Preliminary. Comments Welcome.

Household Wealth Accumulation in the 1990s:

Trends, Determinants, and Implications

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ABSTRACT

This paper explores trends in household wealth accumulation using data from the 1989-2001 Surveys of Consumer Finances. We document that older households (aged 55-64, 65-74 or 75-84) in 2001 had more wealth than similarly aged households in 1989, but younger households did not. We find that changes in standard demographic factors (marital status, education, years in labor force, health status) can explain most of the divergent trends across age groups. This result may be surprising, given the very large capital gains that accrued during the 1990s, and suggests either that households consumed much of the capital gains they obtained, or that there was not anything "unusual" about wealth accumulation in the 1990s in the first place.

I. Introduction

This paper takes a bird's-eye view of household wealth accumulation patterns in the United States, and asks a series of simple but broad questions: To what extent are successive cohorts of American households wealthier than their predecessors? What are the principal determinants of these trends? What are the implications? To explore these questions, we use data from the successive cross-sections provided by the 1989-2001 Surveys of Consumer Finances (SCFs).

The study is motivated by several factors. First, given the importance of understanding what determines broad trends in wealth, surprisingly little is known about such trends or their determinants, despite literally hundreds of studies of particular aspects of saving or portfolio behavior. Second, the remarkable changes in aggregate wealth accumulation that occurred during the 1990s -- including dramatic increases in aggregate net worth and equity prices, and significant diffusion of stock ownership and in eligibility for and participation in 401(k) plans -- provide a potentially interesting environment in which to examine microeconomic patterns and determinants of lifetime wealth accumulation.

We document two key facts. First, older households (with heads aged 55-64, 65-74, or 75-84) in 2001 had significantly more wealth than did similarly aged households in 1989. For example, real median wealth for 65-74 year olds in 2001 was about $100,000 (60 percent) greater than for 65-74 year olds in 1989. Economically and statistically significant increases in wealth also occurred at all points in the wealth distribution and across all major wealth categories -- retirement accounts, other net financial assets, housing equity, and other assets. The second fact stands in sharp contrast: the typical

younger household (aged 25-34, 35-44, or 45-54) in 2001 did not have more wealth than a typical, similarly aged household in 1989.

The bulk of the paper is devoted to examining candidate explanations of these divergent trends and the implications of those explanations. We can conceptualize at least three possible explanations, which are not mutually exclusive. Older households might have had more wealth in 2001 than similarly aged households in 1989 because they received larger capital gains on housing and equities over their lifetimes, because they participated more frequently and of longer duration in defined contribution retirement accounts, or because of demographic reasons -- for example, because women in the 2001 generation spent more years in the labor force than did women in the 1989 generation and thus the households had more income during their working years.

Understanding the extent to which these or other scenarios explain the data is important because of the information revealed about the determinants of saving behavior and the implications for the saving and welfare of current and future generations. Under the first scenario, the gains of older households may be due to luck. Under the second scenario, the gains are more likely to be sustained by future generations and represent improvements in the adequacy of financial preparations for retirement. Under the third, the gains in wealth are also likely to be sustained, but they may not imply improvements in the adequacy of saving if having higher income during working years raises the amount of resources needed to maintain living standards in retirement.

Our central finding is that for older generations the increase in wealth is closely tied to changes in demographic characteristics. This result arises in median regressions, decomposition of changes in mean wealth using the Oaxaca-Blinder decomposition, and

decompositions of the entire distribution of wealth using the techniques outlined in DiNardo, Fortin, and Lemieux (1996) and Machado and Mata (2003). The demographic factors employed include marital status as well as education, years in the full-time labor force, and self-reported health status for both the household head and spouse. Younger households experienced almost no increase in their real net worth over this period, in part because their demographic characteristics were substantially more stable.

The finding that demographic trends can explain the principal features of the data does not rule out the possibility that other factors also affected wealth accumulation. But it is difficult to tell a consistent story based on abnormal capital gains or the rise in defined contribution coverage. If the extra wealth accumulation for older households was due to unusual capital gains, it is unclear why younger households did not have wealth gains worth noting, especially because the likelihood of stock ownership rose by a much greater amount among younger households than older households. Likewise, it is difficult to attribute the wealth gains to the growth of defined contribution plans because changes in participation across age groups does not mirror the changes in wealth noted above. Nevertheless, more formal testing of the role of these and other factors is an important priority for future research.

Section II describes the SCF data. Section III establishes the trends in the data. Section IV measures the determinants of these trends. Section V concludes.

II. Data

The SCF has several useful attributes for the study at hand. The data are of high quality. The survey provides information on the entire distribution of wealth by covering

a wide range of age groups, oversampling wealthy households,[1] and including a broad range of household assets and liabilities, including social security and defined benefit pension wealth, as well as financial and real assets. The survey design has been constant since 1989, facilitating comparisons over time. The main drawback of the survey is its relatively small sample size of approximately 4,000 households.

Our measures of net worth and its components follow the SCF definitions except for the treatment of pension wealth. Because the SCF defines net worth as resources that a household may immediately access and control, defined benefit wealth – which can not be accessed until retirement – is excluded, and defined contribution wealth includes only balances in such accounts that workers can borrow against or withdraw funds from in an emergency.

This definition of pension wealth may systematically overstate the growth in pension benefits over time. Over the past twenty years the employer pension system has moved dramatically toward defined contribution plans and away from defined benefit plans. Furthermore, among defined contribution plans, firms have shifted from illiquid to liquid plans (as defined by the SCF). To address this issue, and provide more comprehensive evidence on changes in household wealth, we include all defined contribution balances, as well as estimates of defined benefit wealth, in the wealth definition.[2]

[1] About two-thirds of the households in the survey are drawn from a stratified, nationally representative random sample. The remainder are randomly selected from statistical records derived from tax returns, using a stratification technique to oversample households likely to have substantial wealth.

[2] The appendix describes our procedures for calculating defined benefit wealth. Kennickell and Sundén (1997) and Wolff (2002) have previously estimated the value of defined benefit wealth with the SCF. Samwick and Skinner (2004) estimate the employer-reported values of defined benefit pensions from the Pension Provider surveys that accompanied the 1983 and 1989 SCFs.

The SCF also includes substantial information on household demographic characteristics and on the current and past jobs held by the household head and spouse. From this information, we construct variables for marital status, total number of years worked full-time, highest grade of education completed, and self-reported health status. We calculate the last three variables separately for men (the household head unless it is a same-sex couple) and women (the household head in a widowed/divorced/single household or the spouse in a married household). For married households, we also determine whether the current marriage is the household head's first marriage and the length of the current marriage. For widowed and divorced households, we determine how many years ago the previous marriage ended.

III. Trends in Wealth, Demographics, Pensions, and Asset Ownership

A. Wealth

Older households, defined as those headed by a person ages 55 or older, had more wealth in 2001 than households of the same age did in 1989, whereas younger households generally had the same amount of wealth in 2001 as similarly aged households in 1989.

Median net worth, for example, of a household with a head between the ages of 65-74 was $164,000 in 1989 and $262,000 in 2001 (Figure 1). The other two older age groups – 55-64 and 75-84 – had wealth increases of about the same amount. In contrast, the median net worth of a household with a head between the ages of 35 and 44 was $110,000 in 1989 and $99,000 in 2001 (Figure 2) and the other two younger age groups – 25-34 and 45-54 – also had no wealth increases.

Average net worth for the older households increased $200,000 to $300,000 over this time period (Figure 3), whereas the increases for the younger age groups ranged from $7,000 to $65,000 (Figure 4). In each of the four major wealth subcategories – retirement wealth, other financial wealth, home equity, and other real assets – average wealth was higher in 2001 than in 1989 for older households but not necessarily for younger households. Average retirement wealth was $78,000 higher in 2001 for the 55-64 group, $36,000 higher for the 65-74 group, and $62,000 higher for the 75-84 group (Figure 5). Among the younger groups, the 45-54 group had a mean $28,000 increase, but the increases for the other two groups were $3,000 or less (Figure 6).

Average home equity dropped for almost all age groups in the recession of the early 1990s, but the drops were much larger for younger households and the subsequent increase in home equity was substantially more muted. The average home equity of households in the 65-74 group, for example, was $95,000 in 1989, $92,000 in 1992, and $127,000 in 2001 (Figure 7). The average home equity of households in the 35-44 group was $62,000 in 1989, $44,000 in 1992, and $63,000 in 2001 (Figure 8).

Mean financial assets rose in each of the age groups (Figures 9 and 10). Although the arithmetic difference was larger for the older groups, the proportional increases were quite substantial for all groups. Other real assets rose for the two oldest groups and were roughly flat for the lower four age groups (Figures 11 and 12).

Perhaps most surprisingly, the higher net worth of older households in 2001 compared to 1989 occurs at all points of the distribution, not just at the median or mean. For the three younger groups, the cumulative distribution function (CDF) of net worth in 2001 approximately coincides with the 1989 CDF (Figures 13, 14, and 15). For all three

older age groups, the cumulative distribution function (CDF) of net worth in 2001 lies strictly to the right of the corresponding CDF in 1989 (Figures 16, 17, and 18).

B. Demographics

The demographic trends generally mirror the pattern shown in the wealth accumulation data. Demographic characteristics "improved" in a number of ways for older households relative to younger households.

For example, the share of households who are married increased among older households and decreased among younger households between 1989 and 2001. For example, from 1989 to 2001 the percent of married households increased from 50 to 58 percent for the 65-74 age group but decreased from 64 to 58 percent for the 35-44 age group (Table 1). Data from the Current Population Survey show a similar, although more muted, pattern: the corresponding changes were an increase from 53 to 55 percent for the 65-74 age group and a decrease from 65 to 61 percent for 35-44 age group.

The increase in the number of older married households may stem from increases in male longevity. Since 1975, male longevity at older ages has increased relative to female longevity because smoking-related deaths have risen for women but not for men. Over the 1989-2001 period, for example, male life expectancy at age 65 increased by 12 months whereas female life expectancy increased by 2 months (Bell and Miller (2002), Table 10). Perhaps reflecting these trends, the percent of widowed households in the 65-74 age group fell from 35 percent in 1989 to 22 percent in 2001 and the percent of households that were headed by a male increased from 60 to 72 percent.

Among younger households, the decrease in percent married appears to stem from delays in the age of first marriage. From 1989 to 2001, the percent of households ages

35-44 with a head who is either single or living with a partner increased from 16 percent to 22 percent. The share of 35-44 year olds that were with a "partner" or married held constant at 67 percent in the two years.

Consistent with the increases in longevity, the share of older households who report their health as "excellent" or "good" increased over the 1989-2001 period. The increase for households in the 65-74 age group, for example, was from 57 to 61 percent. Younger households, however, had a decrease in the number of healthy households: 87 percent of households ages 35-44 rated their health as good or excellent in 1989 and 83 percent rated their health as such in 2001. Although sampling fluctuations may account for this drop, there is some evidence that increased rates of asthma and diabetes have eroded the health of younger households (Lakdawalla, Bhattacharya, and Goldman, 2001).

Educational attainment rose across all age groups, although the changes for men are larger for older households. The share of men in the 65-74 age group with post-secondary education increased from 31 percent in 1989 to 49 percent in 2001, whereas the share rose from 50 percent to 62 percent for men in the 45-54 age group (Table 1).[3] For women, the corresponding increases were from 27 to 44 percent for the 65-74 group and from 44 to 59 percent for the 45-54 group. Data from the Current Population Survey show comparable increases. The GI Bills for World War II and Korean war veterans, the democratization of the college application process, the rise in community colleges, and the advent of birth control account for at least some of these increases (Goldin 1999, Goldin and Katz 2002, Stanley 2003).

[3] The share of men in the 35-44 age group with post-secondary education actually fell by four percentage points over this period, but the other two younger age groups saw increases.

Labor force participation increased for women in all age groups over this period but stayed constant for men. For example, on average women in the 65-74 group had 19 years of full-time work experience in 1989 and 22 years of experience in 2001 (Table 1). Men in this age group had 42 years of experience in both years. Some of the forces underlying the increase in women's labor force participation are labor-saving devices that made housework less burdensome, the rise of the clerical sector, the growth of formal education, and decreased sex discrimination (Costa, 2000), as well as increased access to birth control (Bailey, 2004).

C. Pension Coverage

Pension coverage did not exhibit the clean difference in trends between older and younger households that some of the demographic trends exhibited. For example, pension coverage rose in the youngest (ages 25-34) and oldest (ages 75-84) groups, but was roughly constant in the other age groups (Table 2). Pension coverage is defined as having a pension from a current or past job or an individual retirement account (IRA).

The composition of pension coverage shifted from defined benefit to defined contribution plans in all age groups. Coverage by a defined contribution plan from a current or past job or from an IRA was 9 to 23 percentage points higher in 2001 than in 1989. Oldest households had the largest increase. Coverage by a defined benefit plan from a current or past job fell by 8 to 20 percentage points for most age groups but rose insignificantly for the oldest group. However, defined benefit coverage appears to have fallen less among households employed in good jobs with ample benefits, as the percent of households with both defined benefit and defined contribution coverage fell by 3 to 8

percentage points for the younger age groups and rose by 14 percentage points in the oldest age group.

The increases in all forms of pension coverage for the 75-84 age groups may result from the strong growth in pension coverage over the 1950s. For example, the percent of the labor force covered by pensions rose from 22 percent in 1950 to 40 percent in 1965 (U.S. Department of Labor, 1986, Table 28). Thus pension coverage may have been low in the early working years for households ages 75-84 in 1989.

Pension coverage has risen especially among women because more women are earning pension benefits based on their own work records and more widows are receiving spousal benefits. Specifically, pension coverage among widows increased after the Retirement Equity Act of 1984 required married defined benefit pension beneficiaries to receive benefits in the form of a joint-and-survivor annuity unless the spouse explicitly waived this right (Aura, forthcoming). In the SCF data, the share of women with pension benefits, either from their own work records or from a survivors' benefit, was 10 percentage points higher in 2001 than in 1989 for the youngest age group and was 4 to 13 percentage points higher for the three oldest age groups.

As defined contribution plans become more established, the number of years that households have participated in them has increased. For example, the median length of participation in a defined contribution plan, conditional on being a male working fulltime, increased by 2 years for the 35-44 age group. We exclude women from this calculation so that we do not confound increases in the length of defined contribution participation with increases in labor force participation.

D. Asset Ownership

Stock ownership was 13 to 26 percentage points higher in 2001 than in 1989 (Table 3), depending on the age group. In contrast with demographic factors, which generally improved most for older groups, and pension coverage, which did not display a clear pattern with respect to age, stock ownership grew the most for *younger* households. The youngest age group had the largest increase and the oldest age group had the smallest. The subcategories of stock ownership suggest that the bulk of this increase came from stocks held through defined contribution plans or IRAs; this form of stock ownership increased by 10 to 26 percentage points. The share of households owning stock through mutual funds increased by approximately 12 percentage points across all age groups and the percent of households owning stock directly increased by 6 percentage points for the younger groups but not by much for the older groups.

Home ownership rose by 2 percentage points for the youngest age group and by 5 to 6 percentage points for the two oldest age groups. Innovations in mortgage underwriting, such as decreases in the size of down payments, may have boosted homeownership among younger households. Demographic changes, including improved health and a decreased probability of being widowed, may have made it feasible for more older households to remain in their homes.

IV. Decomposition of Changes in Wealth

Decomposing the changes in wealth is of interest because different sources of wealth change have different implications for understanding saving behavior and for the welfare of current and future generations. Ultimately, our goal is to decompose the

changes in wealth into demographic sources, changes in pensions, any unusual capital gains that occurred during the sample period, and other factors (including the interactions of these factors). Our research to date, however, only examines the extent to which demographic factors can explain the trends in wealth. Perhaps surprisingly, however, we find that demographic factors explain a substantial share of the wealth changes.

The demographic factors examined earlier may all affect wealth accumulation. Married households may benefit from the economies of scale and household production associated with marriage and thus save a larger fraction of their income than unmarried households.[4] Workers with better health may spend more years in the labor force and face fewer out of pocket medical expenses. More educated workers generally have higher lifetime earnings and are more likely to be invested in the stock market.[5] Workers who spend more years in the labor force may have higher lifetime earnings.

A. Decomposition Techniques

We use four different methods to determine how changes in demographic characteristics affect wealth accumulation. First, we run separate median regressions for each age group on the pooled 1989 and 2001 data. A dummy variable for "year=2001" captures the change in median wealth between the 1989 and 2001 groups. If demographic changes explain most of the change in wealth between 1989 and 2001, the coefficient on the dummy variable should decrease sharply when demographic characteristics are added to the regression. This method assumes that the relationship between wealth and demographic characteristics is the same in both years (other than a shift in the intercept).

[4] See Lupton and Smith (2003) for evidence that married households save more than other types of households.
[5] See Dynan, Skinner, and Zeldes (2003) for evidence that saving increases with education.

Second, we use the familiar Oaxaca-Blinder decomposition to examine how much of the change in mean wealth for each age group comes from changes in the demographic characteristics over time and how much comes from all other factors – that is, from changes in the relationship between wealth and demographic characteristics over time. Suppose that wealth W in a given year (say, 2001) is estimated as a linear combination of demographic characteristics X: $W_{01} = X_{01}\beta_{01} + \varepsilon_{01}$. By the assumptions of ordinary least squares, $E(W_{01}) = E\left(X_{01}\beta_{01}\right) = E(X_{01})\beta_{01}$. We estimate $E(X_{01})$ with its sample analog $\overline{X}_{01}$ and thus can express the difference between mean wealth in 2001 and mean wealth in 1989 as

$$E(W_{01}) - E(W_{89}) =$$

$$(\overline{X}_{01}\beta_{01} - \overline{X}_{01}\beta_{89}) + (\overline{X}_{01}\beta_{89} - \overline{X}_{89}\beta_{89}) \text{ or}$$

$$(\overline{X}_{01}\beta_{01} - \overline{X}_{89}\beta_{01}) + (\overline{X}_{89}\beta_{01} - \overline{X}_{89}\beta_{89}).$$

In the above expressions, the term in which X is constant shows the percent of the change attributable to change in β and the term in which β is constant shows the percent of the change attributable to changes in X. As before, we run this decomposition separately for each age group.

Finally, to examine the effects of changes in demographic characteristics on the entire distribution of net worth, we simulate the density of net worth $f(w)$ as a function of demographic characteristics X from t_x =2001 and of the relationship between wealth and demographics from t_w = 1989. We use two techniques that are based on the following relationship:

$$(1) \qquad f(w; t_w = 1989, t_x = 2001) = \int f(w \mid X, t_w = 1989) dF(X \mid t_x = 2001)$$

DiNardo, Fortin, and Lemieux (1996) suggest estimating (1) with weighted kernel density techniques. They note that (1) can be rewritten as

$f(w; t_w = 1989, t_x = 2001) = \int f(w \mid X, t_w = 1989) \psi_x dF(X \mid t_x = 1989)$ where the

weight $\psi_x = \dfrac{dF(X \mid t_x = 2001)}{dF(X \mid t_x = 1989)}$. In essence, this term reweights the households in the 1989 Survey of Consumer Finances so that their distribution of demographic characteristics matches the distribution from the 2001 survey.

To estimate ψ_x, note that by Bayes' law,

$\dfrac{dF(X \mid t_x = 2001)}{dF(X \mid t_x = 1989)} = \dfrac{prob(year = 2001 \mid X)}{prob(year = 1989 \mid X)} \dfrac{prob(year = 1989)}{prob(year = 2001)}$. The first term can be obtained by estimating a logit model in which the dependent variable is a dummy variable for "year=2001" and the independent variables are demographic characteristics. Exponentiating the predicted value for each observation gives the odds $\dfrac{prob(year = 2001 \mid X)}{prob(year = 1989 \mid X)}$. We can ignore the second term because it is constant for all observations. With this weight in hand, we simply estimate a standard weighted kernel density on the 1989 data.

Machado and Mata (2003) propose estimating (1) with a resampling technique based on quantile regressions. They note that $f(w \mid X, t_w = 1989)$ can be approximated by estimating quantile regressions of the form $w = X\beta_\theta + \varepsilon$ at the quantiles θ of the 1989 wealth distribution. This specification imposes a linear relationship between wealth and demographic characteristics at each quantile. To obtain the distribution of wealth that would occur with the 2001 distribution of demographic characteristics and the 1989 relationship between wealth and demographics, they employ the following procedure:

1. Randomly draw a quantile θ from a uniform [0, 100] distribution and obtain the corresponding quantile regression coefficients β_θ from the 1989 SCF.
2. Randomly draw an observation from the 2001 SCF and obtain its set of demographic characteristics X.
3. Combine the coefficients β_θ from step 1 and the characteristics X from step 2 to obtain an observation from the counterfactual wealth distribution.
4. Repeat until a sample of the desired size is obtained.

Albrecht, Björklund, and Vroman (2003) used this procedure to examine the gender log wage gap in Sweden.

As before, we implement both decomposition procedures separately for each age group. If changes in demographic characteristics explain much of the changes in the distribution in wealth, the counterfactual density based on 2001 demographic characteristics and the 1989 relationship between wealth and demographics should lie near the actual 2001 wealth distribution.

B. Results

These decomposition techniques consistently indicate that changes in demographic characteristics can explain much of the increase in wealth among older households. For example, in the median regression technique, adding demographic characteristics takes away almost all of the 1989-2001 increase in wealth for the older age groups (Table 4). The difference in median wealth falls from $64,326 to $11,816 for the 55-64 group; from $94,996 to -$12,393 for the 65-74 group; and from $95,435 to $18,940 for the 75-84 group. Although the difference in the unconditional medians is statistically significantly different from zero for all three age groups, the difference in the medians controlling for

demographic characteristics is not and the drop in the magnitude of the coefficient on the 2001 dummy term is large in economic terms.

Controlling for demographic characteristics also changes the difference in median wealth for the younger households, but not in a systematic or statistically significant manner. The notable exception is the group aged 45-54: the median net worth of households in this age group, conditional on their demographics, was $22,000 *lower* in 2001 than in 1989. This coefficient suggests that households in this age group are accumulating significantly less wealth than would be predicted historically from their demographic characteristics.

Turning next to average net worth, the Oaxaca-Blinder decompositions indicate that much of the change in the average wealth of older households stems from demographic changes (Table 5). Specifically, about half of the increase in net worth for the age 55-64 group and almost all of the increase for the ages 65-74 and 75-84 groups can be attributed to changes in demographic variables. These results are robust to whether the decomposition is based on 2001 characteristics and 1989 β's or on 1989 characteristics and 2001 β's. At traditional significance levels, we can reject the hypothesis that the change stemming from changes in demographic variables is zero.

The Oaxaca-Blinder decompositions are significantly less stable for the younger groups, in part because the change in net worth that the decomposition is trying to explain is small. Although these decompositions indicate that demographic characteristics explain part of the change in average wealth, the results are not consistent across X and β combinations and are generally not statistically significant.

The decompositions of the entire net worth distribution are perhaps the most powerful evidence that demographic characteristics are a significant determinant of the higher wealth of older households in 2001. The counterfactual distribution of net worth, based on the 2001 characteristics and the 1989 relationship between demographics and wealth, nearly coincides with the actual distribution of net worth in 2001 for the 55-64 and 65-74 age groups and explains about half of the increase for the 75-84 age group (Figures 22 – 27). For expositional ease, net worth is shown on a log scale on the y axis. This result is robust to the choice of decomposition technique, although the Machado-Mata technique appears to behave erratically in the tails of the distribution.

For the younger age groups (Figures 19-21), the 2001 distribution of net worth is almost the same as the 1989 distribution. Thus, the decomposition has very little change to explain and the counterfactual density lies close to the actual densities.

V. Conclusion

We document substantial and widespread gains in wealth among older households in 2001 relative to households in the same age range in 1989, but also find that younger households in 2001 generally had not accumulated more wealth than similarly aged households in 1989. This result relates to findings in Wolff (2002), who documents declines in wealth for the age group aged 47-64 in 2001 compared to a similar age group in 1983. The difference in results may be due to the emphasis on different age groups, time periods, data adjustments, or econometric techniques.

Given that the changes that we document occurred in the 1990s, the presence of unusual capital gains and the rise in defined contribution pension coverage are two

natural candidate explanations for the rise in wealth among older households. Our descriptive results, however, show that demographic factors "improved" for older households in 2001 relative to 1989 and were generally constant for younger households. Formal tests indicate that the change in demographic factors is capable of explaining a substantial share of the change in wealth among groups over time.

The best interpretation of these results, however, is still somewhat open. Certainly, a natural interpretation of the finding that the relationship between wealth and demographic variables did not change over this time period is that household saving behavior did not change and, by extension, the non-demographic determinants of household saving behavior did not change.

Although the results do not rule out a role for unusual capital gains or the diffusion of defined contribution pension coverage, several features of the data suggest that it is hard to link such changes to the divergent wealth patterns documented above. Stock ownership rose more among younger households than older households, and pension coverage rose as much among younger households as older households. Alternatively, households may have experienced unusual capital gains and in response either increased their consumption or decreased their active saving in such a manner that the relation between demographic factors and wealth accumulation was unchanged.[6] For these and other reasons, formal testing of the role of capital gains, pension changes, and any interactions between the two is warranted.

[6] Maki and Palumbo (2001) present evidence that households with substantial capital gains in the 1990s significantly increased their consumption. Juster, Lupton, Smith, and Stafford (2004) document that households that received significant capital gains from equities decreased their saving.

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Wolff, Edward N. *Retirement Insecurity: The Income Shortfalls Awaiting the Soon-to-Retire*. Washington, DC: Economic Policy Institute (2002).

Appendix

The SCF asks each spouse to report information on up to three pension plans from their current job. In addition, the household can report information for up to six plans from previous jobs of the head or spouse and up to six plans from which either spouse is currently receiving benefits. Estimating the value of defined contribution pension plans and individual retirement accounts is straightforward: we simply sum the reported account balances for all such plans.

For defined benefit pensions, the SCF asks households when they expect to start receiving benefits and what they expect their monthly benefits to be. Households can report benefits as a percentage of pay at retirement or as a monthly dollar amount. We estimate the expected present value of this stream of payments using year-specific life tables from the National Center for Health Statistics.[7] To ensure that changes in pension wealth over time are not driven by temporary changes in interest rates and inflation, we use nominal discount rates of six percent and inflation rates of three percent in all years in computing the present value of future income from defined benefit plans. For households that report benefits as a percentage of pay at retirement, we assume one percent real wage growth from the year of the survey until the worker's expected year of retirement.

Comparing the current value of defined contribution accounts to the expected present value of future defined benefit payments is problematic, however, because DC account balances reflect wealth accumulation to date and DB wealth reflects wealth accumulated over a worker's entire career. As a result, if a defined benefit plan and a defined contribution plan pay the identical benefits in each year of retirement for a

[7] See http://www.cdc.gov/nchs/products/pubs/pubd/lftbls/lftbls.htm.

worker with a given set of characteristics, the reported value of the DC plan would be lower than the reported value of the DB plan using standard methods above at every age, except retirement, when they would be equal. (See Gale (1998) for further discussion.)

We experiment with two methods for putting defined contribution and defined benefit wealth on the same basis. First, we transform DB wealth to DB wealth accrued to date. Let g be the real growth in wages, T be the number of years that the worker has been on the job, N be the number of years until the worker leaves the job, w be the worker's annual wage, and a be the accrual rate. Assume that pension benefits are based on a maximum of 30 years of earnings. Then the benefit earned by the worker to date is

$$B_T = w(1+g)^T a[\min\{T,30\}] \quad (1)$$

and the benefit earned by the worker over his entire career is

$$B_{T+N} = w(1+g)^{T+N} a[\min\{T+N,30\}]. \quad (2)$$

To transform DB wealth into DB wealth accrued to date, we multiply DB wealth by the ratio of (1) and (2), or

$$\frac{B_T}{B_{T+N}} = \frac{\min\{T,30\}}{(1+g)^N \min\{T+N,30\}}$$

In computing this ratio, we use the self-reported year that the worker expects to leave his job.

Second, we transform DC wealth to wealth accumulated over a career by adding the expected present value of future employee and employer contributions. The SCF asks households the percentage of pay that the employee and the employer contribute to the

account. The SCF also asks workers when they expect to leave their current job. We assume, as before, one percent real wage growth and assume that workers and employers hold constant the percentage that they contribute to the plan until the worker's expected year of leaving the job. Like the first method, this method has the advantage of putting DB and DC wealth on a similar basis. However, because this method puts DB and DC wealth on a different basis than all other wealth accumulation, we emphasize the first method in our empirical work and use this method solely to establish the robustness of our results.[8]

One limitation of this data, obviously, is that it is self-reported. As documented in several studies, workers are often not well informed about their pension benefits.[9] In future work, we intend to compare the results with those arising from the Health and Retirement Study and adjust the pension benefits for taxes using the insights from Poterba (2004).

[8] Khitatrakun, Kitamura, and Scholz (2001) use this method to put DB and DC wealth on the same basis.
[9] Mitchell (1988), Gustman and Steinmeier (1989), Starr-McCluer and Sunden (1999) and Gustman and Steinmeier (2000) compare employer and employee reports of pension benefits and conclude that some workers are poorly informed about their pension benefits.

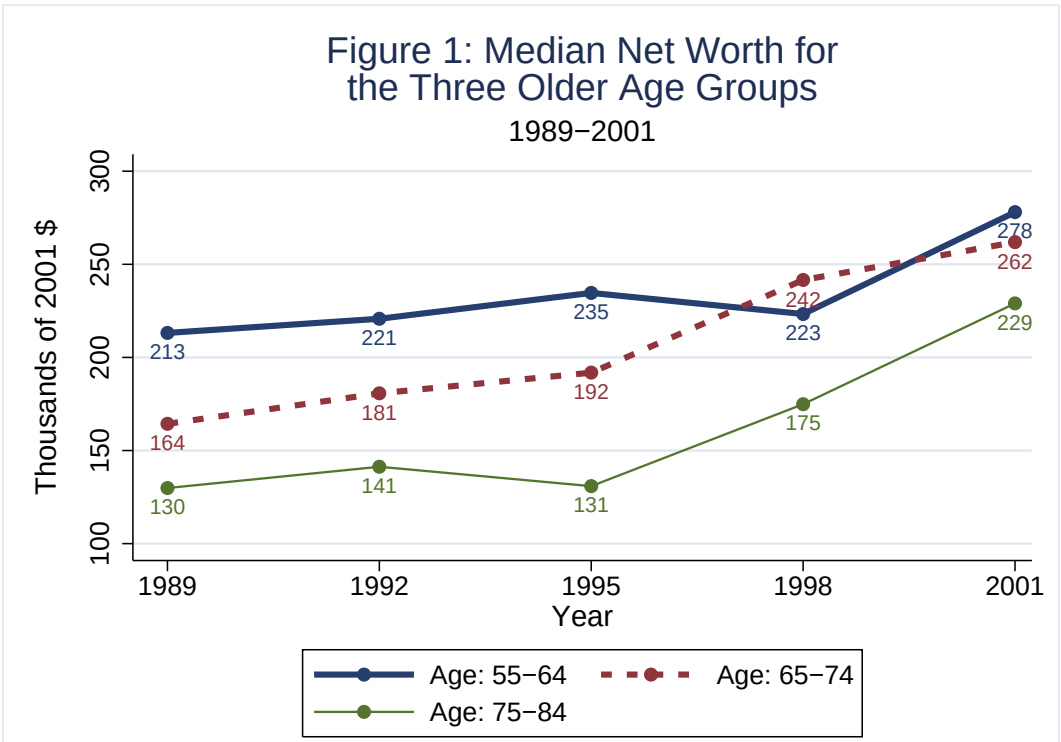


Figure 1: Median Net Worth for
the Three Older Age Groups
1989−2001
Thousands of 2001 $
100
150
200
250
300
1989
1992
1995
1998
2001
Year
213
221
235
223
278
164
181
192
242
262
130
141
131
175
229
Age: 55−64
Age: 65−74
Age: 75−84

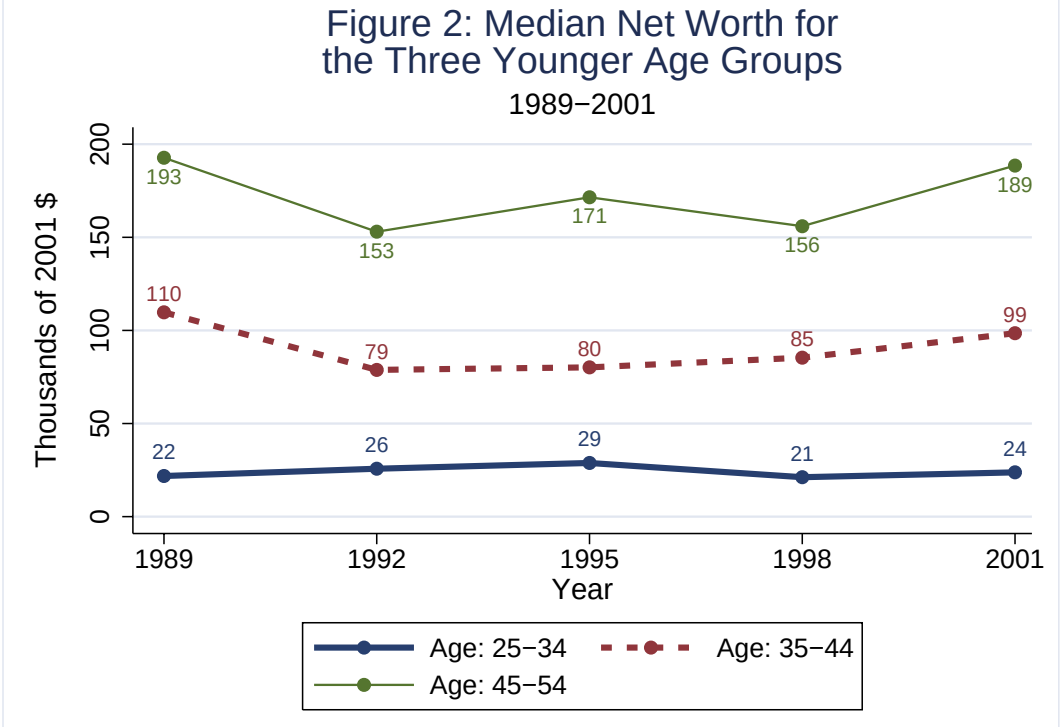


Figure 2: Median Net Worth for
the Three Younger Age Groups
1989−2001
Thousands of 2001 $
0
50
100
150
200
1989
1992
1995
1998
2001
Year
193
153
171
156
189
110
79
80
85
99
22
26
29
21
24
Age: 25−34
Age: 35−44
Age: 45−54

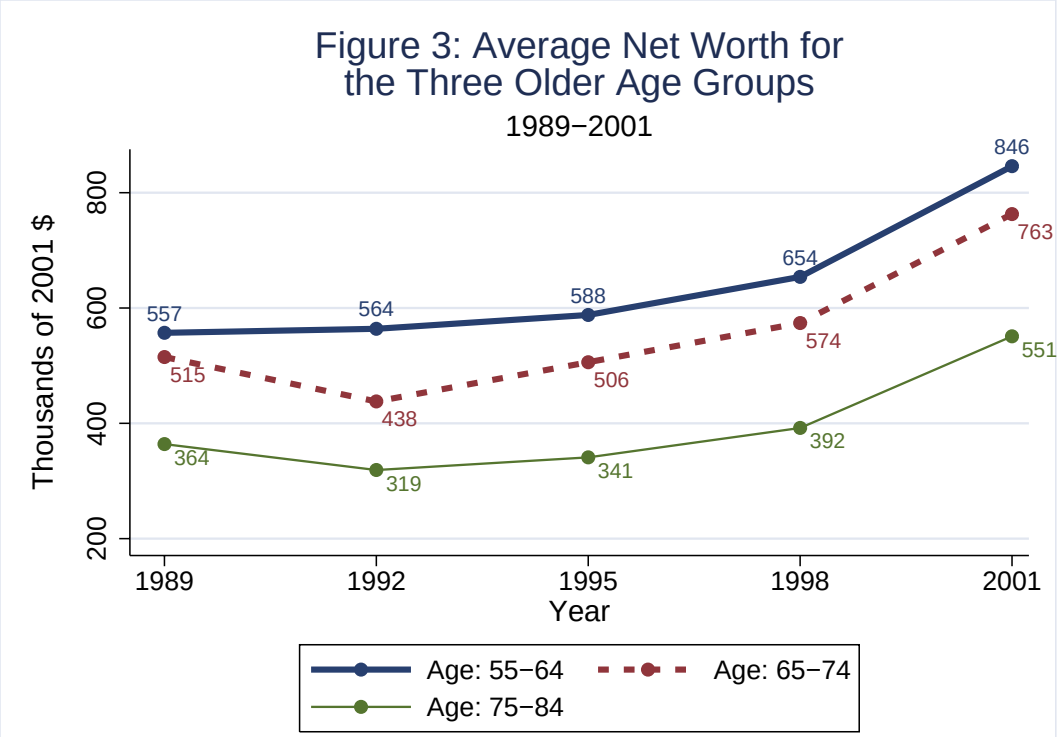


Figure 3: Average Net Worth for the Three Older Age Groups
1989−2001
Thousands of 2001 $
200
400
600
800
1989
1992
1995
1998
2001
Year
557
564
588
654
846
515
438
506
574
763
364
319
341
392
551
Age: 55−64
Age: 65−74
Age: 75−84

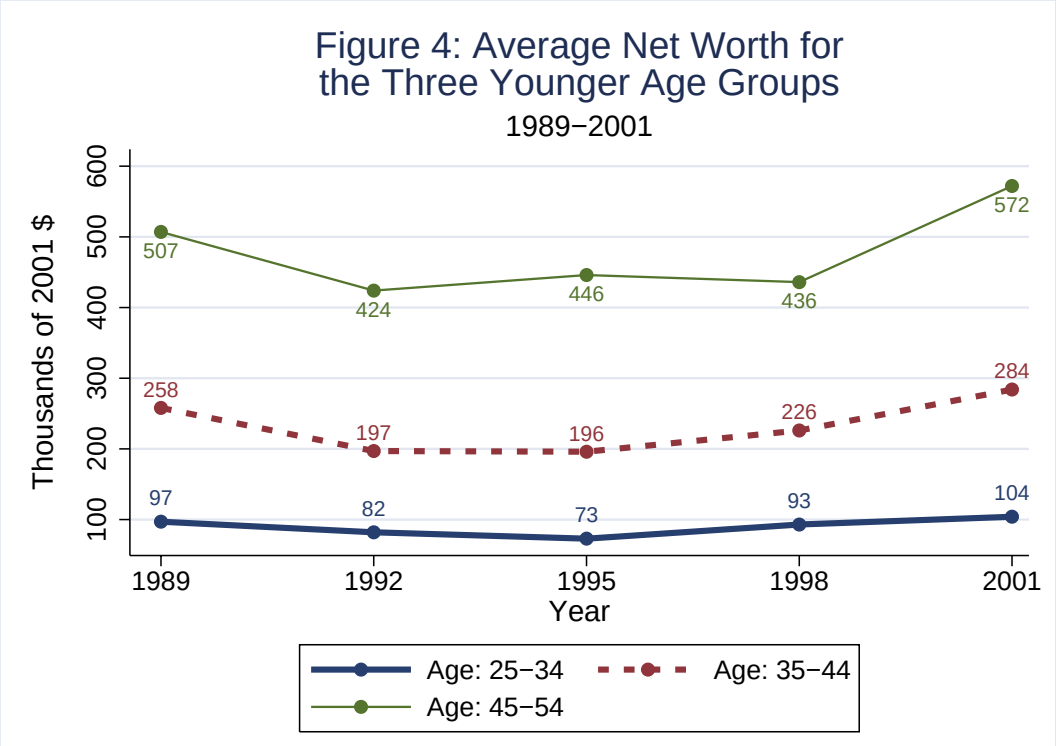


Figure 4: Average Net Worth for the Three Younger Age Groups
1989−2001
Thousands of 2001 $
100
200
300
400
500
600
1989
1992
1995
1998
2001
Year
507
424
446
436
572
258
197
196
226
284
97
82
73
93
104
Age: 25−34
Age: 35−44
Age: 45−54

Figure 5: Average Retirement Wealth for the Three Older Age Groups

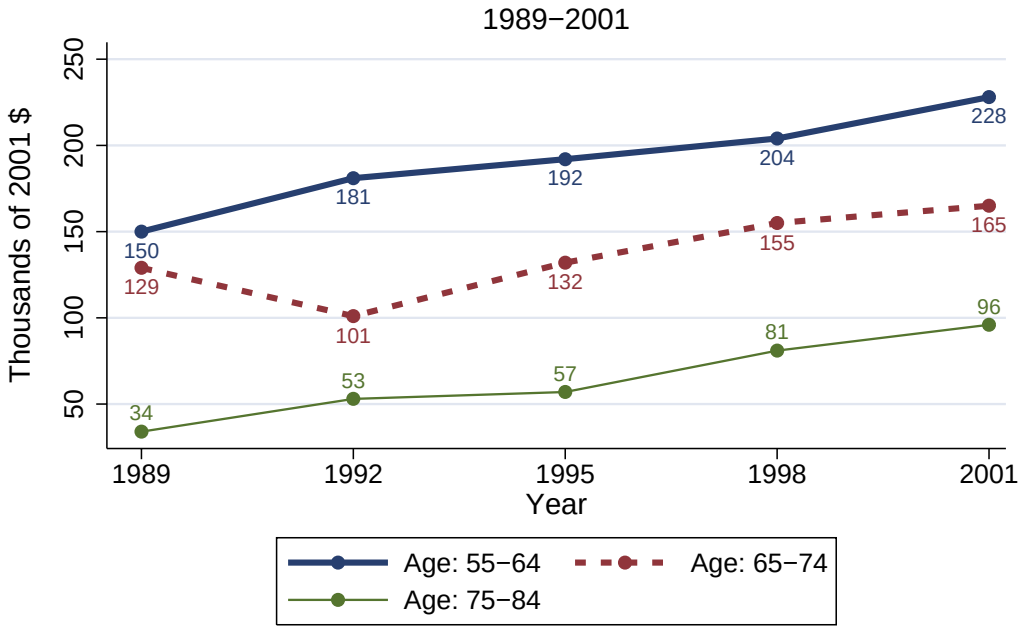
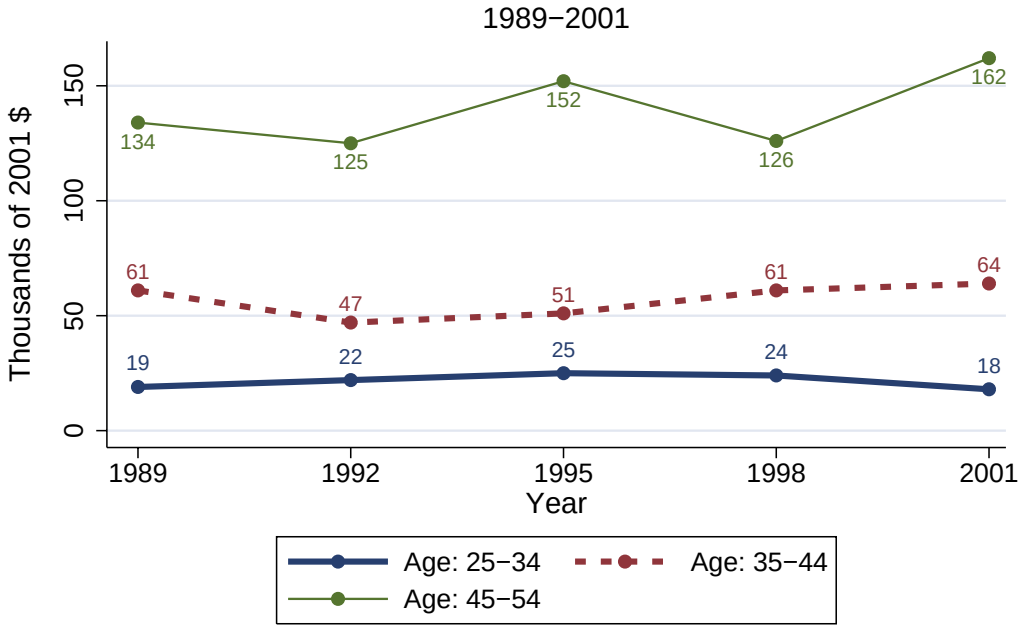


Figure 6: Average Retirement Wealth for the Three Younger Age Groups



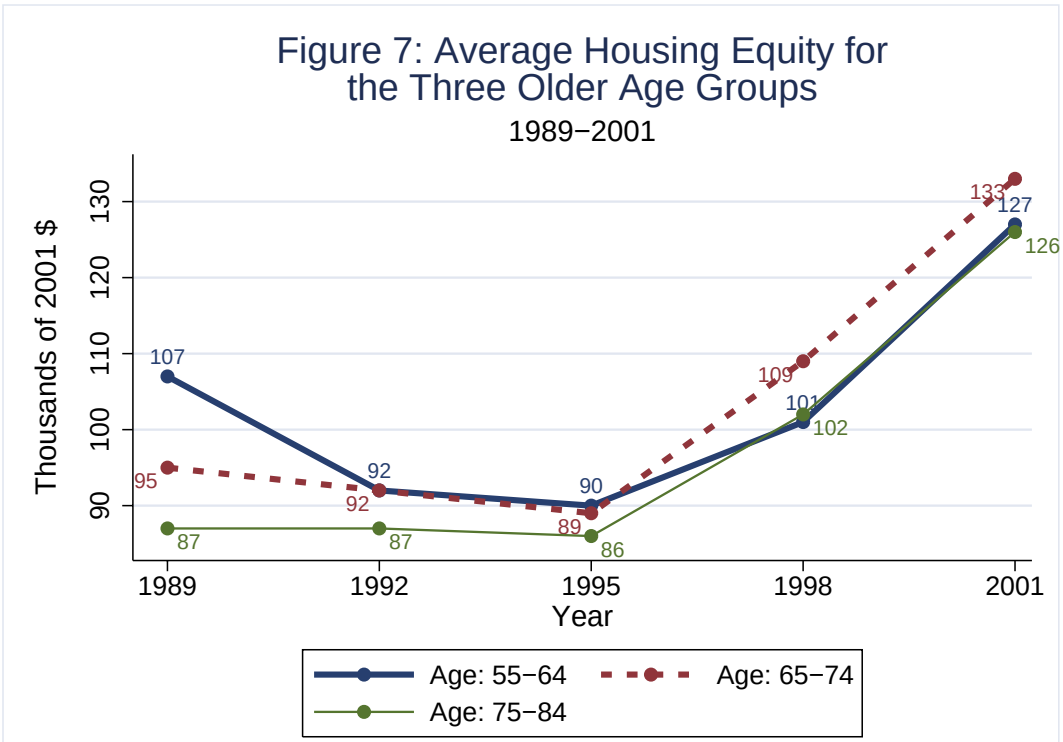


Figure 7: Average Housing Equity for the Three Older Age Groups
1989−2001
Thousands of 2001 $
90
100
110
120
130
1989
1992
1995
1998
2001
Year
107
92
90
101
127
95
92
89
109
133
87
87
86
102
126
Age: 55−64
Age: 65−74
Age: 75−84

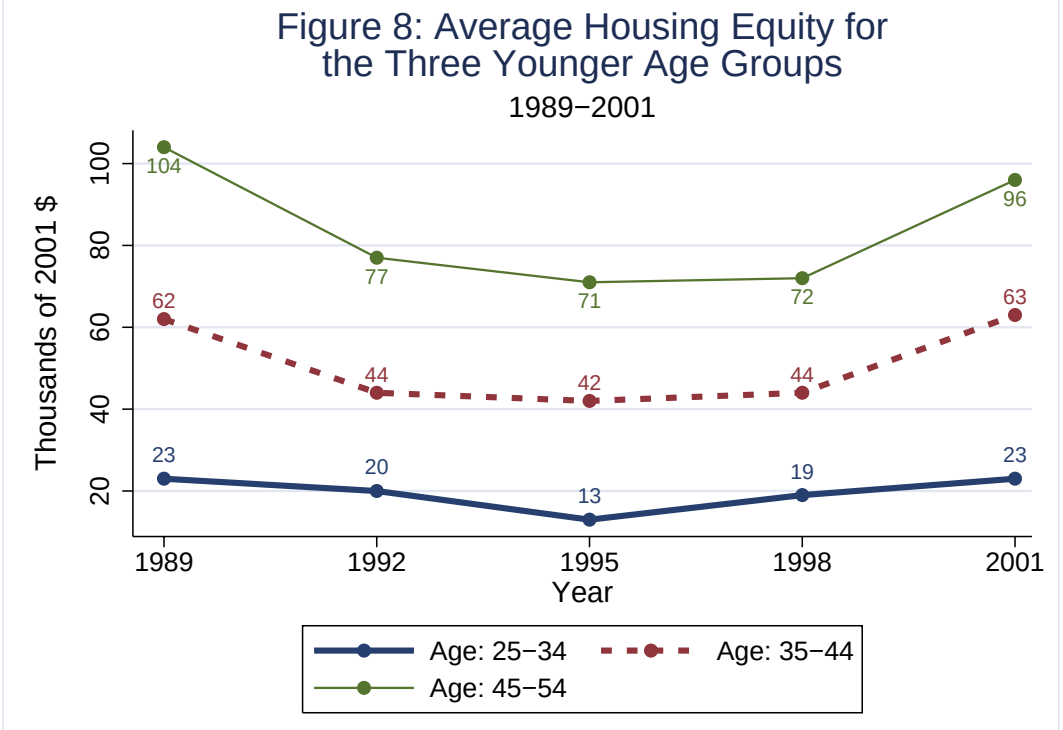


Figure 8: Average Housing Equity for the Three Younger Age Groups
1989−2001
Thousands of 2001 $
20
40
60
80
100
1989
1992
1995
1998
2001
Year
23
20
13
19
23
62
44
42
44
63
104
77
71
72
96
Age: 25−34
Age: 35−44
Age: 45−54

Figure 9: Average Net Financial Assets for the Three Older Age Groups

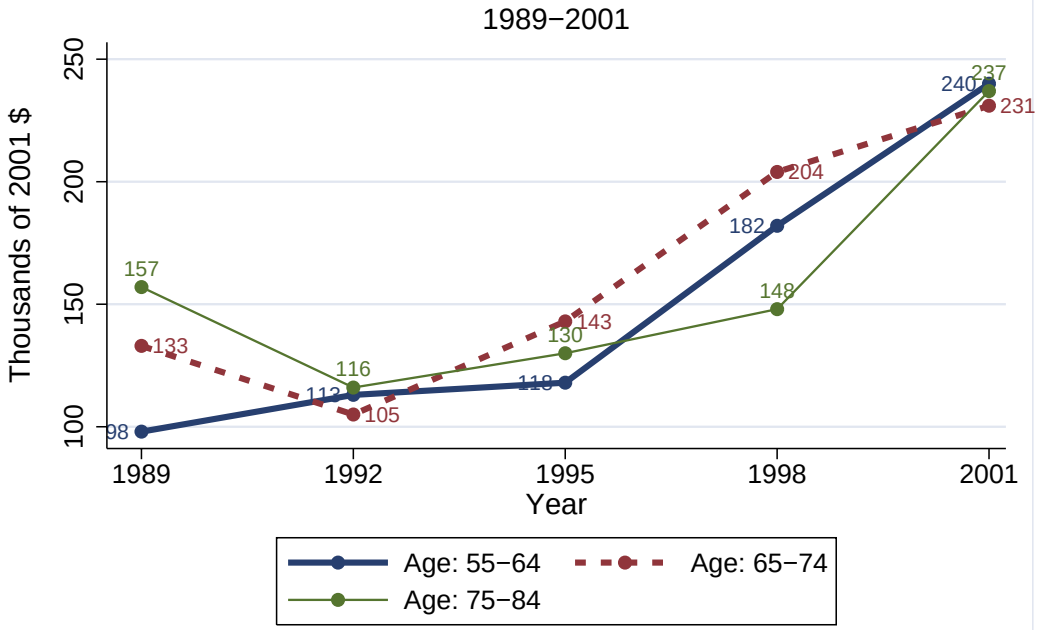
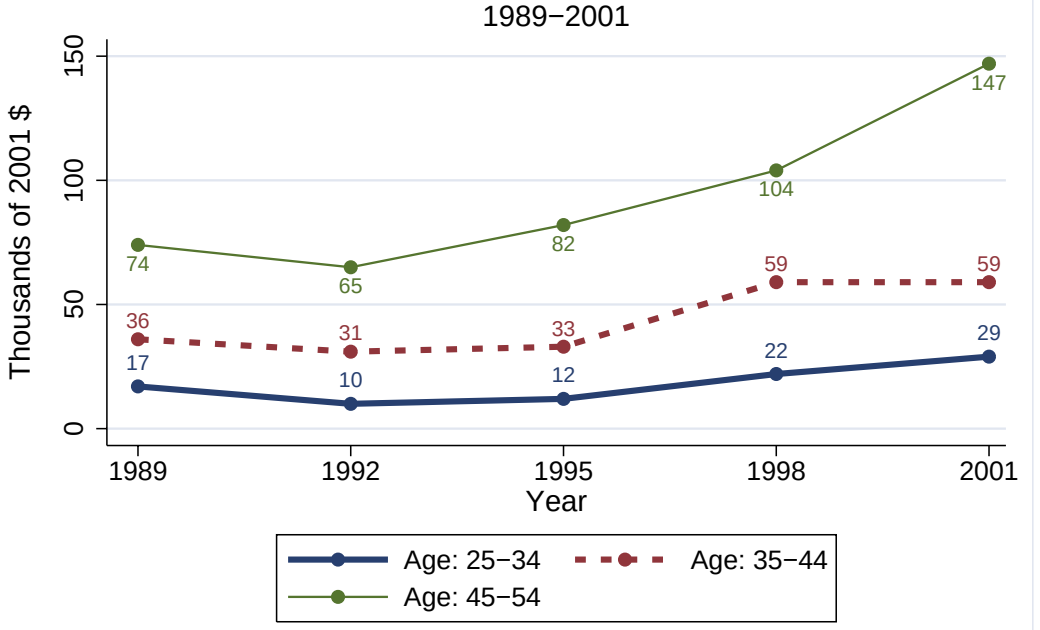


Figure 10: Average Net Financial Assets for the Three Younger Age Groups



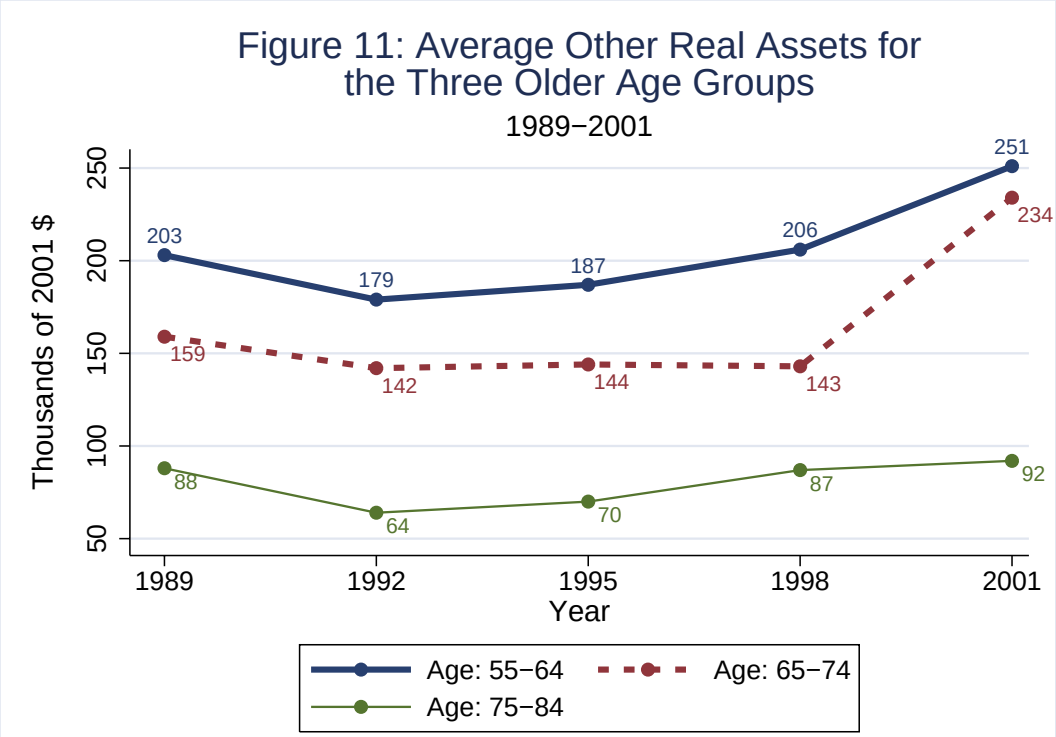


Figure 11: Average Other Real Assets for the Three Older Age Groups
1989−2001
Thousands of 2001 $
50
100
150
200
250
1989
1992
1995
1998
2001
Year
203
179
187
206
251
159
142
144
143
234
88
64
70
87
92
Age: 55−64
Age: 65−74
Age: 75−84

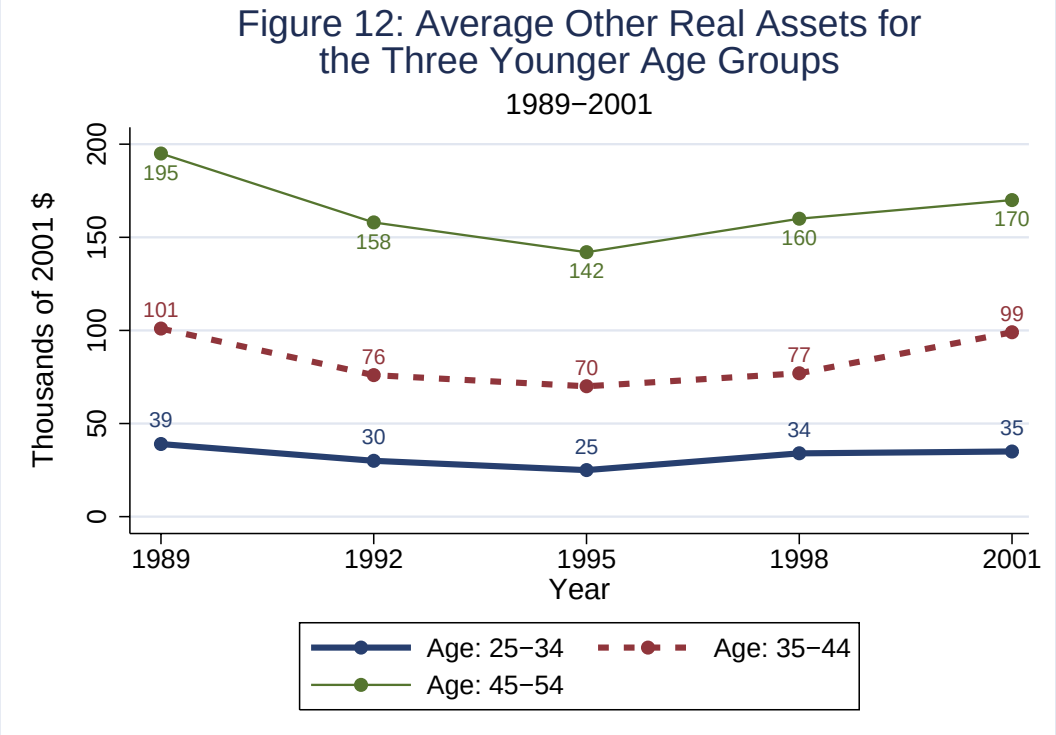


Figure 12: Average Other Real Assets for the Three Younger Age Groups
1989−2001
Thousands of 2001 $
0
50
100
150
200
1989
1992
1995
1998
2001
Year
195
158
142
160
170
101
76
70
77
99
39
30
25
34
35
Age: 25−34
Age: 35−44
Age: 45−54

Figure 13: CDF of Net Worth

Households Ages 25−34

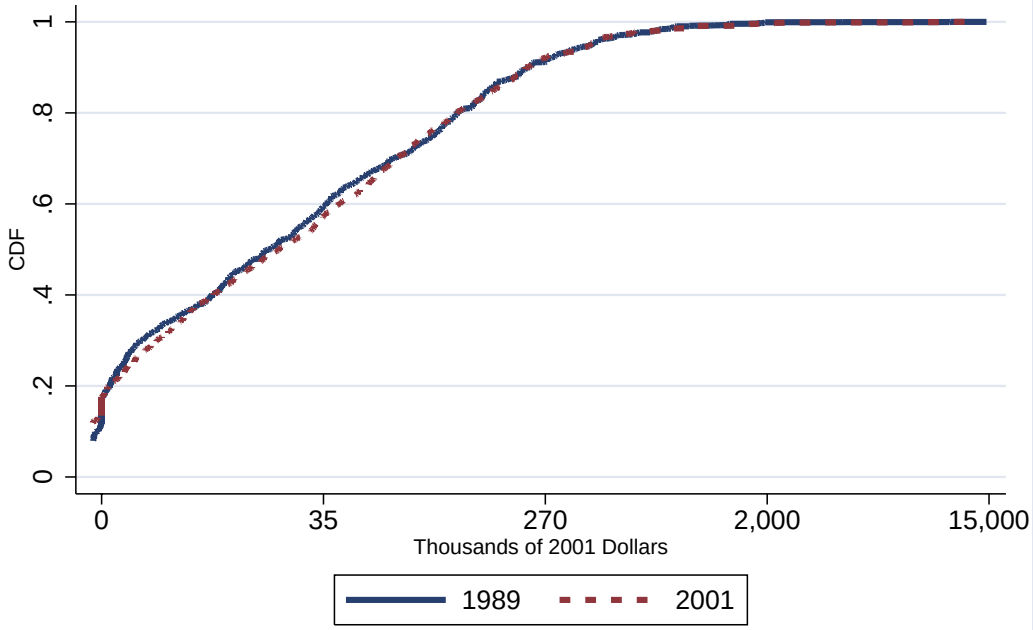


Figure 14: CDF of Net Worth

Households Ages 35−44

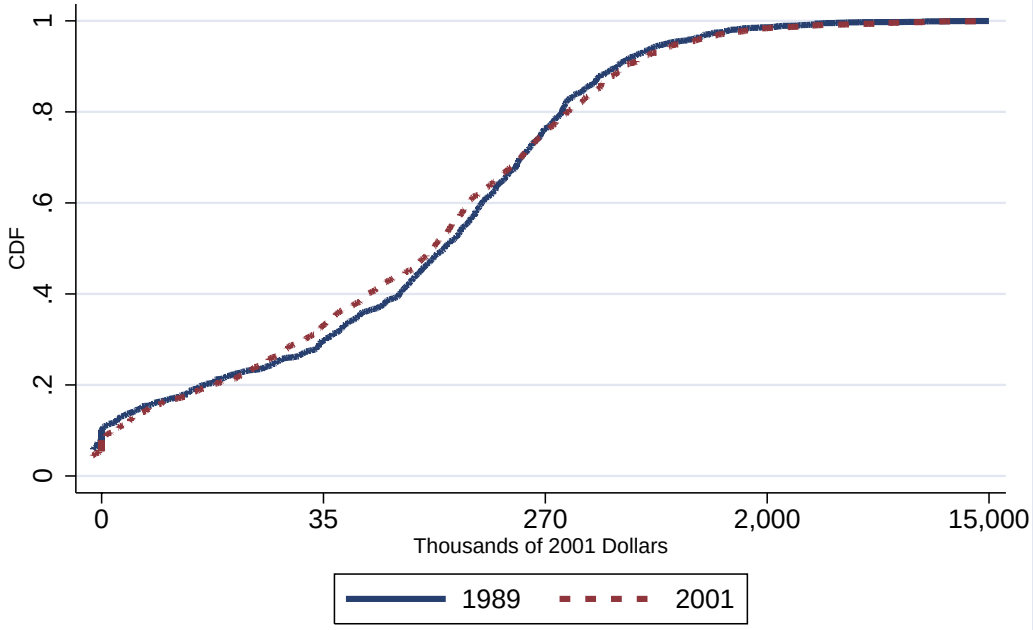


Figure 15: CDF of Net Worth

Households Ages 45−54

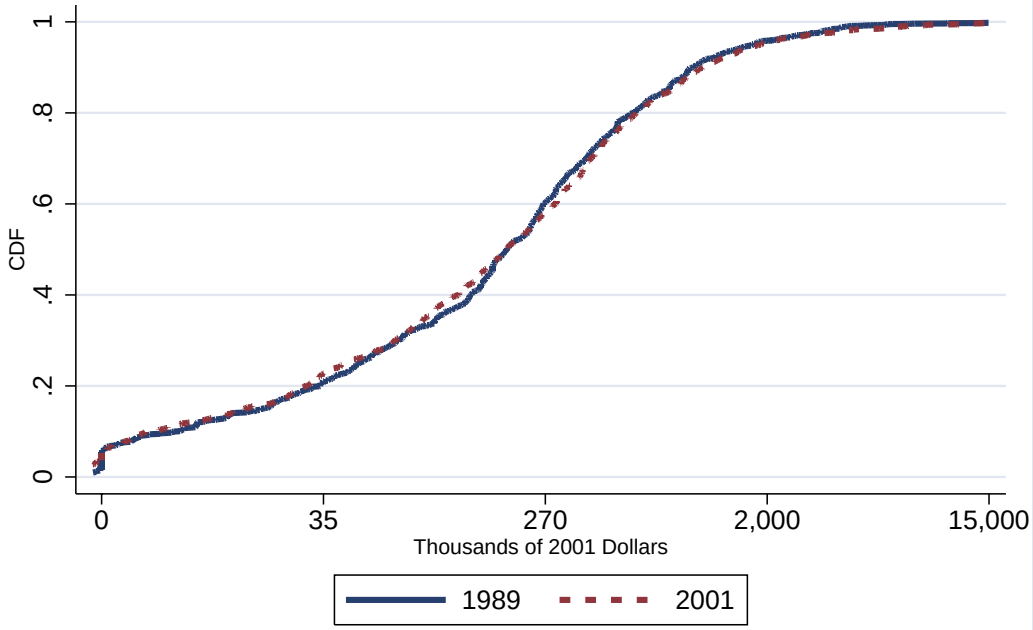


Figure 16: CDF of Net Worth

Households Ages 55−64

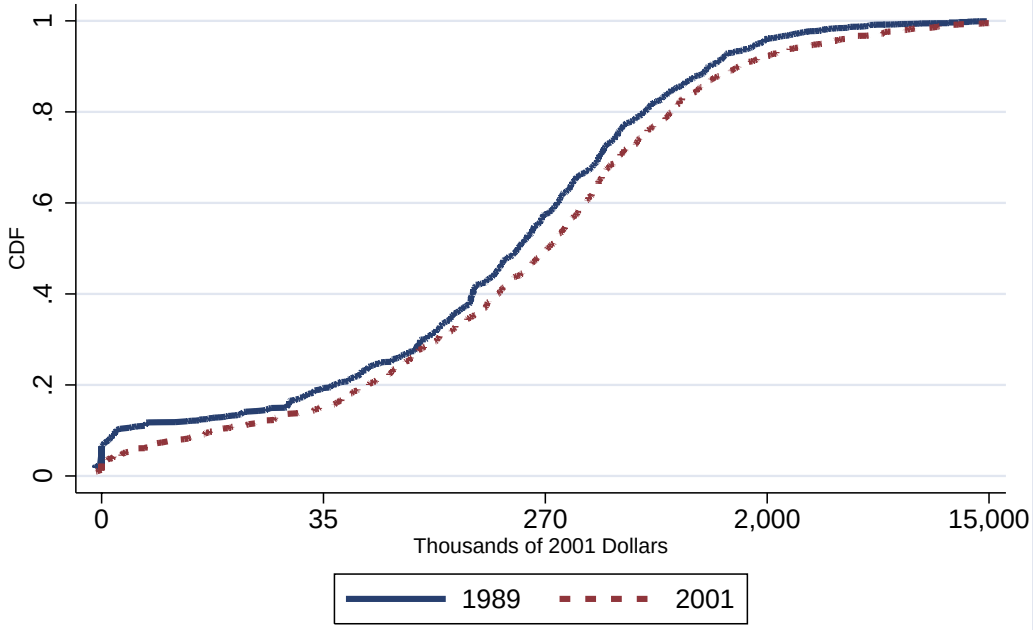


Figure 17: CDF of Net Worth

Households Ages 65−74

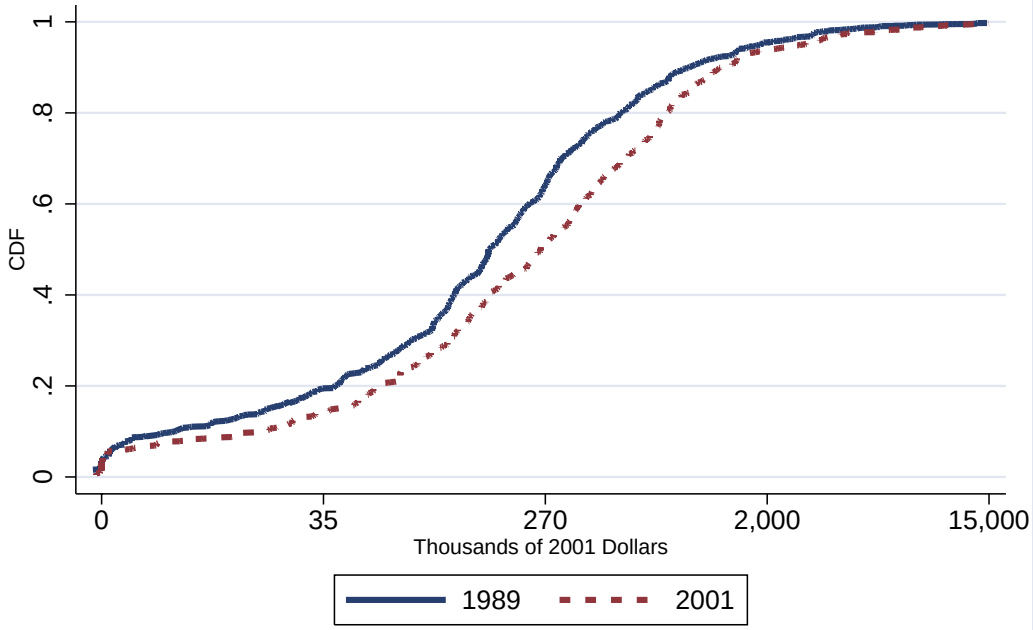
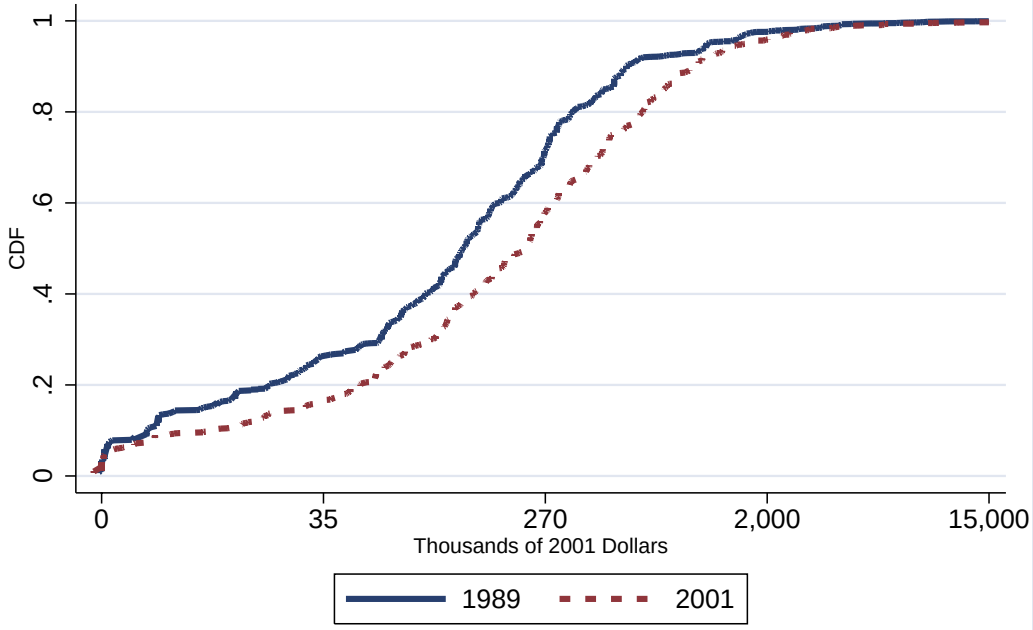


Figure 18: CDF of Net Worth

Households Ages 75−84



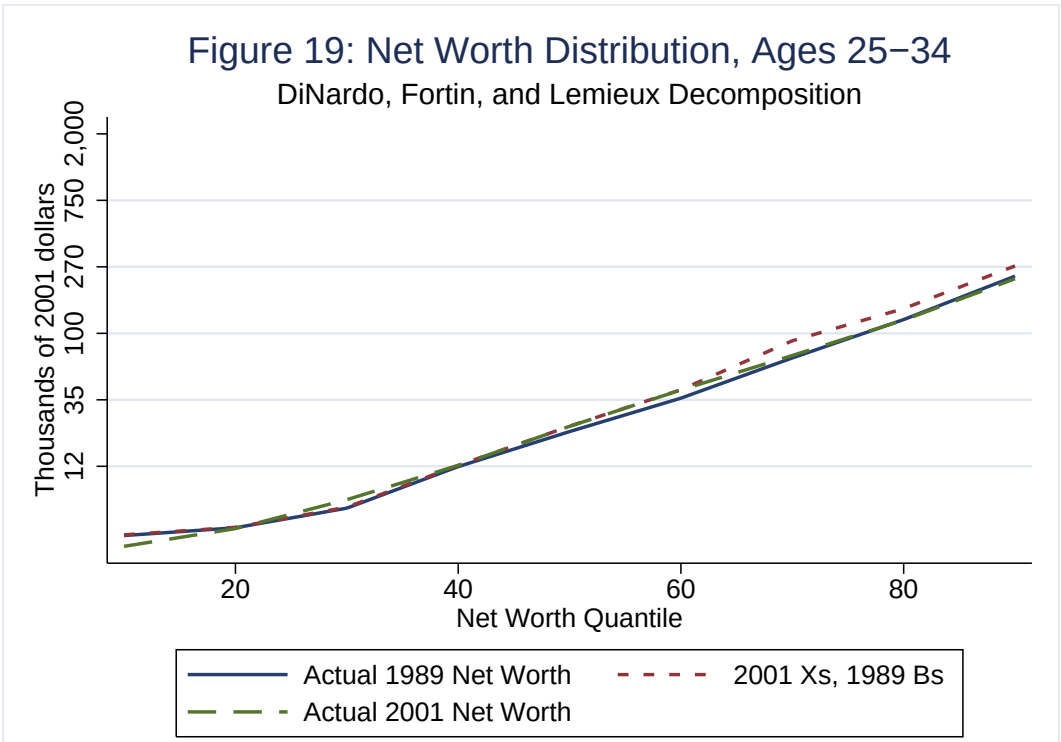


Figure 19: Net Worth Distribution, Ages 25−34
DiNardo, Fortin, and Lemieux Decomposition
Thousands of 2001 dollars
12
35
100
270
750
2,000
20
40
60
80
Net Worth Quantile
Actual 1989 Net Worth
2001 Xs, 1989 Bs
Actual 2001 Net Worth

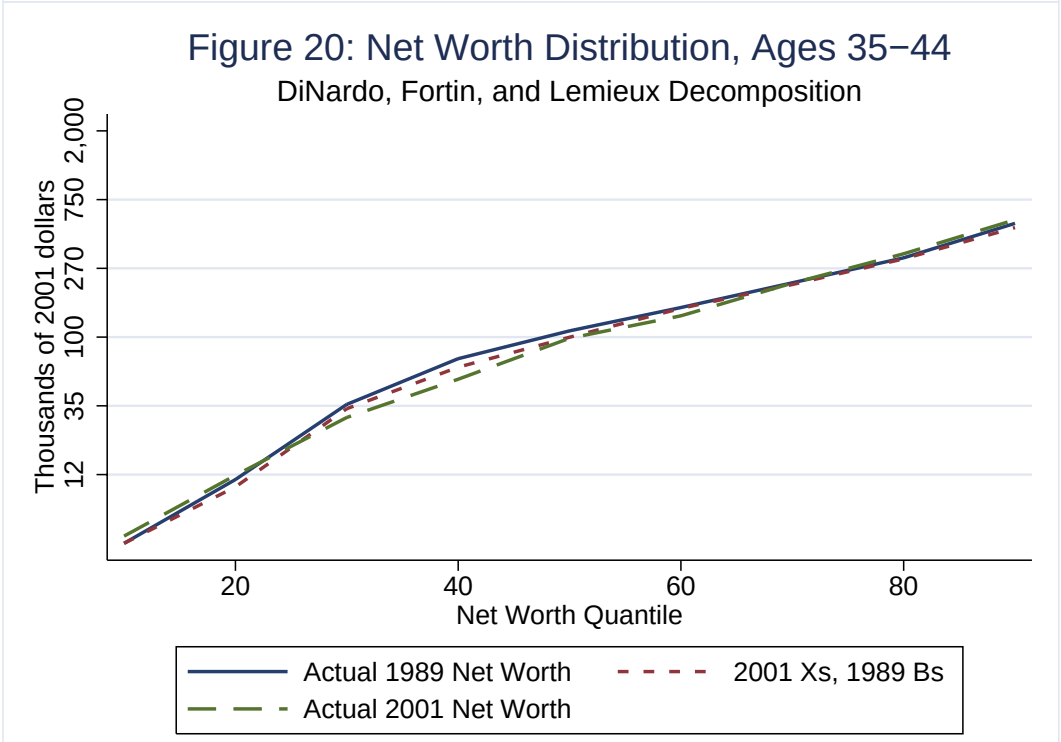


Figure 20: Net Worth Distribution, Ages 35−44
DiNardo, Fortin, and Lemieux Decomposition
Thousands of 2001 dollars
12
35
100
270
750
2,000
20
40
60
80
Net Worth Quantile
Actual 1989 Net Worth
2001 Xs, 1989 Bs
Actual 2001 Net Worth

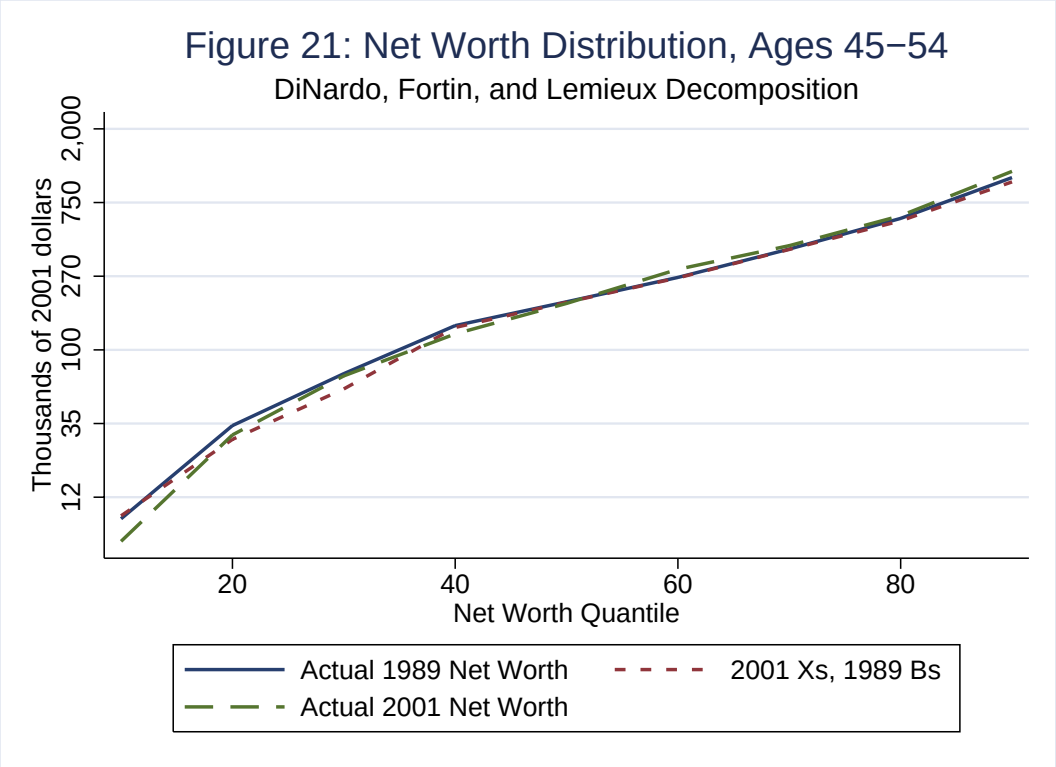


Figure 21: Net Worth Distribution, Ages 45−54
DiNardo, Fortin, and Lemieux Decomposition
Thousands of 2001 dollars
12
35
100
270
750
2,000
20
40
60
80
Net Worth Quantile
Actual 1989 Net Worth
2001 Xs, 1989 Bs
Actual 2001 Net Worth

Figure 22: Net Worth Distribution, Ages 55−64

DiNardo, Fortin, and Lemieux Decomposition

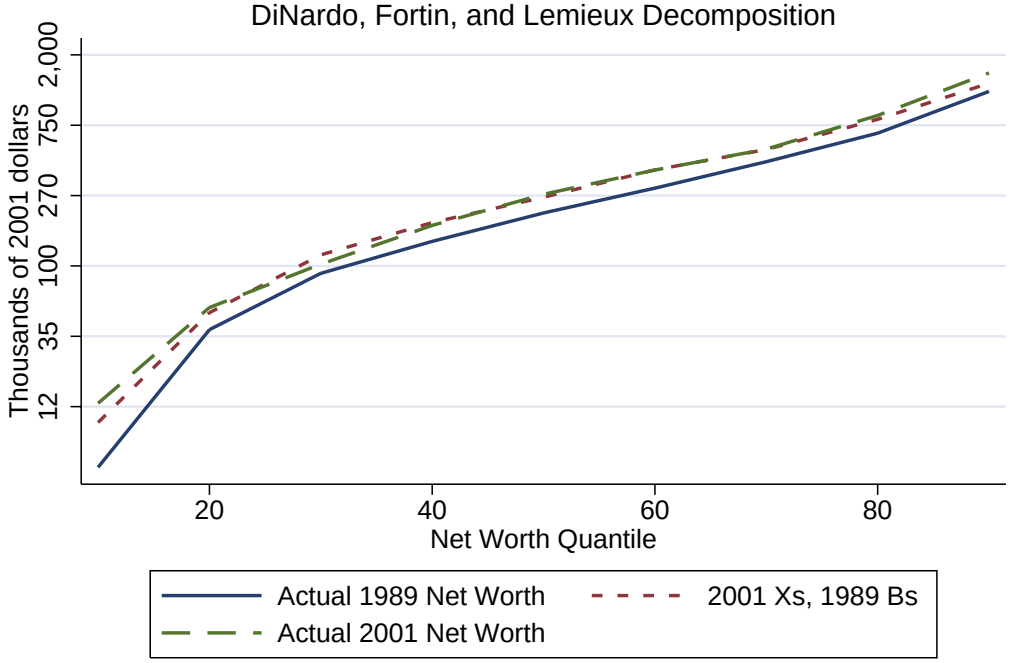


Figure 23: Net Worth Distribution, Ages 55−64

Machado−Mata Decomposition

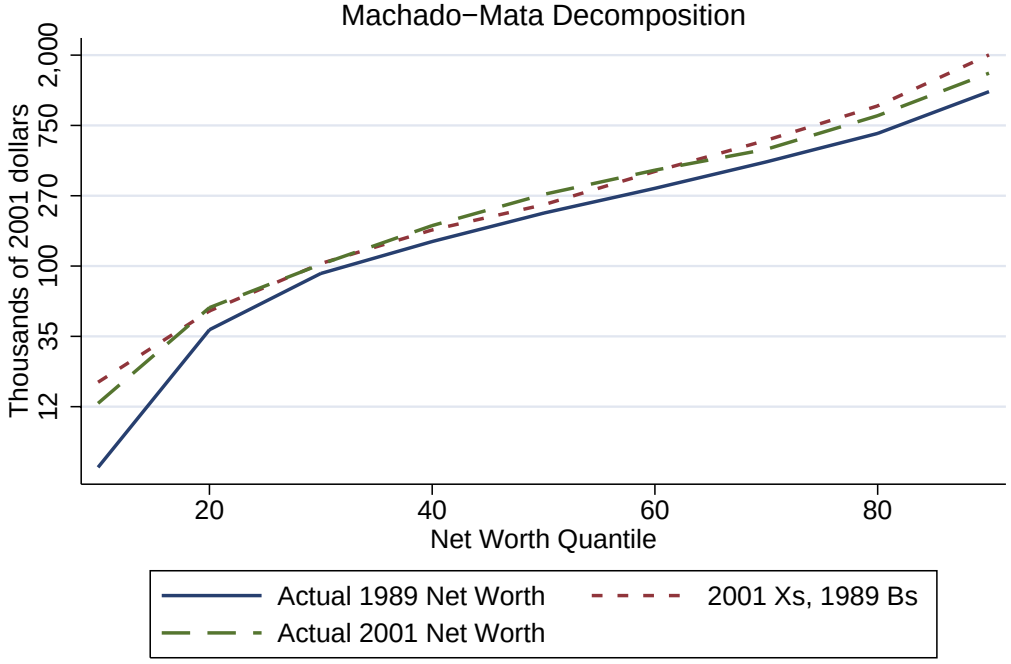


Figure 24: Net Worth Distribution, Ages 65−74

DiNardo, Fortin, and Lemieux Decomposition

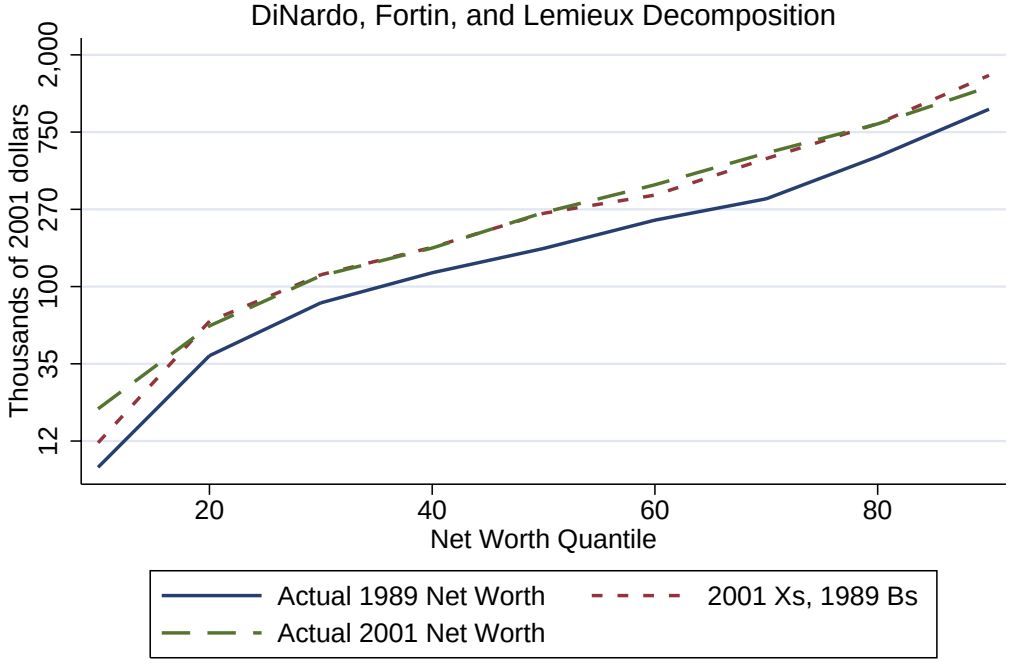


Figure 25: Net Worth Distribution, Ages 65−74

Machado−Mata Decomposition

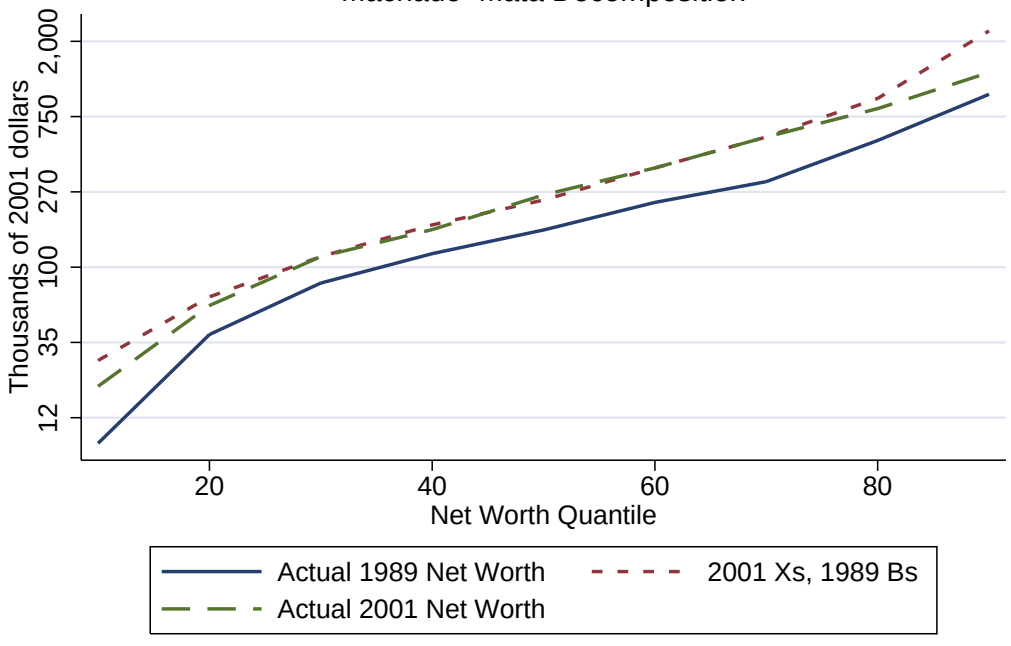


Figure 26: Net Worth Distribution, Ages 75−84

DiNardo, Fortin, and Lemieux Decomposition

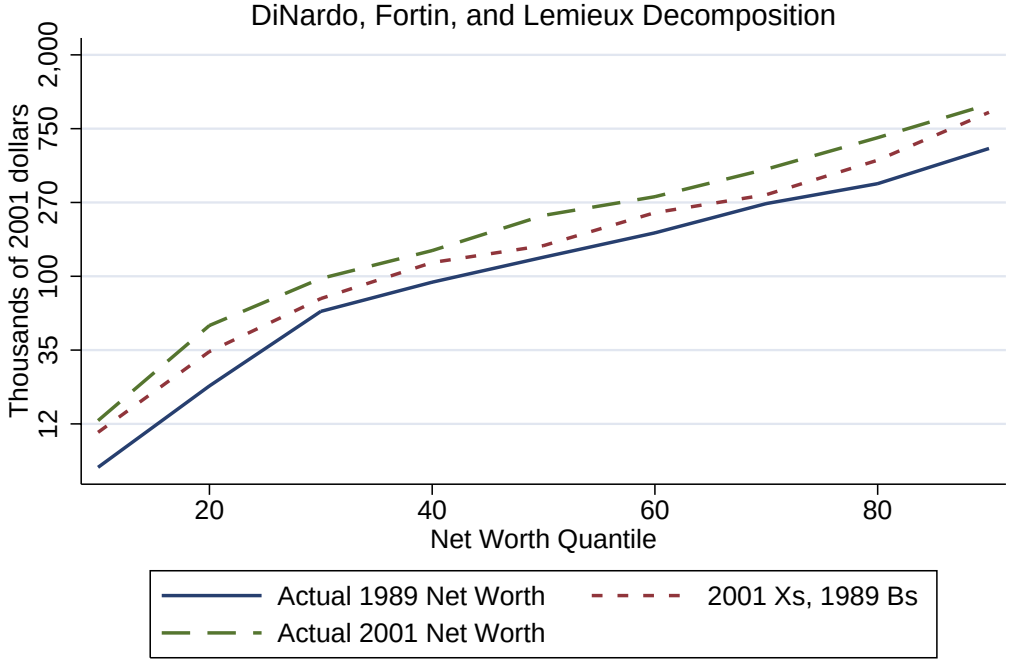


Figure 27: Net Worth Distribution, Ages 75−84

Machado−Mata Decomposition

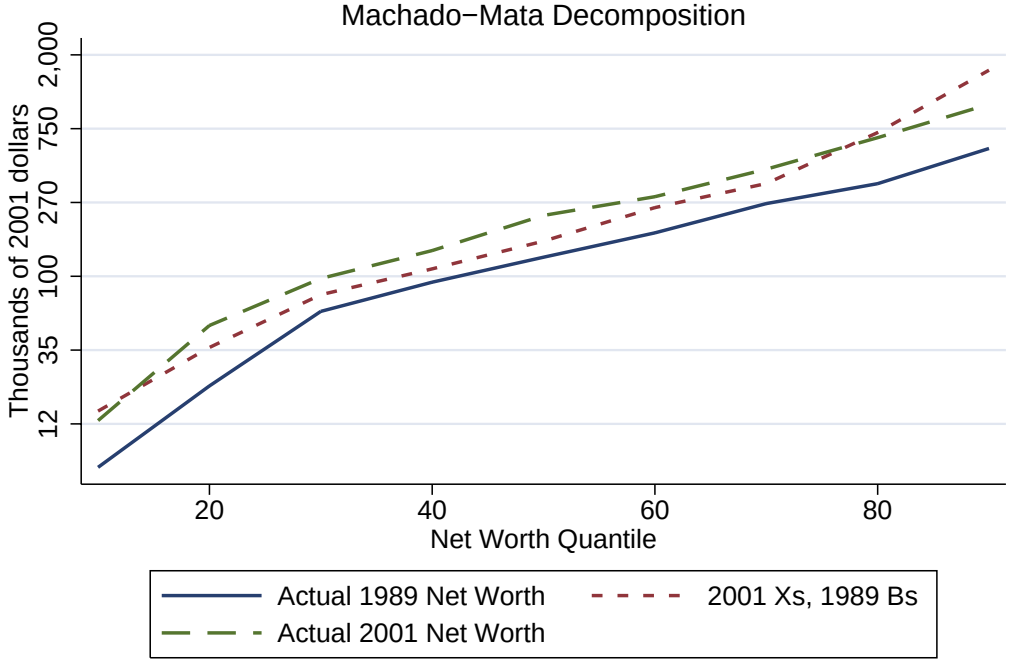


TABLE 1. DEMOGRAPHIC CHARACTERISTICS BY YEAR AND AGE GROUP

Demographic Characteristic/ Age Group	1989	2001	2001-1989 Difference
Percent married			
25-34	57	47	-10***
35-44	64	58	-6**
45-54	65	58	-7**
55-64	60	61	1
65-74	50	58	8**
75-84	39	49	10**
Percent with "excellent" or "good" health			
25-34	89	83	-6***
35-44	87	83	-4**
45-54	79	77	-2
55-64	62	71	9***
65-74	57	61	4
75-84	49	60	11***
Percent of men with post-secondary education			
25-34	51	57	6*
35-44	60	56	-4
45-54	50	62	12***
55-64	37	54	17***
65-74	31	49	18***
75-84	24	42	18***
Percent of women with post-secondary education			
25-34	43	57	14***
35-44	49	59	10***
45-54	44	57	13***
55-64	31	49	18***
65-74	27	40	13***
75-84	22	33	11***
Average full-time years in the labor force, men			
25-34	10.1	9.7	-0.4
35-44	18.5	18.8	0.3
45-54	28.6	28.1	-0.5
55-64	36.9	36.3	-0.6
65-74	41.8	42.1	0.3
75-84	46.4	45.5	-0.9
Average full-time years in the labor force, women			
25-34	7.0	7.3	0.3
35-44	11.3	13.8	2.5***
45-54	15.1	18.8	3.7***
55-64	17.8	22.1	4.3***
65-74	18.9	22.3	3.4***
75-84	21.7	23.9	2.2

NOTE. Difference in means statistically significantly different from zero at the *10 percent level **5 percent level ***1 percent level. Standard errors bootstrapped with 999 replicates in accordance with the sample design and adjusted for imputation uncertainty.

TABLE 2. PENSION COVERAGE CHARACTERISTICS BY YEAR AND AGE GROUP

Pension Coverage Characteristic/ Age Group	1989	2001	2001-1989 Difference
Any retirement plan coverage			
25-34	52	58	6**
35-44	72	70	-2
45-54	77	76	-1
55-64	72	77	5*
65-74	66	68	2
75-84	49	62	13***
Defined contribution or individual retirement account coverage			
25-34	39	53	14***
35-44	52	64	12***
45-54	56	65	9***
55-64	50	60	10***
65-74	30	45	15***
75-84	8	31	23***
Defined benefit coverage			
25-34	31	18	-13***
35-44	49	29	-20***
45-54	60	40	-20***
55-64	57	49	-8**
65-74	58	47	-11***
75-84	45	50	5
Both defined contribution/IRA and defined benefit coverage			
25-34	18	14	-4**
35-44	29	22	-7***
45-54	38	30	-8***
55-64	34	31	-3
65-74	22	23	1
75-84	04	18	14***
Any retirement plan coverage, women			
25-34	33	43	10***
35-44	49	51	2
45-54	58	58	0
55-64	56	60	4
65-74	42	52	10***
75-84	31	44	13***
Median years participating in a DC plan, male DC participants working full-time			
25-34	4	3	-1
35-44	4	6	2***
45-54	6	8	2

NOTE. Difference in means statistically significantly different from zero at the *10 percent level **5 percent level ***1 percent level. Standard errors bootstrapped with 999 replicates in accordance with the sample design and adjusted for imputation uncertainty.

TABLE 3. ASSET OWNERSHIP CHARACTERISTICS BY YEAR AND AGE GROUP

Asset Ownership Characteristic/ Age Group	1989	2001	2001-1989 Difference
Own stock			
25-34	29	55	26***
35-44	40	60	20***
45-54	44	59	15***
55-64	36	57	21***
65-74	26	40	14***
75-84	23	36	13**
Own stock through 401(k) or IRA			
25-34	20	46	26***
35-44	30	54	24***
45-54	33	53	20***
55-64	23	44	21***
65-74	8	24	16***
75-84	4	14	10***
Own stock through mutual fund			
25-34	0	12	12***
35-44	5	16	11***
45-54	7	19	12***
55-64	7	20	13***
65-74	4	17	13***
75-84	6	19	13***
Own stock directly			
25-34	13	19	6***
35-44	17	22	5**
45-54	22	22	0
55-64	21	27	6*
65-74	19	20	1
75-84	18	22	4
Own house			
25-34	46	48	2**
35-44	66	68	2
45-54	76	76	0
55-64	80	83	3
65-74	78	83	5*
75-84	71	77	6*

NOTE. Difference in means statistically significantly different from zero at the *10 percent level **5 percent level ***1 percent level. Standard errors bootstrapped with 999 replicates in accordance with the sample design and adjusted for imputation uncertainty.

TABLE 4. 1989-2001 DIFFERENCE IN MEDIAN WEALTH BY AGE GROUP

Age group	*Without demographic controls*	*With demographic controls*
25-34	2,068	-1,169
	(4,701)	(3,632)
35-44	-11,190	-5,637
	(10,712)	(6,690)
45-54	-1,915	-22,105*
	(25,670)	(13,435)
55-64	64,326**	11,816
	(27,159)	(18,361)
65-74	94,996**	-12,393
	(38,263)	(15,960)
75-84	95,435***	18,940
	(24,440)	(17,716)

NOTE. Standard errors are in parentheses and are bootstrapped with 999 replicates in accordance with the sample design. Coefficients and standard errors are adjusted for imputation uncertainty.
* statistically significant at the 10 percent level
** statistically significant at the 5 percent level
*** statistically significant at the 1 percent level

TABLE 5. OAXACA-BLINDER DECOMPOSITION RESULTS

	2001 Xs, 1989 βs		*1989 Xs, 2001 βs*	
Age group	% explained by β	% explained by X	% explained by β	% explained by X
25-34	.10	.90	.03	.97*
35-44	1.62	-.62	.77	.23
45-54	.77	.23	.30	.70*
55-64	.54*	.46***	.48**	.52***
65-74	-.04	1.04***	.08	.92***
75-84	.05	.95***	.18	.82***

NOTE. Standard errors are bootstrapped with 999 replicates in accordance with the sample design and are adjusted for imputation uncertainty.
* statistically significant at the 10 percent level
*** statistically significant at the 1 percent level