flat over the

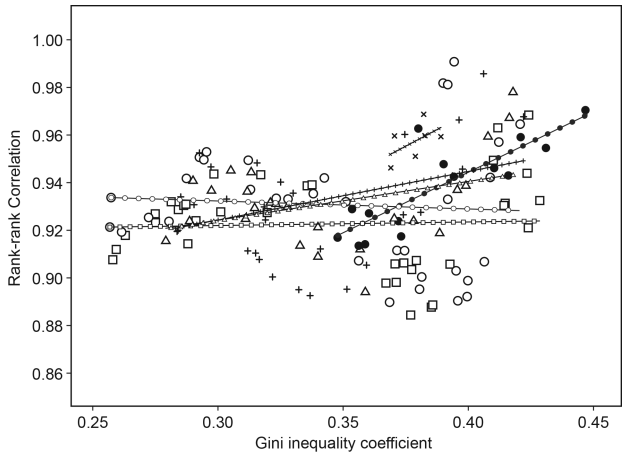

Fig. 14.6a Income Gini and rank-rank correlation by cohort

life cycle and over time. Wealth mobility differs, with significantly less mobility over the life cycle across all cohorts. As cohorts age, there is a relatively consistent increase in the rank-rank correlation or decrease in mobility.

In contrast to inequality, the pattern is that consumption mobility is greater than income mobility (figure 14.5). While theory predicts that consumption mobility should be lower than income mobility, we are not the first to document this pattern (Attanasio and Pistaferri 2016; Jappelli and Pistaferri 2006). We can rule out that this pattern is caused by the imputation because the PSID includes reported consumption from 1999 to 2017. Reported consumption mobility is higher than income mobility, as shown in the online appendix (figure A5, http://www.nber.org/data-appendix/c14444/appendix.pdf). As expected, reported consumption mobility is lower than imputed consumption mobility, but both exceed income mobility. Consumption mobility is also higher than income mobility using a Shorrocks measure of mobility and the Gini mobility. The Shorrocks measure uses fewer bins than the rank-rank correlation, while the Gini mobility is closer to a continuous measure than the rank-rank correlation. Using all three mobility measures demonstrates the consumption mobility is higher than income mobility across a wide spectrum of mobility measures.

Combining figures 14.4a–c and 14.5a–c yields intragenerational Great Gatsby curves in the spirit of the intergenerational Great Gatsby curves (Corak 2013). Figures 14.6a–c plot the rank-rank correlation with the Gini coefficient for the same resource measure. We include a linear best fit line by cohort. Similar to Corak (2013), we find that higher inequality is associated with less mobility. The pattern within a cohort and across cohorts is clearer for consumption and wealth, while the within cohort evidence for income

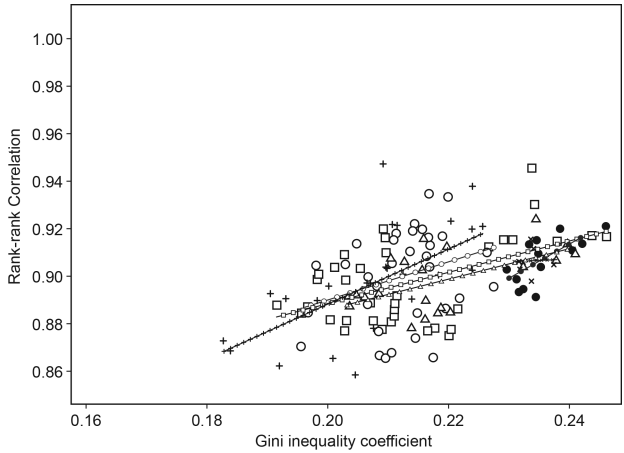

Fig. 14.6b Consumption Gini and rank-rank correlation by cohort

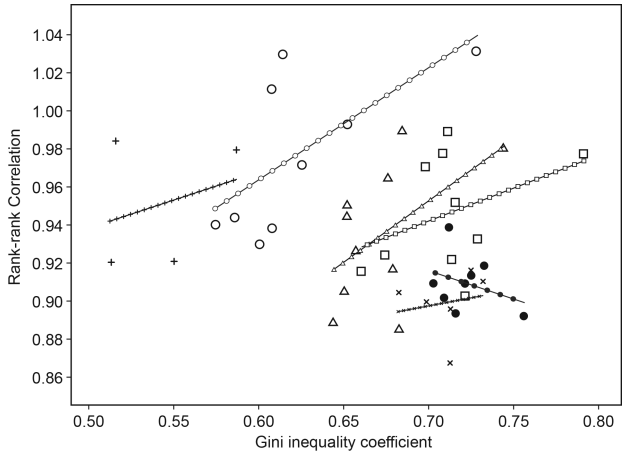

Fig. 14.6c Wealth Gini and rank-rank correlation by cohort

is more mixed. The evidence suggests that when a cohort is experiencing higher inequality, it also experiences less mobility. More evidence is needed to establish whether this relationship is causal.

14.4 Conclusion

Using income, consumption, and wealth provides a more complete picture of the inequality and mobility of individuals and families. In order to evaluate all three for the same individuals, we need a data source with all measures—the PSID provides that unique opportunity. While wealth

inequality is higher than income inequality, which is higher than consumption inequality, we find the reverse relationship for intragenerational mobility—consumption mobility is greater than income mobility, while there is more variation over the life cycle for wealth mobility. At younger ages, there is more wealth mobility but it decreases over the life cycle until there is less wealth mobility than income or consumption mobility. We also show that all cohorts experience a fall in intragenerational mobility for income and wealth. This is coupled with increasing inequality within cohorts. Finally, we find that the younger cohorts, while experiencing higher mean income and consumption than their older cohorts, also experience higher inequality and lower mobility.

An open question remains regarding the relationship between consumption mobility and income mobility. Like previous research, we find that consumption mobility exceeds income mobility, contrary to standard theoretical models. We ruled out that the result is generated by the imputation of consumption or by the mobility measure used. We find higher consumption mobility using reported consumption from 1999–2017 as well. And, we find that consumption mobility is higher than income mobility using three very different measures of mobility. Future research will need to continue to investigate this puzzle.

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