RECESSIONS, REELING MARKETS, AND RETIREE WELL-BEING

Courtney C. Coile
Phillip B. Levine

Recessions, Reeling Markets, and Retiree Well-Being
Courtney C. Coile and Phillip B. Levine
NBER Working Paper No. 16066
June 2010
JEL No. H55,J26

ABSTRACT

This paper examines the impact of late-career investment returns and job loss on subsequent retiree well-being. Specifically, we explore whether there is a link between the income of retirees aged 70 to 79 and the stock market and labor market conditions that existed around the time of their retirement. We use data from the 2000 Census and the 2001 through 2007 American Community Surveys and consider both total personal income and income by type. We find that a long-term decline in the stock market in the years leading up to retirement leads to a modest reduction in investment income a decade or so later for those in the top third of the income distribution. The consequences of approaching retirement when the labor market is weak are more severe. A higher unemployment rate around the time of retirement reduces Social Security income for those in the bottom two-thirds of the income distribution; we estimate that an unemployed worker experiences a roughly 20 percent drop in Social Security income, consistent with claiming benefits several years early. Overall, our results indicate the importance of the challenges faced by lower-income workers who face a weak labor market as they approach retirement.

Courtney C. Coile
Department of Economics
Wellesley College
106 Central Street
Wellesley, MA 02481
and NBER
ccoile@wellesley.edu

Phillip B. Levine
Department of Economics
Wellesley College
106 Central Street
Wellesley, MA 02481
and NBER
plevine@wellesley.edu

I. INTRODUCTION

Once older workers retire, their ability to control their level of income declines considerably. Social Security and defined benefit pension payments are fixed in either real or nominal terms. Retirees may increase the rate at which they draw down their defined contribution retirement accounts, Individual Retirement Accounts, and other savings, but consuming these resources too quickly runs the risk of exhausting them before the end of the retiree's life. Returning to work is possible, but relatively rare.[1] Taken as a whole, it is fairly difficult for retirees to adjust their incomes should they desire to do so.

As a result, events that affect the sources of a retiree's income have the potential to have very long-lasting effects even if they occur prior to retirement. Older workers who are nearing retirement age, for instance, run the risk of 20 or more years of diminished economic well-being if they experience a shock that reduces their savings, pension, or Social Security benefits. In essence, the economic conditions that occur in the period leading up to a worker's retirement may affect his or her economic well-being for the remainder of his life. Initial conditions may matter a great deal.

This feature of retiree income has taken on particular salience in light of the recent economic crisis. With stock market declines on the order of a third or more, workers nearing retirement age who had planned to live off their retirement savings accounts or other investment accounts now have smaller nest eggs to draw from. Delaying retirement is certainly a possibility; our past research suggests that this behavior is evident among more-skilled older

---

[1] Studies by Bruce et. al. (2000) and Coile and Levine (2006) suggest that the average rate of re-entry for older workers is on the order of 2 to 4 percent per year. Maestas (2007) reports higher rates of what she terms "unretirement," with 26 percent of workers unretiring over a 6-year period. However, her definition of unretirement is somewhat broader than our definition of labor force re-entry, including, for example, transitions from part-time work to full-time work.

workers (Coile and Levine, 2009).[2] This course of action will enhance subsequent retirement income both by reducing the period of time over which support is needed and by potentially providing an opportunity to replenish diminished savings. Nevertheless, if affected workers do not stay in the labor force long enough to make up for the losses they have experienced, they may have reduced economic well-being for the remainder of their lives.

Skyrocketing levels of unemployment also threaten the economic well-being of those nearing retirement age, both in the near term and for the rest of their lives.[3] Some older workers will lose their jobs over the course of a recession and may struggle to find new work.[4] Rather than fight through what may be a long and frustrating job search, they may choose to withdraw from the labor force instead. The availability of Social Security benefits at age 62 may increase the likelihood of this course of action; those needing immediate income support may choose to initiate benefit receipt and retire. In previous work (Coile and Levine, 2007 and 2009), we have documented that older workers do retire earlier in response to an economic downturn and that this pattern of behavior is only evident starting at age 62.

Although claiming Social Security benefits may be necessary to provide income support during difficult economic times, it has long-term implications for retiree well-being. Workers who claim at 62 receive lower monthly benefits for the remainder of their lives relative to what they would have received if they had waited to claim later. Social Security benefits are designed

---

[2] In other past work (Coile and Levine, 2006), we find no evidence that short-term market fluctuations alter retirement decisions, but our more recent work indicates that long-term changes in security prices do alter the decision of more-skilled workers to withdraw from the labor market.

[3] Plunging home prices could similarly alter retirement decisions and subsequent well-being in retirement. We have chosen not to incorporate home prices into our analysis, though, based on the results of previous research. In our own work (Coile and Levine, 2009) we find that home price fluctuations are unrelated to retirement decisions. Moreover, previous research shows that individuals are unlikely to use the value of their homes to finance routine retirement consumption (Venti and Wise, 2001 and 2004).

[4] Hutchens (1988) provides evidence supporting the notion that job opportunities diminish as retirement age approaches.

to be roughly actuarially fair, so that expected value of lifetime benefits is the same regardless of when workers initiate benefit receipt. Since workers claiming earlier will receive benefits for more years, the benefit amount must be less. Those who retire at age 62 rather than at, say, age 65 historically have faced a 20 percent benefit reduction.[5] Thus shocks to financial wealth and labor market shocks may both have long-term effects on post-retirement income.

Although the recent economic crisis motivates our study, our work may be viewed more generally as a contribution to a broader literature on the long-term effects of economic shocks. Specifically, one may draw a parallel between our work and studies exploring the long-term effects of entering the labor market at a time of high unemployment or of experiencing a plant closing. Past studies in these areas, which we review below, have found that these events have important effects that persist for many years. In theory, shocks experienced around the time of labor market exit could have even greater and longer-lasting effects, since older workers have fewer years available to recoup any human capital investments and their time horizon in the labor market is sufficiently short that they may choose to retire and accept the lost income.

The purpose of this paper is to explore the impact of economic fluctuations around the time of retirement on the well-being of retirees well past their exit from the labor force. We will consider the impact of both financial system shocks that lower investment returns and labor market shocks that increase the chance of unemployment around the time of retirement. In our analysis we use data from the 2000 Census and the 2001 through 2007 American Community Surveys (ACS). We examine income levels by type as well as total personal income received by retirees between the ages of 70 and 79, relating them to the market conditions that existed around

---

[5] This figure is true for the 1937 and earlier birth cohorts. Older birth cohorts are subject to larger benefit reductions in relation to the changing normal retirement age, which will increase to age 67 for those born in 1960 and later. These younger cohorts will experience a 30 percent reduction in benefits if they retire at 62 rather than 67.

the time of their retirement. We also examine these effects separately for retirees at different points in the income distribution.

The results of our analysis suggest that equity and labor market conditions around the time of retirement have effects on economic well-being even a decade or so later. Workers who face a weak labor market around the period of labor force withdrawal receive lower Social Security payments. This effect is concentrated among lower income and middle class retirees. Those who experience below average stock market returns in the years leading up to retirement are less likely to receive any investment income in retirement, although this effect is evident only for higher income retirees. Combined with the results of our earlier analyses (Coile and Levine, 2006, 2007, and 2009), these results underscore the problems that older workers face when the labor market weakens, as it did so dramatically in the recent economic crisis.

II. LITERATURE REVIEW

No past work of which we are aware has addressed the specific question we seek to answer in this paper. Nevertheless, there are a number of related literatures that we can use to inform the discussion that follows. In this section of the paper, we review the relevant evidence from these literatures.

A. Impact of Labor Market Conditions at Labor Force Entry

The current analysis shares a strong conceptual connection to an existing literature on the impact of economic conditions at the time of labor market entry on subsequent career outcomes. Previous studies find that the disadvantage new entrants experience by entering the labor market during a recession persists long after the economy rebounds due to frictions in the labor market (cf. Beaudry and DiNardo, 1991; Oreopolus, et al., 2006). Similar reasoning can be applied to

labor market conditions at the time of retirement. In fact, one could argue that the problem that older workers face may be even greater than that which younger workers experience. Younger workers are likely to be more willing to invest in additional human capital or continue looking for work until the labor market strengthens, eventually regaining their earnings capacity. Older workers are less flexible, both because additional human capital investments would have lower rates of return and their time horizon in the labor market is short enough that they may choose not to wait out the storm. The existing research shows that initial conditions at labor market entry matter. The purpose of this paper is to determine whether initial conditions at labor market exit do as well.

B. Impact of Job Loss on Earnings over the Long Term

A small body of previous literature has established that job loss is relatively common for older workers (c.f., Farber, 2005; Munnell et. al., 2006) and has long-lasting negative consequences for employment and wages (c.f., Chan and Stevens 1999, 2001, and 2004; von Wachter, et al., 2008). Some of these studies compare the outcomes of workers who were laid off to those of workers who were not. One problem with this approach is the likelihood that layoffs are correlated with other characteristics that affect retirement. Von Wachter, et al. (2008) focuses on the response to mass layoffs, which are more plausibly exogenous to the individual. He similarly finds large, long-lasting negative consequences on the employment and earnings of older workers. The approach we employ here is somewhat broader, considering reduced form models of the impact of aggregate changes in labor market conditions, as measured by the state/year level unemployment rate. Perhaps more importantly, our analysis differs in looking at post-retirement personal income rather than employment and earnings.

C. Impact of Economic Conditions on Retirement

Research on the impact of current economic conditions on retirement is certainly relevant to this analysis, insofar as it may provide some indication of the extent to which workers respond to weak labor markets by retiring early or to poor stock market returns by retiring later, both responses that may affect the worker's subsequent retirement income. We have explored this issue in depth in our previous work (Coile and Levine, 2006, 2007, and 2009). Coile and Levine (2009), in particular, provides additional analyses and summarizes our thinking on this question. We use thirty years of data from the Current Population Survey to examine whether fluctuations in labor, housing, and stock markets affect workers' retirement decisions. We expect that plummeting house prices and stock market indices may lead individuals to work longer because their stock of retirement wealth has been depleted. We further expect that rising unemployment will lead to earlier retirement, as older workers may lose their jobs, be unable to locate new ones, and be forced to retire earlier than expected as a result.

We find no evidence that fluctuations in house prices affect retirement decisions. On the other hand, we find that long-term declines in stock prices do lead workers to delay retirement.[6] We also find that rising unemployment leads to an increase in retirements.[7] Specifically, workers age 62 and older are more likely to retire when the labor market is weak. The age-specific nature of this response coincides with the availability of Social Security retired worker benefits at age 62. We also simulate the magnitudes of these effects in the recent economic crisis and predict that the increase in unemployment associated with the recession will lead to more earlier retirements than the fall in the stock market will lead to delayed retirements. On net the retirement rate will increase. We also find important distributional consequences. The early

---

[6] Coile and Levine (2006) and Hurd, et al. (2009) focus on short-run market changes and find no such effect. Coronado and Perozek (2003) find a very small increase in retirement associated with large unexpected gains in the market.

[7] Von Wachter (2007) also obtains this result, as does Hallberg (2008) using data from Sweden.

retirements are concentrated among less-skilled workers and the delayed retirements are concentrated among more-skilled workers.

These findings have direct implications for the analysis we conduct in this paper. They suggest that a weak labor market may be associated with reduced Social Security benefits and lower total income for those towards the lower end of the economic distribution, since these workers tend to respond by retiring early, which will result in a lower benefit amount. The effect of poor stock market returns on workers at the higher end of the income distribution is less clear, since workers tend to respond to this shock by working longer. If individuals delay retirement by long enough, they could restore their lost wealth and have levels of income in retirement comparable to what they would have had otherwise. If not, their retirement income may fall as a result.

III. DATA AND METHODS

Our analysis will make use of data from the 2000 Census and the 2001 through 2007 American Community Surveys (ACS). We augment these data with external sources of information on market conditions in equity and labor markets. We begin this section by detailing the data issues relevant to this exercise and continue with a description of the methodological approach that we used to estimate our econometric models.

A. Data from the Census and the American Community Surveys

Intuition and our past work suggest that any impact of market conditions on retirement will not be that large in the aggregate. For instance, a major recession would result in, say, an additional five percent of older workers losing their jobs. Only some fraction of those workers will change their retirement behavior as a result. This means that only a small share of the total

population is at risk of facing income loss associated with weak market conditions. The losses

may be significant for those affected, but in the aggregate it will be hard to identify this effect.

This suggests that large amounts of data will be required to do so.

We use microdata from the 2000 United States Census and the 2001 through 2007 ACS

in our analysis. The Census provides a very large number of observations; 5 percent of the U.S.

population. To obtain time series variation, we augment these data with the ACS data.[8] The

ACS is modeled after the Census, with similar variables and coding. The Minnesota Population

Center provides unified Census/ACS extracts through their IPUMS USA project; we take

advantage of those data.[9] ACS data are available through IPUMS beginning in 2000. The 2000

through 2004 surveys were nationwide demonstrations geared to provide lessons for full

implementation of the survey beginning in 2005 (for household units – group quarters were not

fully incorporated until 2006). Once fully implemented the ACS contains data for one percent of

the population.

In the end, we use data from the 2000 Census and seven ACS samples beginning in 2001,

providing income data for 1999 through 2006 (since the last currently available ACS at the time

of our analysis is from 2007). Over this period, data are available for around 1.68 million

respondents between the ages of 71 and 80.[10] Their reported income represents values from the

---

[8] In theory, we could include data from earlier census years, such as 1990 and 1980. However, it is somewhat awkward to have a data set that includes continuous data from 2000 to 2007 and only sporadic (once a decade) data from earlier years. The sample we use includes individuals born in the years 1920-1936 (individuals who were ages 71-80 in survey years 2000-2007, or ages 70-79 in the prior year for which they report income), which represents a big enough time span to provide significant variation in the stock and labor market conditions around the time of retirement.

[9] For more detail, see Ruggles, et al. (2009). The URL for these data is http://usa.ipums.org/usa/

[10] Alexander, et al. (2010) cautions users about the potential that the age and sex variables in the 2000 Census and some subsequent American Community Surveys may include some miscoded data due to erroneous disclosure avoidance procedures. Although the evidence they provide is disturbing, we do not believe that these problems have a substantive impact on our analysis. We will return to the issue subsequently when we discuss our results.

preceding calendar year when the respondents would have been between 70 and 79. All income figures are adjusted to 2007 dollars. In each of these surveys, respondents provide data on a variety of specific components of income. We focus on income from Social Security, pensions, investment income, and total personal income.[11]

We place two other sample restrictions on our data that reduce the final sample size. First, our focus is on income in retirement, so we restrict the sample to those individuals who have already left the labor force. This is not a major constraint given the age composition of the sample. Only 11 percent of respondents are still working; imposing this restriction reduces the sample to around 1.49 million.

We also restrict our attention to the incomes of men. Our decision to do so is largely related to program rules and data availability. For instance, most women in these birth cohorts are likely to receive Social Security payments as a function of their husbands' benefit level, either because their own work history is insufficient to qualify for retired worker benefits or because their dependent spouse benefit is greater than their own retired worker benefit. This means that it may be the market conditions present around the time that the husband retired that matter, not those around the time that the wife retired. For those women who have become widowed, however, we have no data on the age of her husband. Imposing this restriction reduces our sample to 600,211; this is our final sample size.

As we describe in more detail subsequently, one key explanatory variable in our analysis is the unemployment rate in the respondent's state of residence at age 62. Ideally we would know where the respondent lived when he was 62 years old, but in practice, all we know is his

---

[11]The survey itself contains a category labeled "retirement income" that is intended to capture income from pensions. It is unclear, however, whether those who receive distributions from defined contribution pension plans would label this as "retirement income" or investment income. The 2000 Census and the ACS survey forms do not clarify this distinction.

state of residence in the survey year. We therefore assume that no mobility has taken place between age 62 and the survey year, assigning the unemployment rate in the year the respondent was age 62 in the respondent's current state of residence.[12]

We also attach to these data information on the stock market conditions that existed around the time that the respondent was making retirement decisions. We create four additional variables based on the December average values of the Standard & Poors 500 Index, adjusted for inflation. These variables capture the five-year real rate of growth in the index starting in the year the respondent turned age 50, 55, 60, and 65. Our reasoning for choosing these measures is described subsequently.

B. Methods

The main question we seek to address is the long-term impact of market conditions around the time of retirement on retirement income. The first issue that is raised by this question is what we mean by "around the time of retirement." In theory, if we could observe every individual's complete work history, we could think about alternative definitions of retirement (departure from "career job," complete labor force withdrawal, etc.), choose an appropriate one for our purposes, and assign that retirement date to each record in the data. We could then attach the unemployment rate at that time and the stock market return in the preceding five or ten years to each worker's record. In practice, of course, surveys that are of sufficient size to be useful for our analysis do not contain that level of information on respondents' work histories.

---

[12] The Census data contains current state of residence along with state of residence five years ago. We use this data to estimate the likelihood that individuals between the ages of 65 and 69 moved across state lines in the past five years, since the time when they were between the ages of 60 to 64. Our results indicate that 83 percent of respondents reside in the same state. The main discrepancies occur for those who move to either Arizona or Florida. We found that excluding residents of those states had little impact on our results. Therefore, while we acknowledge the possibility of measurement error in our analysis, we do not think it is likely to be a particularly serious problem.

Even if we had this information, it is not clear whether we would want to use it in this way, as the timing of retirement may be endogenous. Those who are willing to live on less and who receive greater disutility from work may retire earlier. If those preferences have any time series and/or regional variation, they may be correlated with changes in market conditions. We would rather assign market conditions to workers around the time of their retirement using alternative, exogenous measures that still may capture the market constraints workers face when they consider retirement.

To capture labor market conditions, we have chosen to use the state unemployment rate in the year that an individual is 62 years old as our preferred measure. This value has the advantage of being exogenous to individual decision-making and occurs at a time at which previous research has shown that there is a spike in retirement rates anyway, coincident with the initial eligibility of Social Security retirement benefits. Our own past work (Coile and Levine, 2007 and 2009) has shown that the impact of labor market conditions on retirement decisions does not begin until age 62, further supporting this decision.[13]

To capture equity market conditions, we have chosen to use the five-year real rate of return in the S&P 500 starting in the year the respondent turned age 50, 55, 60, and 65 (representing returns between ages 50 and 55, 55 and 60, 60 and 65, and 65 and 70, respectively). Our past work shows that retirement decisions are more likely to respond to longer-term changes in market returns, including those at a five-year interval. Our analysis of retirement income focuses on respondents beginning at age 70, so working backwards from there seems like a reasonable approach.

---

[13] We have also explored a number of alternative specifications as well, including the unemployment rate at different ages individually and collectively. When we included different single age unemployment rates between ages 58 and 65 we found the greatest impact around age 62 and little impact of unemployment at the younger and older ages. When we included unemployment rates at each age in the same regression, we obtained unstable results, presumably because of the high serial correlation in year-to-year unemployment rates.

The value of using multiple five-year intervals is that the impact of market returns at different ages may have differential effects on retirement income. These effects would be determined by the age profile of stock ownership and stock holdings conditional on ownership. As stock ownership rates and levels may change as a worker ages, the potential impact of stock market returns on subsequent retirement income may change as well. The exact pattern we would expect to observe in the response to market conditions by age, however, is difficult to predict a priori without further information regarding age profiles of stock ownership. We present some data on that subsequently to inform this question.

The source of variation in these labor market and stock market variables is somewhat different, but both are based on the differing historical experiences of individuals born into different birth cohorts. In essence, we treat the labor market and stock market conditions around the time of retirement as a draw that is randomly assigned to individuals. If we only observed retirees in one year, this approach would be equivalent to an identification strategy that is solely based on an individual's age in the survey year. The fact that we have multiple surveys enables us to also control for aging patterns in retirement income with age fixed effects, since we are able to observe individuals at the same age who were born in different birth cohorts. Similarly, we are able to control for contemporaneous patterns in retirement income with survey year fixed effects, which aggregate different ages in each survey year to see if there are collective patterns in retirement income over time.

The one potential weakness of our identification strategy is that we are not able to control for patterns in retirement income across birth cohorts that may have occurred for reasons other than differing market conditions through the use of birth cohort fixed effects. If there are systematic patterns in retirement income by birth cohort that happen to be related to market

conditions, this will introduce bias into our analysis. That bias would still need to be linked to socioeconomic status, though, since we estimate these models separately by position in the income distribution and expect different results for different income groups. The fact that we find that pattern, as reported below, suggests this is not a significant problem in our analysis.

Tables 1A and 1B are designed to provide additional detail regarding the variation in market conditions that we use in our identification strategy. Both tables show the survey years we are using (2000 through 2007 surveys, representing income from 1999 through 2006) and respondents' ages in those survey years (71 to 80, representing ages 70 to 79 in the years income is measured). Table 1A presents the real percentage increase in the S&P 500 between ages 55 and 60 that was experienced for each cohort. For instance, those respondents who were 79 years old in 2000 would have been 55 years old in 1976. The S&P 500 fell by 29 percent between 1976 and 1981 in real terms. Similarly, a 74-year-old respondent in that survey year was 55 years old in 1981; the market rose 68 percent in real terms in the following five years. Looking across the table, there is variation in the historical stock market returns that respondents experienced not only across surveys and across ages (reflected in the different values in a single row or column, respectively), but also across the interaction of surveys and ages. In the context of panel data methods, we are able to include both survey year and age fixed effects and maintain our identification based on the interaction of the two.

Table 1B presents a similar analysis for the unemployment rate respondents experienced at age 62. The national unemployment rate at age 62 varies from a high of 9.7 percent to a low of 4.5 percent for the cohorts used in the analysis. As with stock returns, the unemployment rate differs across surveys and across ages, but the variation in the interaction of the two is the important feature for our analysis. Moreover, and unlike with stock returns, there are further

differences across individuals in the unemployment rate they faced at age 62 due to geographic variation. In our analysis, we assign to each individual the state unemployment rate that existed when he was 62 years old. Our identification strategy relies on all of these sources of variation in the data.

This discussion leads us to our formal econometric specification. The models we estimate take the form:

$$\text{Income}_{i,s,t,a} = \beta_0 + \beta_1 \cdot \text{UR62}_{s,t,a} + \beta_2 \cdot \text{SP5055}_{t,a} + \beta_3 \cdot \text{SP5560}_{t,a} + \beta_4 \cdot \text{SP6065}_{t,a}$$
$$+ \beta_5 \cdot \text{SP6570}_{t,a} + \beta_6 \cdot X_{i,s,t,a} + \gamma_s + \gamma_t + \gamma_a + \varepsilon_{i,s,t,a} \tag{1}$$

In this specification, the dependent variable represents alternative measures of income for individual i who resides in state s in survey year t and is age a in the survey year. In some specifications, we will consider an indicator variable for whether an individual has a particular form of income. In those instances, we estimate linear probability models. In other specifications, we consider the amount of income received, conditional upon receipt; we estimate these models using ordinary least squares. In yet another set of models, we consider the unconditional amount of income received. For specific types of income, we generally estimate Tobit models due to the presence of a substantial number of zero values. For overall total personal income, few zero values are present so we use ordinary least squares. In all models where the dependent variable is the level of some type of income, the dependent variable is measured in 2007 dollars, rather than in logs, because we believe the linear specification aids in our interpretation of the results.[14]

---

[14] Using linear specifications enables us to include the relatively small number of negative and zero values of total personal income when we estimate models of that form. Once we estimate this model in levels, it makes sense to estimate the remaining models in levels so that we can compare results across income categories. However, we have also estimated all models with continuous measures of income, conditional upon receipt, using log linear specifications. In all cases, the results are qualitatively similar.

The key explanatory variables are the unemployment rate at age 62 and the five-year real rates of returns in the S&P 500 index between ages 55 and 70, as described earlier. We also include other individual characteristics (X) as covariates, including race, ethnicity, gender, marital status, and educational attainment. In addition to these variables, we include the contemporaneous unemployment rate as well as fixed effects that generically control for differences across survey years, across ages, and across states of residence.[15]

All of these models are estimated for the full sample of respondents as well as by the respondents' position in the income distribution. Respondents are divided into thirds according to their level of total personal income. We conduct these analyses separately by location in the income distribution because the impact of market conditions around the time of retirement may have differential effects by income level. One potential limitation of this analysis is that we are separating our sample according to one of our dependent variables, suggesting it may be endogenous. In this particular instance, however, we do not believe that this presents much of a problem, because the endogeneity problem would only exist to the extent that market conditions around the time of retirement moved individuals between these three broad income categories. Although this is possible, we believe it will occur in only rare instances.[16]

---

[15] In principle, the variation available to us also enables us to estimate models that also include interactions of state of residence and survey year along with state of residence and age in survey year. In the OLS specifications, we have estimated these models as well, which mainly yielded qualitatively similar results, particularly for the impact of labor market conditions. In the Tobit models, however, the estimation procedure had difficulty converging with such a precise identification strategy. Because these additional fixed effects do not substantially change our findings when we are able to include them, we chose to report all of the results from the more parsimonious specifications that exclude them.

[16] We have also attempted to estimate the exact same models distinguishing workers by the education level rather than their location in the income distribution. Educational attainment is certainly correlated with level of income and is almost certainly exogenous to outcomes so late in a worker's career. The results of these models almost uniformly yielded insignificant coefficients. Our interpretation of this is that education does not adequately distinguish the difficulties that individuals face regarding their retirement income. One way to see this is that the dispersion in income levels across education groups is considerably smaller than that presented subsequently regarding income (see Table 2). Intuitively, particularly among these older cohorts, even less educated workers

IV. RESULTS

This section will describe the results of the statistical analysis we just described. We begin with a descriptive analysis of the available data on retirees' income before moving to a formal presentation of the econometric results.

A. Descriptive Analysis of Census and ACS Data

Table 2 presents means of income levels by type for all respondents 70 to 79 years old and for respondents distinguished by their location in the income distribution. For all retirees, we see that total personal income averages $34,034. On average, Social Security represents around one-third of this amount at $11,388. Pension and investment income constitute the majority of the remainder, averaging $10,730 and $8,066, respectively. These three sources together represent almost 90 percent of total personal income, emphasizing our focus on these categories.[17]

Average levels of income across the income distribution obviously vary quite a bit, ranging from $9,686 for the bottom third of the distribution to $23,032 for the middle third, and $68,356 for the top third. The interesting feature of this part of the analysis is that the different components of income play such different roles across income categories. For those at the bottom of the income distribution, Social Security represents by far the largest component of their income. For them, 81 percent of their average total personal income ($7,807 of $9,686) comes from Social Security.[18] For those in the top third of the income distribution, the

---

could have reasonably high retirement incomes and face the same sorts of issues regarding retirement income that more educated workers face.

[17] Other sources of income reported in these data include: wage and salary income (a negligible total among those currently retired), business and farm income, welfare income, income from the Supplemental Security Income program, and other income.

[18] To put these numbers in perspective, the official poverty thresholds in 2007 for individuals over age 65 were $9,944 and $12,533 for those in one and two person households, respectively, without any related children under age 18 in the household. Poverty calculations are based on family income, not total personal income, so married respondents would add their spouse's income. Note that a married man receiving $7,807 in Social Security who has

comparable figure is 20 percent. Because Social Security benefit formulas are progressive in nature, it is not surprising that benefit levels increase relatively little as income rises. Other sources of income increase by a lot more. Pension and investment income each increase many fold between the bottom and top of the income distribution.

These statistics have important implications for what we might expect in the remainder of our analysis. First, the role that stock market fluctuations play in determining the income of retirees must be rather limited for all but those at the very top of the income distribution. Those are the only ones with enough pension and investment income where market fluctuations could make a meaningful impact on their income.[19] Second, the importance of Social Security to those at the bottom of the income distribution is hard to overstate. If labor market conditions lead workers to retire earlier and accept lower Social Security benefits as a result, this could have an important impact on their economic well-being in retirement.

B. Descriptive Analyses of Other Data Sources

The preceding discussion provides some insight regarding what we might expect to observe in our empirical analysis with respect to the effect of labor market conditions and equity returns on retiree income by income group. To continue to develop our intuition along these lines, we present the results of two additional descriptive analyses that rely on other data sources. In the first of these analyses, we seek to document the level of unemployment risk that workers in different socioeconomic groups face. We anticipate that those groups that are subject to greater unemployment risk should be relatively more affected by labor market conditions around the time of retirement.

---

a spouse receiving half his benefit would receive $11,711 in total from that source. In both single and married households, this means that Social Security alone puts those even towards the bottom of the income distribution near the poverty threshold.

[19] Gustman and Steinmeier (2010) make a similar point using data from the Health and Retirement Survey and the wealth of data on the net worth of individuals at or near retirement age.

To explore this, we use data from the 1979 through 2007 March Current Population Surveys and estimate unemployment rates over time for those 55 to 64 (i.e. those nearing retirement). In our subsequent analysis, we divide workers by their level of retirement income, but that is not feasible here. Instead, we use level of education as an alternative proxy for permanent income. Because annual movements in the unemployment rate are rather noisy for small population subgroups, we report three year (backward looking) moving averages. The results are displayed in Figure 1. As expected, those at the bottom of the socioeconomic ladder are the most susceptible to unemployment when recessions strike. Those in the middle are less so, although they still experience significant unemployment risk during an economic downturn, particularly earlier in this sample period. Because the remainder of our analysis focuses on those 70 to 79 in 1999 through 2007, it is this earlier period that is relevant here. Those at the top of the economic ladder are exposed to the lowest level of risk. Therefore, we expect that the impact of unemployment around the time of retirement on retirement income should be greatest for low-income individuals and smallest for high-income individuals.

We also seek to develop our intuition regarding the expected age profile in the response to changing stock market conditions. We will be including in our regression models the market returns to which individuals were exposed at ages 50 to 55, 55 to 60, 60 to 65, and 65 to 70. It is not obvious, a priori, what the age profile of this response should be. It seems sensible, however, that the percentage of individuals that hold stocks by age and the amount that they hold should affect the age profile. Only those who hold stocks should be subject to changing market conditions and those who own more stock should be more at risk.

To examine these age profiles, we use data from the 2007 Survey of Consumer Finances to estimate the percentage of respondents who own stock and the level of those holdings

conditional on ownership by age category.[20]   The results are displayed in Figures 2 and 3. Figure 2 shows that the likelihood of stock ownership displays an inverted U shape, rising with age into the 50s and then declining. Earlier in life, individuals do not have the resources to purchase stocks and later in life, individuals are moving out of riskier investments. Figure 3 shows that the level of stock holdings among stock holders rises dramatically in the mid 50s, almost doubling between ages 50 to 54 and ages 55 to 59. These patterns lead us to conclude that we should expect to see the responsiveness of retirement income increase in the mid 50s.

C. Econometric Analysis

We now turn to our main analysis, using the Census and ACS data to estimate the model given in equation 1 above. In Tables 3 through 7 we report the estimated impact of labor and stock market conditions on various types of income, first for all retirees and then separately for retirees in each third of the income distribution.

We begin by reporting the impact of market conditions around the time of retirement on Social Security, pension, and investment income for all retirees between the ages of 70 and 79 at the time the income was received. We estimate separate models for the likelihood that any income was received from one of these sources, the conditional amount of income received, and the unconditional amount received. As described above, these specifications are estimated using linear probability models, OLS, and Tobit models, respectively.

Columns 1 through 3 focus on Social Security income. Stock market conditions are not found to have any statistically significant effects on the likelihood of receipt or level of income. Likewise, these results indicate that deteriorating labor market conditions do not have a

---

[20] The use of cross-sectional data to simulate what is truly a longitudinal behavior pattern has some flaws in this particular application. To the extent that there are cohort effects leading to greater reliance on stocks as an investment vehicle, any age profiles displayed here will be muted from the investment behavior of actual cohorts as they age.

statistically significant impact on the likelihood of Social Security receipt. This finding is not surprising because 91 percent of all retirees are collecting Social Security. Those remaining are likely to be ineligible for benefits, and changing market conditions are unlikely to affect this. Conditional upon receipt, however, we find that a one percentage point increase in the unemployment rate at age 62 reduces subsequent annual Social Security benefits by $21; this finding is statistically significant. The magnitude of this coefficient is an important issue. Taken at face value, it is very small, certainly with respect to the $12,530 average level of benefits received. But it is important to recognize that the $21 figure is the aggregate effect. If the unemployment rate rises by 1 percent, then 99 percent of the workforce is unaffected. For those who lose their jobs, our estimates suggest that Social Security benefits in retirement would drop by $2,084, which represents about a 17 percent reduction in benefits. This figure seems reasonable if one considers the Social Security rules that would apply to workers in this age group. A worker who was forced to move up his Social Security retirement claim from age 65 to age 62 would have experienced a 20 percent reduction in his monthly benefit amount.[21] When we look at the effect of labor market conditions on the unconditional income received, which incorporate the effect on conditional income receipt along with the noisy and statistically insignificant effect on the likelihood of receipt, we find a statistically insignificant result.

The remainder of the table focuses on the receipt and value of pension and investment income. Columns 4 through 6 report our findings for pension income; we find no statistically significant effects here. Our estimates regarding the impact of labor market conditions on investment income are also statistically insignificant.

---

[21] For workers born in 1937 or earlier, which represents all workers in our data, the Social Security "normal retirement age" was 65. For those workers, commencing benefit receipt at age 62 rather than age 65 would lead to a 20 percent reduction in their benefits. Currently, the normal retirement age is 66 and those who retire at age 62 would face a 25 percent reduction in their monthly benefit.

When we focus on stock market returns instead, we see that retirees who were exposed to higher rates of return in the years leading up to their retirement are more likely to be receiving some investment income. If the market return between ages 55 and 60 increases by 100 percentage points, then the likelihood of receiving investment income between ages 70 and 79 jumps by 2.2 percentage points, according to our estimates. That same 100-point incremental return between ages 60 and 65 generates a 1 percentage point increase in the likelihood of receiving investment income. The impact of market returns between 50 and 55 and between 65 and 70 are not statistically significant. Taken as a whole, these results support the notion of an inverted U-shaped response by age to stock market returns.

Among those retirees who receive investment income, higher returns are estimated to generate higher investment income (at least past age 55), but the impact is not statistically significant. Part of the reason for this may be selection. If investment returns rise and more retirees now have investment income available, the marginal investment income recipient is likely to have less investment income. When we focus on income received from investments unconditional on receipt, our results indicate that investment income in retirement is higher when the stock market performs better in the years leading up to retirement (at least past age 55). Incomes for retirees between the ages of 70 and 79 are estimated to be about $1,750 higher per year if the return in the S&P 500 is 100 percentage points higher in the five-year period when the worker was between ages 55 and 60. The comparable estimate is almost $1,100 for a 100-point increase in the return between ages 60 and 65. These values represent increases in investment income in retirement of 22 percent and 13 percent, respectively.

We get a clearer picture of the impact of market conditions on retirement income when we distinguish individuals by their location in the income distribution. As discussed above, we

divide retirees into those in the bottom third, middle third, and top third of the income distribution and conduct the same analysis just described for each income group separately.

We begin in Table 4 by examining the impact of market conditions on Social Security receipt and income. The top row of the table provides means for each outcome variable by income group. Regarding the likelihood of Social Security receipt, we see that it is high for all three income groups, albeit a bit lower for those in the bottom third of the distribution. Regardless of income level, we are unable to find any impact of market conditions on Social Security receipt.

The middle three columns of this table display the impact of market conditions on Social Security income among those who receive benefits. For these workers, we see that higher unemployment generates a statistically significant drop in the amount of income received from Social Security for recipients in both the lowest and the middle third of the income distribution. We find no significant impact on the top third.[22] In terms of the magnitude of the estimated effect, a one point increase in the unemployment rate reduces Social Security income by $30 and $20 per year for retirees in the bottom and middle third of the income distribution, respectively. For the individual unemployed worker, these figures convert to about a $3,000 and $2,040 drop in conditional annual income, reflecting a 32 percent and 15 percent drop in Social Security income received. Although the point estimate for workers in the bottom third of the distribution is greater than the 20 percent reduction in benefits that we described earlier which would be associated with retiring at 62 rather than 65, it is not statistically significantly different from that

---

[22] Results like these lead us to believe that the problems described in Alexander, et al. (2010) are not a major problem in our analysis. The potential problem with age reporting in the Census and some ACS surveys would introduce measurement error in our calculation of the unemployment rate at age 62. If this measurement error were random, it would introduce downward bias in our findings. If it were systematic, it would need to be somehow correlated with the unemployment rate at age 62. Either way, it is hard to imagine how it would exist for the less educated, but not the more educated.

value.[23] When we factor in the combination of the estimated impact on income from Social Security, conditional on receipt, and the probability of receipt, we are unable to identify a statistically significant effect on unconditional Social Security income for any income group.

Table 5 reports the results of an analogous exercise focusing on pension income. We are unable to find any impact of labor or stock market conditions on any type of pension income measure for retirees in any of the three income categories. This may be attributable to the fact that among workers in this age group, private pensions are largely defined benefit plans rather than defined contribution plans. If so, stock market conditions would not have that much of an impact. Gustman, et al., (2010) provide evidence supporting this assertion. They find that 52 percent of full-time employees between the ages of 53 and 58 in 2006 covered by a pension have a defined benefit plan. Even those covered by a defined contribution pension have only made contributions for ten years, on average, suggesting that the funds in these accounts are not that large. The relative importance of defined benefit over defined contribution plans would be even more dramatic for those who retired 20 years earlier as in our analysis. Taken as a whole, these findings suggests that it may be years before the increased reliance on defined contribution plans that has taken place over the past two decades filters through to have a large impact on retiree well-being.

Table 6 reports the results of our analysis of the impact of market conditions on investment income by income group. As we have described earlier, only retirees in the top third

---

[23] Two alternative explanations are also possible that could explain the relatively large magnitude of this effect. First, the basis of our comparison is dependent upon the worker retiring at 62 rather than 65. He could have chosen to retire later than that, which would increase the penalty associated with early retirement. Second, a worker who continues working until age 65 may be able to replace low earnings years with high earnings years in the benefit formula, suggesting that the 20 percent benefit reduction associated with early retirement may be an understatement. The third potential reason is that the key right hand side variable is the aggregate unemployment rate. A one point increase in the aggregate unemployment rate may reflect a larger increase in the unemployment rate of those workers who are at higher risk of unemployment. This would also likely lead to an upward bias in our results for low income workers.

of the income distribution are likely to have enough investment income for market conditions to affect their post-retirement income. This hypothesis is supported by our empirical findings, which shows that retirees in the bottom two-thirds of the income distribution are largely unaffected by changes in both labor and stock market conditions.[24]

Those in the top third of the income distribution, however, are significantly affected by stock market conditions. We find that higher income retirees are more likely to receive investment income in retirement, and they report receiving a higher average level of investment income in response to stronger equity market returns after age 55. An increase of 100 percentage points in the S&P 500 between ages 55 and 60 is estimated to result in an additional 3.3 percent of retirees in the top third of the income distribution receiving investment income. On average, this change is projected to increase the average level of retirement income in the group by nearly $2,300. Run-ups in the market that occur at ages 60 to 65 and ages 65 to 70 also increase the likelihood of investment income in retirement by 2.1 and 0.8 percentage points and increase average investment income by $2,100 and $840, respectively. These findings are consistent with the inverted U-shaped pattern of response by age that we predicted earlier.

Although these effects are large and statistically significant, it is important to place the magnitudes of these estimates in perspective. Investment income increases on the order of $2,000 are clearly substantial, but they add to average investment income of $21,000 and average total personal income of $68,000. As a share of total income, these effects are not that large. By contrast, when we focus on the impact of increased unemployment on Social Security income among those receiving benefits, we see dollar estimates of the impact of unemployment of about the same magnitude for the bottom and middle thirds of the income distribution ($3,000

---

[24]We do observe some modest effects for the bottom third of the income distribution in response to market conditions at ages 55 to 60. The relative impact on their income, however, is very small in response to large increases in stock market returns.

and $2,100). Their levels of income, though, are considerably lower. They receive $9,300 and $13,000 in Social Security income and $10,000 and $23,000 in total personal income, respectively. Relative to their total income, the losses of Social Security benefits that these groups experience are quite a bit larger than the losses of investment income for those in the top third of the distribution.

Table 7 presents the results of our analysis of the impact of market conditions around the time of retirement on the income of retirees when we combine all sources of personal income. Again, we consider the impact on total personal income for all retirees as well as for each third of the income distribution separately. In this table, the only statistically significant coefficient (at the 5 percent level) is the impact of the unemployment rate at age 62 in total personal income among retirees in the bottom third of the income distribution. For these individuals, a one percentage point increase in the unemployment rate is estimated to reduce total personal income by $25. This means that the incremental individual who becomes unemployed at age 62 will experience a reduction in income of $2,550 a decade or so later. This amounts to about one-quarter of his total personal income. The results we presented earlier suggest that the largest single component of this overall decrease is the reduction in Social Security income that would presumably result from the worker claiming these retirement benefits early.

V. CONCLUSIONS

This study has focused on the effect of labor market and stock market conditions on subsequent economic well-being in retirement. Our results suggest that the weakness in both markets in the recent economic crisis will have deleterious effects on retirees in the coming years. We find that the income levels of retirees between the ages of 70 and 79 in the bottom

third of the income distribution are lower if the unemployment rate was higher when they were 62 years old. This effect is driven by a reduction in Social Security benefits; its magnitude is roughly consistent with the benefit reduction rate that is associated with retiring several years earlier than the normal retirement age. We also find that for workers in the top third of the income distribution, long-term declines in stock prices when the workers are in their 50s and 60s subsequently lower their incomes when they are retirees ages 70 to 79 through a reduction in investment income.

These findings provide a consistent story with those from our earlier work on the impact of market conditions on retirement. Collectively, they indicate that falling stock prices harm the well-being of more-advantaged older workers by preventing them from retiring when they want and reducing their retirement income. Rising unemployment harms the well-being of less-advantaged older workers by leading them to withdraw from the labor market sooner than they want and also reducing their retirement income. We estimate that there are a greater number of less advantaged workers who have changed their retirement behavior as a result of the recent economic crisis than of more advantaged workers who have changed their behavior. We also estimate that the relative impact of experiencing unemployment at age 62 on less advantaged workers' retiree income is much larger than the impact of experiencing poor equity returns on more advantaged workers' retiree income, particularly when the effect it measured as a share of total income. Combining these findings with virtually any social welfare function suggests that the problems that low-income older workers face when the labor market weaken are of greater concern than the problems that upper-income older workers when equity markets plunge.

References

Alexander, J. Trent, Michael Davern, and Betsey Stevenson (2010). "Inaccurate Age and Sex Data in the Census PUMS files: Evidence and Implications." NBER working paper 15703.

Beaudry, Paul and John DiNardo (1991). "The Effect of Implicit Contracts on the Movement of Wages Over the Business Cycle: Evidence from Micro Data." *Journal of Political Economy*. 99(4): 665-688.

Bruce, Donald, Douglas Holtz-Eakin, and Joseph Quinn (2000). "Self-Employment and Labor Market Transitions at Older Ages," *Center for Retirement Research at Boston College Working Paper:* 2000-13.

Chan, Sewin and Ann Huff Stevens (1999). "Employment and Retirement Following a Late-Career Job Loss." *American Economic Review*, 89(2): 211-216.

Chan, Sewin and Ann Huff Stevens (2001). "Job Loss and Employment Patterns of Older Workers." *Journal of Labor Economics*, 19(2): 484-521.

Chan, Sewin and Ann Huff Stevens (2004). "How Does Job Loss Affect the Timing of Retirement?" *Contributions to Economic Analysis & Policy*, 3(1): article 5.

Coile, Courtney C. and Phillip B. Levine (2009). "The Market Crash and Mass Layoffs: How the Current Economic Crisis May Affect Retirement." National Bureau of Economic Research, Working Paper 15395.

Coile, Courtney C. and Phillip B. Levine (2007). "Labor Market Shocks and Retirement: Do Government Programs Matter?" *Journal of Public Economics*. 91(10): 1902-1919.

Coile, Courtney C. and Phillip B. Levine (2006). "Bulls, Bears, and Retirement Behavior." *Industrial and Labor Relations Review*. 59(3): 408-429.

Coronado, Julie and Maria Perozek (2003). "Wealth Effects and the Consumption of Leisure: Retirement Decisions During the Stock Market Boom of the 1990s," Board of Governors of the Federal Reserve System, Finance and Economics Discussion Series #2003-20.

Farber, Henry S. (2005). "What do we know about Job Loss in the United States? Evidence from the Displaced Workers Survey, 1984-2004" Princeton University, Industrial Relations Section Working Paper #498.

Gustman, Alan L., Thomas L. Steinmeier and Nahid Tabatabai (2010). *Pensions in the Health and Retirement Study*. Cambridge, MA: Harvard University Press, forthcoming.

Hallberg, Daniel (2008). "Economic Fluctuations and Retirement of Older Employees," Institute for Labour Market Policy Evaluation, number 2008-2.

Hutchens, Robert (1988). "Hiring the Older Worker: Do Job Opportunities Decline with Age?" *Industrial and Labor Relations Review*. 42(1): 89-99.

Hurd, Michael D., Monika Reti, and Susann Rohwedder (2009). "The Effect of Large Capital Gains or Losses on Retirement," in Developments in the Economics of Aging, David A. Wise, ed. Chicago: University of Chicago Press.

Maestas, Nicole (2007). "Back to Work: Expectations and Realizations of Work after Retirement," RAND Working Paper WR-196-2, April.

Munnell, Alicia, Steven Sass, Mauricio Soto, and Natalia Zhivan (2006). "Has the Displacement of Older Workers Increased?" Center for Retirement Research Working Paper 2006-17.

Oreopoulos, Phil, Till von Wachter, and Andrew Heisz (2006). "The Short- and Long-Term Career Effects of Graduating in a Recession: Hysteresis and Heterogeneity in the Market for College Graduates." National Bureau of Economic Research, working paper 12159.

Steven Ruggles, Matthew Sobek, Trent Alexander, Catherine A. Fitch, Ronald Goeken, Patricia Kelly Hall, Miriam King, and Chad Ronnander (2009). *Integrated Public Use Microdata Series: Version 4.0* [Machine-readable database]. Minneapolis, MN: Minnesota Population Center [producer and distributor].

Venti, Steven and David Wise (2001). "Aging and Housing Equity" in Olivia S. Mitchell, Zvi Bodie, P. Brett Hammond, and Steven Zeldes (eds.), *Innovations for Financing Retirement.* Philadelphia: University of Pennsylvania Press.

Venti, Steven and David Wise (2004). "Aging and Housing Equity: Another Look," in (ed.) David Wise (ed.), *Perspectives in the Economics of Aging.* Chicago: University of Chicago Press.

von Wachter, Till (2007). "The Effect of Economic Conditions on the Employment of Workers Nearing Retirement Age." Center for Retirement Research Working Paper 2007-25.

von Wachter, Till M., Jae Song, and Joyce Manchester (2008). "Long-Term Earnings Losses due to Mass-Layoffs During the 1982 Recession: An Analysis Using U.S. Administrative Data from 1974 to 2004." Unpublished manuscript, Columbia University.

Table 1A: Real Percentage Increase in S&P 500 between Ages 55 and 60, by Year of Survey and Age in Survey Year

Age in Survey Year	Survey Year							
	2000	2001	2002	2003	2004	2005	2006	2007
71	76.6	27.5	38.1	43.2	38.6	9.3	62.7	54.3
72	41.5	76.6	27.5	38.1	43.2	38.6	9.3	62.7
73	48.5	41.5	76.6	27.5	38.1	43.2	38.6	9.3
74	67.8	48.5	41.5	76.6	27.5	38.1	43.2	38.6
75	22.8	67.8	48.5	41.5	76.6	27.5	38.1	43.2
76	12.9	22.8	67.8	48.5	41.5	76.6	27.5	38.1
77	14.9	12.9	22.8	67.8	48.5	41.5	76.6	27.5
78	-5.7	14.9	12.9	22.8	67.8	48.5	41.5	76.6
79	-29.2	-5.7	14.9	12.9	22.8	67.8	48.5	41.5
80	-3.1	-29.2	-5.7	14.9	12.9	22.8	67.8	48.5

Table 1B: National Unemployment Rate at Age 62, by Year of Survey and Age in Survey Year

Age in Survey Year	Survey Year							
	2000	2001	2002	2003	2004	2005	2006	2007
71	6.8	7.5	6.9	6.1	5.6	5.4	4.9	4.5
72	5.6	6.8	7.5	6.9	6.1	5.6	5.4	4.9
73	5.3	5.6	6.8	7.5	6.9	6.1	5.6	5.4
74	5.5	5.3	5.6	6.8	7.5	6.9	6.1	5.6
75	6.2	5.5	5.3	5.6	6.8	7.5	6.9	6.1
76	7	6.2	5.5	5.3	5.6	6.8	7.5	6.9
77	7.2	7	6.2	5.5	5.3	5.6	6.8	7.5
78	7.5	7.2	7	6.2	5.5	5.3	5.6	6.8
79	9.6	7.5	7.2	7	6.2	5.5	5.3	5.6
80	9.7	9.6	7.5	7.2	7	6.2	5.5	5.3

Table 2: Mean Incomes of 70 to 79 Year Old Retired Men,
by Location in Total Personal Income Distribution

Group	Total Personal Income	Social Security Income	Pension Income	Investment Income	Other Income
All	$34,034	$11,388	$10,730	$8,066	$3,850
Bottom Third	$9,686	$7,807	$701	$306	$872
Middle Third	$23,032	$12,673	$6,429	$2,261	$1,669
Top Third	$68,356	$13,621	$24,644	$21,234	$8,857

Notes: Reported dollar values represent the mean for each income type in each income level and are reported in 2007$.

Table 3: Impact of Labor Market Conditions and Stock Market Returns
around the Time of Retirement on Components of Retirement Income for Men in their 70s

	Any Income from Social Security (1)	Income from Social Security (if received) (2)	Income from Social Security (3)	Any Pension Income (4)	Pension Income (if received) (5)	Pension Income (6)	Any Investment Income (7)	Income from Investments (if received) (8)	Income from Investments (9)
Mean	90.9%	$12,530	$11,388	51.9%	$20,679	$10,730	46.5%	$17,377	$8,066
Unemployment Rate at Age 62	0.043 (0.044)	-20.841 (7.327)	-11.761 (9.195)	-0.073 (0.067)	53.059 (49.184)	12.739 (42.277)	0.037 (0.061)	102.870 (61.743)	79.672 (61.033)
S&P 500 Returns, Age 50 to 55	-0.006 (0.004)	-0.203 (0.824)	-1.210 (0.851)	0.005 (0.006)	-4.021 (3.135)	--0.941 (3.876)	-0.001 (0.004)	-7.031 (5.035)	-4.369 (4.039)
S&P 500 Returns, Age 55 to 60	-0.003 (0.003)	-0.247 (0.652)	-0.792 (0.826)	-0.002 (0.006)	0.144 (3.666)	-0.358 (3.724)	0.022 (0.005)	0.516 (10.040)	17.557 (6.116)
S&P 500 Returns, Age 60 to 65	0.001 (0.002)	-0.371 (0.464)	-0.229 (0.654)	0.003 (0.005)	1.500 (2.062)	2.399 (2.563)	0.010 (0.004)	4.370 (4.553)	10.736 (4.602)
S&P 500 Returns, Age 65 to 70	0.001 (0.001)	0.041 (0.199)	0.238 (0.267)	0.001 (0.002)	-0.367 (1.170)	0.092 (1.184)	0.003 (0.002)	0.904 (2.731)	3.212 (1.906)
number of obs.	600,211	545,499	600,211	600,211	311,443	600,211	600,211	279,414	600,211

Notes: Estimates in Columns 1, 4, and 7 are from linear probability models. Coefficient estimates and standard errors in those models are multiplied by 100. Estimates in Columns 2, 5, and 8 are from OLS models. Estimates in Columns 3, 6, and 9 are from Tobit models. Each model contains the variables listed along with the contemporaneous state level unemployment rate, demographic factors (marital status, race/ethnicity), educational attainment, and age, survey year, and state of residence fixed effects. Standard errors are clustered at the state level.

Table 4: Impact of Labor Market Conditions and Stock Market Returns
around the Time of Retirement on Social Security Income of Men in their 70s, by Income Level

Position in Personal Income Distribution:	Any Income from Social Security			Income from Social Security, if Received			Income from Social Security		
	Bottom Third (1)	Middle Third (2)	Top Third (3)	Bottom Third (4)	Middle Third (5)	Top Third (6)	Bottom Third (7)	Middle Third (8)	Top Third (9)
Mean	83.6%	95.3%	93.7%	$9,343	$13,299	14,533	$7,807	$12,673	$13,621
Unemployment	0.095	0.078	0.007	-30.064	-20.435	0.116	-11.966	-7.815	2.052
Rate at Age 62	(0.099)	(0.040)	(0.042)	(9.641)	(7.607)	(12.472)	(12.246)	(9.771)	(15.576)
S&P 500 Returns,	-0.008	-0.006	-0.005	-0.139	-0.480	-1.091	-1.090	-1.420	-1.859
Age 50 to 55	(0.007)	(0.004)	(0.003)	(0.911)	(1.065)	(1.546)	(1.237)	(1.000)	(1.530)
S&P 500 Returns,	-0.001	-0.002	-0.010	0.019	-0.873	-0.906	-0.182	-1.095	-2.562
Age 55 to 60	(0.007)	(0.003)	(0.005)	(0.733)	(0.952)	(1.111)	(1.100)	(0.953)	(1.453)
S&P 500 Returns,	0.006	-0.002	-0.004	-0.557	-0.149	-0.992	0.169	-0.392	-1.600
Age 60 to 65	(0.004)	(0.003)	(0.004)	(0.574)	(0.570)	(0.984)	(0.827)	(0.724)	(1.396)
S&P 500 Returns,	0.002	0.000	0.001	-0.090	0.212	-0.078	0.221	0.134	0.104
Age 65 to 70	(0.002)	(0.001)	(0.002)	(0.314)	(0.327)	(0.429)	(0.417)	(0.332)	(0.580)
number of observations	198,192	197,969	204,050	165,608	188,647	191,244	198,192	197,969	204,050

Notes: Estimates in Columns 1, 4, and 7 are from linear probability models. Coefficient estimates and standard errors in those models are multiplied by 100. Estimates in Columns 2, 5, and 8 are from OLS models. Estimates in Columns 3, 6, and 9 are from Tobit models. Each model contains the variables listed along with the contemporaneous state level unemployment rate, demographic factors (marital status, race/ethnicity), educational attainment, and age, survey year, and state of residence fixed effects. Standard errors are clustered at the state level.

Table 5: Impact of Labor Market Conditions and Stock Market Returns
around the Time of Retirement on Pension Income of Men in their 70s, by Income Level

Position in Personal Income Distribution:	Any Pension Income			Pension Income, if Received			Pension Income		
	Bottom Third (1)	Middle Third (2)	Top Third (3)	Bottom Third (4)	Middle Third (5)	Top Third (6)	Bottom Third (7)	Middle Third (8)	Top Third (9)
Mean	15.9%	64.3%	74.8%	$4,420	$9,998	$32,927	$701	$6,429	$24,644
Unemployment	-0.053	-0.136	0.035	7.684	-8.789	105.448	-9.252	-28.713	119.318
Rate at Age 62	(0.054)	(0.099)	(0.087)	(19.518)	(16.719)	(86.774)	(19.154)	(21.701)	(73.761)
S&P 500 Returns,	-0.002	0.007	0.000	-0.572	0.628	-10.470	-0.773	1.549	-9.232
Age 50 to 55	(0.008)	(0.009)	(0.008)	(1.463)	(1.135)	(4.651)	(2.688)	(1.833)	(6.152)
S&P 500 Returns,	-0.007	-0.008	-0.008	-1.429	0.761	-3.364	-3.112	-1.039	-5.515
Age 55 to 60	(0.010)	(0.008)	(0.010)	(1.423)	(1.692)	(6.036)	(3.206)	(1.867)	(6.095)
S&P 500 Returns,	-0.004	-0.003	0.001	-0.285	-0.670	4.563	-1.336	-1.170	5.210
Age 60 to 65	(0.006)	(0.008)	(0.005)	(0.845)	(0.937)	(4.272)	(1.973)	(1.634)	(5.519)
S&P 500 Returns,	0.000	0.001	0.000	0.538	0.555	-0.704	-0.065	0.487	-0.427
Age 65 to 70	(0.002)	(0.004)	(0.002)	(0.425)	(0.417)	(2.303)	(0.811)	(0.753)	(1.969)
number of observations	198,192	197,969	204,050	31,418	127,304	152,721	198,192	197,969	204,050

Notes: Estimates in Columns 1, 4, and 7 are from linear probability models. Coefficient estimates and standard errors in those models are multiplied by 100. Estimates in Columns 2, 5, and 8 are from OLS models. Estimates in Columns 3, 6, and 9 are from Tobit models. Each model contains the variables listed along with the contemporaneous state level unemployment rate, demographic factors (marital status, race/ethnicity), educational attainment, and age, survey year, and state of residence fixed effects. Standard errors are clustered at the state level.

Table 6: Impact of Labor Market Conditions and Stock Market Returns
around the Time of Retirement on Investment Income of Men in their 70s, by Income Level

| Position in Personal Income Distribution:	Any Investment Income			Investment Income, if Received			Investment Income		
	Bottom Third (1)	Middle Third (2)	Top Third (3)	Bottom Third (4)	Middle Third (5)	Top Third (6)	Bottom Third (7)	Middle Third (8)	Top Third (9)
Mean	16.6%	47.4%	74.8%	$2,039	$4,804	$28,418	$306	$2,261	$21,234
Unemployment Rate at Age 62	0.091 (0.084)	0.061 (0.092)	-0.044 (0.092)	12.528 (10.664)	17.890 (16.470)	164.058 (99.602)	16.451 (11.634)	17.291 (18.192)	83.248 (102.304)
S&P 500 Returns, Age 50 to 55	0.003 (0.006)	-0.007 (0.008)	-0.003 (0.007)	-0.179 (1.180)	-1.283 (1.194)	-13.113 (8.315)	0.553 (1.073)	-1.480 (1.202)	-12.437 (7.779)
S&P 500 Returns, Age 55 to 60	0.014 (0.006)	0.010 (0.011)	0.033 (0.007)	0.460 (1.011)	-0.677 (1.382)	-0.008 (16.842)	2.689 (1.269)	1.053 (1.690)	22.659 (11.878)
S&P 500 Returns, Age 60 to 65	0.000 (0.006)	0.006 (0.007)	0.021 (0.007)	0.126 (0.991)	0.014 (0.839)	8.785 (7.107)	0.321 (1.116)	0.858 (0.990)	21.339 (7.189)
S&P 500 Returns, Age 65 to 70	-0.003 (0.002)	0.005 (0.003)	0.008 (0.002)	-0.244 (0.377)	-0.329 (0.434)	3.508 (4.720)	-0.453 (0.334)	0.620 (0.445)	8.420 (4.087)
number of observations	198,192	197,969	204,050	32,902	93,885	152,627	198,192	197,969	204,050

Notes: Estimates in Columns 1, 4, and 7 are from linear probability models. Coefficient estimates and standard errors in those models are multiplied by 100. Estimates in Columns 2, 5, and 8 are from OLS models. Estimates in Columns 3, 6, and 9 are from Tobit models. Each model contains the variables listed along with the contemporaneous state level unemployment rate, demographic factors (marital status, race/ethnicity), educational attainment, and age, survey year, and state of residence fixed effects. Standard errors are clustered at the state level.

Table 7: Impact of Labor Market Conditions and Stock Market Returns
around the Time of Retirement on Total Personal Income of Men in their 70s, by Income Level

|	All Men (1)	Bottom Third of Income Distribution (2)	Middle Third of Income Distribution (3)	Top Third of Income Distribution (4)
Mean Income	$34,034	$9,686	$23,032	$68,356
Unemployment	8.200	-24.840	-8.204	112.741
Rate at Age 62	(51.049)	(9.767)	(11.128)	(107.305)
S&P 500 Returns,	-4.192	-0.504	-0.440	-16.029
Age 50 to 55	(3.838)	(0.801)	(0.709)	(8.195)
S&P 500 Returns,	-0.179	-0.876	-0.782	-5.001
Age 55 to 60	(5.814)	(0.680)	(1.014)	(12.453)
S&P 500 Returns,	3.431	-0.459	-0.283	11.727
Age 60 to 65	(3.042)	(0.656)	(0.692)	(6.358)
S&P 500 Returns,	0.704	0.204	0.315	4.170
Age 65 to 70	(1.289)	(0.351)	(0.285)	(3.178)
number of obs.	600,211	198,192	197,969	204,050

Notes: Estimates are obtained from OLS regression models that each contain the variables listed along with the contemporaneous state level unemployment rate, demographic factors (marital status, race/ethnicity), educational attainment, and age, survey year, and state of residence fixed effects. Standard errors are clustered at the state level.

Figure 1: Unemployment Rates among Those Age 55 to 64 (3 year moving averages)
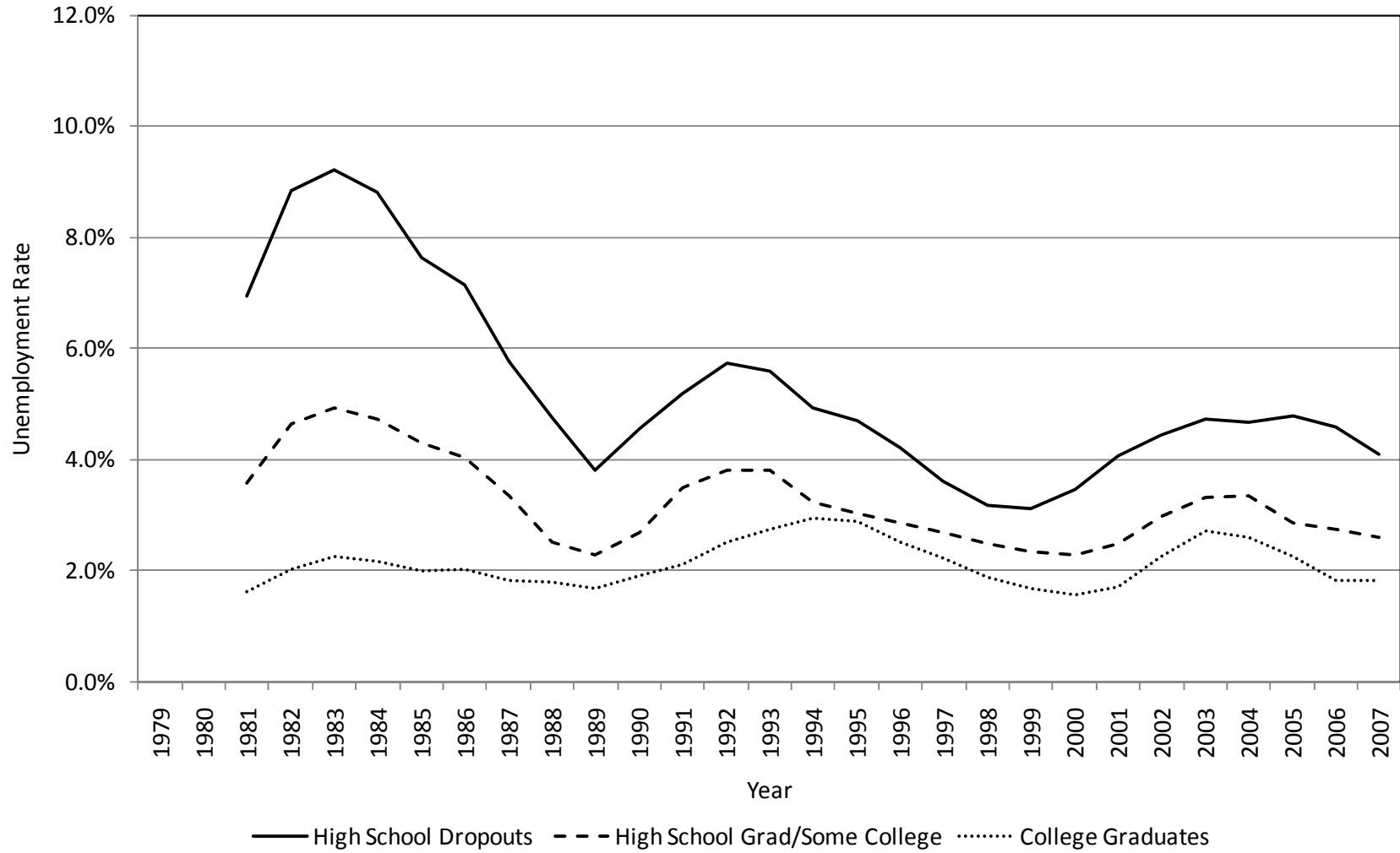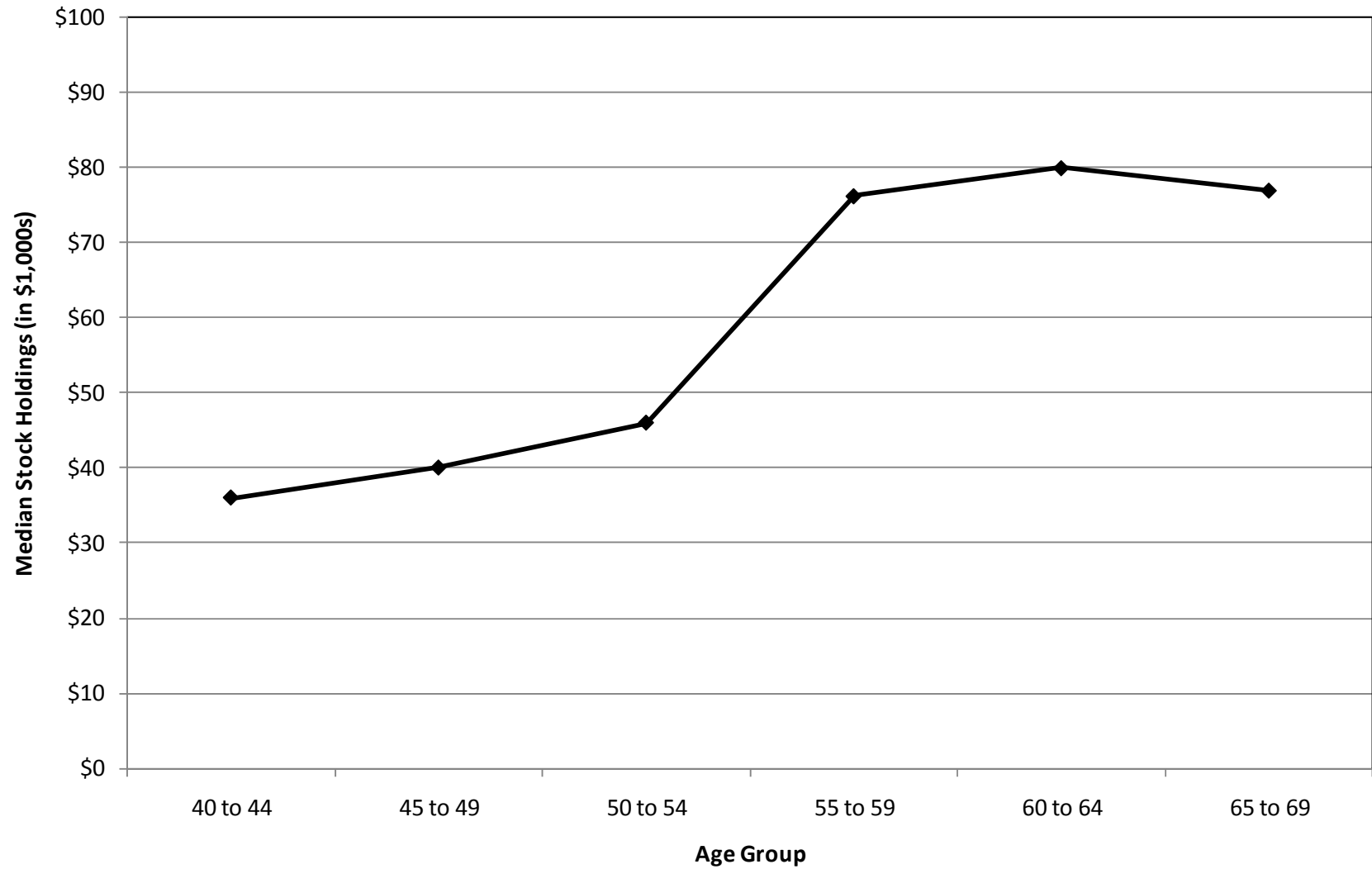
Source: Authors' calculations from the 1979 through 2007 March Current Population Surveys.

Figure 2: Share of Households Holding Stock, by Age
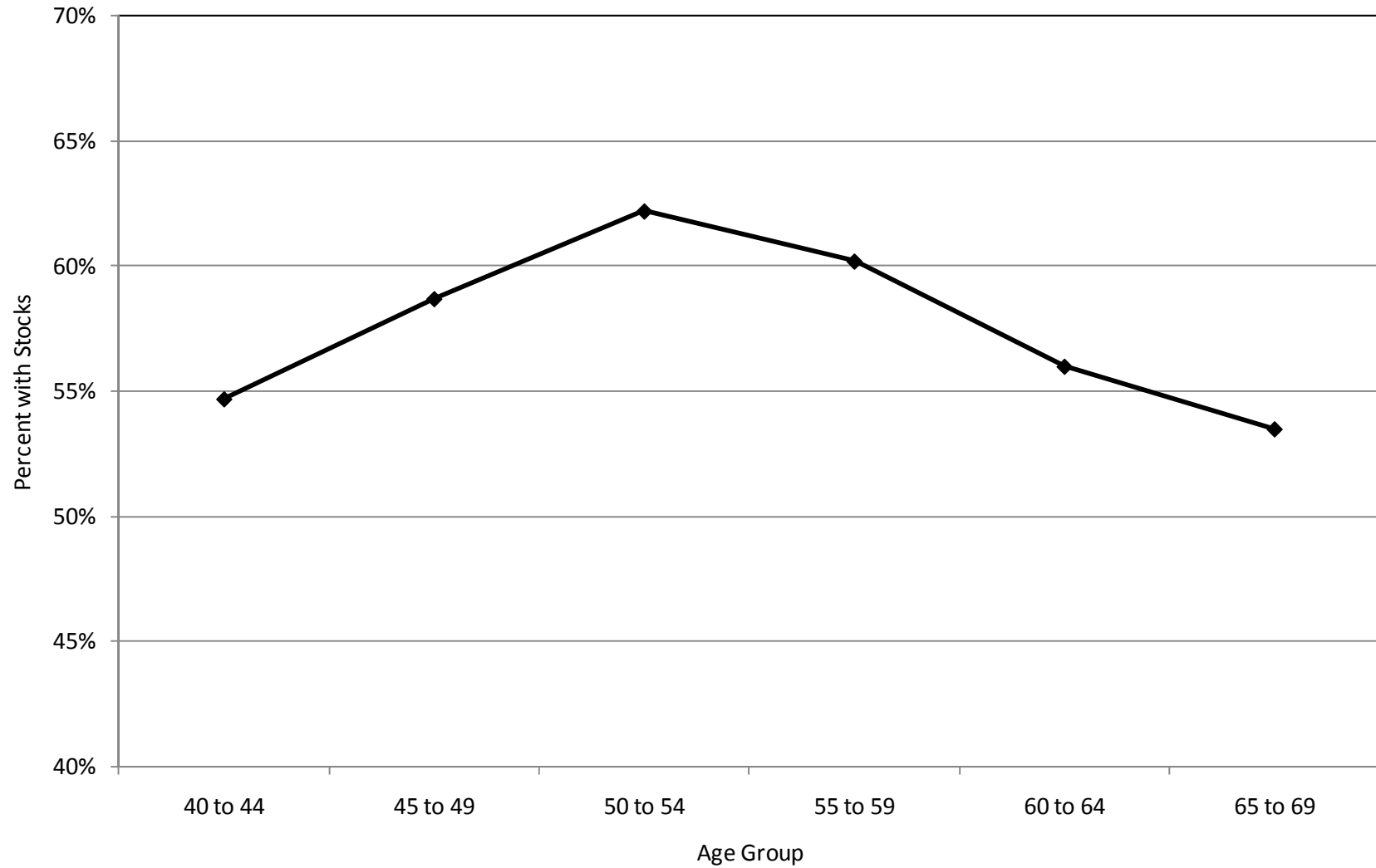
Source: Authors' calculations from the 2007 Survey of Consumer Finances.

Figure 3: Median Stock Holdings among Stockholders by Age

Source: Authors' calculations from the 2007 Survey of Consumer Finances.