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## **The Illusory Benefit of Working Longer on Financial Preparedness for Retirement**

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### **Abstract**

Older workers with insufficient savings are advised to delay retirement. Using Health and Retirement Study data, we compare outcomes of those who delay retirement, a possibly select group, with the predictions of a typical spreadsheet model. Work to age 70 is associated with an 18 percentage-point increase in the share financially prepared for retirement, compared with a predicted 46 percentage points because most older workers claim Social Security and retirement wealth barely increases. Drawing down retirement wealth while working makes sense for most, because earnings are lower than post-retirement income, in part because many older workers voluntarily work part time.

**Keywords:** retirement income, Social Security claiming, older worker labor supply

**Subject classification codes:** H55, J26, J32

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## **Rethinking Advice that Working Longer Increases Retirement Income**

Older workers with inadequate retirement wealth are advised to work longer. In the United States, workers who delay claiming Social Security from age 62 to age 70 increase their benefits by at least 76 percent. Theoretical calculations – what we call “spreadsheet models” – that assume workers delay claiming Social Security until they retire and also continue to contribute to their employer sponsored retirement plans show that delayed retirement can substantially increase financial preparedness. We use the term “spreadsheet models” because the calculations are simple enough to be performed on a spreadsheet, requiring inputs of little more than earnings, retirement plan contribution rate, and a deterministic investment rate of return. These simple calculations appear to be the basis of much investment advice (Society of Actuaries, 2019) and may also influence policymakers.<sup>1</sup>

Using data from the Health and Retirement Study (HRS), we investigate whether work at older ages delivers the promised benefit of increased financial preparedness for retirement, and if not, why not. Our analysis is purely descriptive. We do not estimate how those who retire early might fare were they induced to delay by some policy intervention. We calculate the age-related increase in the share of participants in Health and Retirement Study working past age 62 who were financially prepared for retirement. We compare this increase with the increase projected by Munnell, Orlova, and Webb (2013) for participants who are, on average, drawn from slightly more recent birth cohorts. Munnell, Orlova, and Webb (2013) projected that working from age 62 to age 70 could increase the share of households able to meet target replacement rates (target post-retirement income as a percent of pre-retirement earnings) from 26 percent at age 62 to 72 percent at age 70, an increase of 46 percentage points. We find that even among those who work until age 70, work increased the

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<sup>1</sup> Some more advanced calculators incorporate stochastic investment returns.

share of households financially prepared for retirement by far less, chiefly because many older workers do not delay claiming Social Security benefits.

We do not claim the spreadsheet models' assumptions represent optimizing behavior or that failure to adhere to those assumptions is sub-optimal. Spreadsheet models assume away financial and labor market risk and can, at best, be regarded as a description of so-called optimal behavior under highly restrictive assumptions. However, we show that, for many, claiming may be consistent with optimizing behavior.

We acknowledge older households that work, but do not accumulate wealth, may prefer or need more consumption at their current age than at older ages. But our analysis shows that unsustainable pre-retirement consumption is not the norm. And we do not attempt to answer the counterfactual question – what would have happened to the wealth and preparedness of households that delayed retirement had they not delayed. Our contribution is to show that spreadsheet models do not describe actual behavior and that advice stemming from them has the potential to mislead both workers and policymakers.

### **Literature Review**

In theory, working at older ages can substantially increase the likelihood of achieving a target retirement income. Claiming Social Security retired worker benefits at age 70 instead of age 62 increases benefits by at least 76 percent because workers avoid the reduction in benefits for claiming before the Full Retirement Age, currently age 66, and benefit from the Delayed Retirement Credit. The Social Security benefit boost is even greater if earnings past age 62 displace lower earning years in the calculation of Average Indexed Monthly Earnings (AIME) upon which Social Security benefits are based. In addition, workers who delay drawing down their 401(k) plans and instead continue to contribute will enjoy higher income from their plans in retirement because they can draw down a larger account balance over a shorter post retirement life-expectancy.

The advice to work longer in personal finance blogs e.g. Elkins (2019) often assumes older workers delay claiming and save more. All academic projections of the benefit of working at older ages -- for example, Bajtelsmit, Foster, and Rappaport (2013), Bronshtein, Scott, Sloven, and Slavov (2018), Butrica, Johnson, Smith, and Steuerle (2004), Butrica, Smith, Steuerle and Schmidt (2007), Munnell, Golub-Sass, and Webb, (2011), Munnell, Hou, and Sanzenbacher (2019), and Munnell, Orlova, and Webb (2013) – also assume workers delay claiming Social Security. All except Bajtelsmit, Foster, and Rappaport (2013) assume increases in financial wealth, and only Butrica, Smith, Steuerle, and Schmidt (2007) takes into account that earnings don't generally increase at older ages, instead parameterizing earnings projections to observed age-earnings profiles. Since the models use optimistic assumptions about claiming and saving it is not a surprise the studies project substantial increases in replacement rates – ranging from 5-9 percent a year (Bajtelsmit, Foster, and Rappaport, 2013; Butrica, Johnson, Smith, and Steuerle 2004; Butrica, Smith, Steuerle and Schmidt, 2007), reductions in the share at risk of outliving their wealth (Bajtelsmit, Foster, and Rappaport, 2013), reductions in target savings rates from the impossible to the feasible (Munnell, Golub-Sass, and Webb, 2011), and substantial increases in the share of households able to achieve replacement rate targets (Munnell, Orlova, and Webb, 2013).

### **Data and Descriptive Statistics on Financial Preparedness for Retirement**

The HRS is a nationally representative panel survey of household heads over the age of 50 and their spouses irrespective of age. The initial cohort comprised individuals born in 1931-41 or married to someone born between those years. These individuals have been re-interviewed every two years since 1992. The 1942-47 birth cohort was added in 1998, and subsequent birth cohorts were added in 2004, 2010, and 2016. We study individuals born 1931-47 who attained age 62 in 1993-2009 and who were also interviewed before and after their 62nd birthday.

The starting sample used in our analysis has 11,062 individuals. The sample is reduced by dropping 77 individuals who lack administrative and self-reported claims data as well as self-reported benefit receipt. We drop a further 974 individuals who have ever claimed Social Security Disability Insurance (SSDI), leaving a sample of 10,011, of whom 6,184 worked after age 62 and 3,827 never worked after age 62. Of the 6,184 workers, 2,655 were married men, 2,009 married women, 412 single men, and 1,108 single women, 2,434 were born in the 1931-36 cohort, 2,180 in the 1937-41 cohort, and 1,570 in the 1942-47 cohort. We follow these individuals until the earliest of death, exit from the survey without re-entry, and age 70 (in the wave closest to their 70th birthday).

We use administrative data on earnings and Social Security claim ages when available. The study classifies a person as working at each age from 62 to 70 if they do not report being fully retired at the interview date closest to the relevant birthday (workers are not asked what date they “retired”). We also consider individuals retired if they respond that the survey question eliciting retirement status is irrelevant. Self-reported retirement status is a good indicator of the strength of a person’s attachment to the labor force. In the pooled cross section sample, of the 45 percent who report they were fully retired, only 4 percent worked for pay. Of the 26 percent who reported they were not retired almost all (91 percent) worked for pay. Another 17 percent report being partly retired, of whom 72 percent worked for pay. We treat this group as working. Finally, of the 12 percent who stated the question was irrelevant only 1 percent worked for pay. We treat this group as not working.

We follow Munnell, Orlova, and Webb (2013) and consider a worker financially prepared for retirement if they live in a household that could retire immediately on an income exceeding a replacement rate target drawn from the Georgia State University/AON RETIRE Project (Georgia State). We acknowledge heterogeneity in preferences and circumstances and that the Georgia State model makes many simplifying assumptions, so that achieving a

replacement rate target is not synonymous with utility maximizing behavior. We use replacement rate targets solely to benchmark age-related trends in financial preparedness for retirement. We chose the Georgia State target not because of any superiority to similar targets or to intertemporal optimization model such as Scholz, Seshadri, and Khitatrakun (2006), but to facilitate comparison with Munnell, Orlova, and Webb (2013) who use the same benchmark.

The Georgia State replacement rate targets vary with labor market earnings and household composition – for example, low earner households need higher replacement rates than higher earners (see Appendix Table 1). Georgia State use Consumer Expenditure Survey data to estimate age- and work-related expenses that vary with income, marital status, and number of earners. Georgia State replacement rate targets assume 2008 tax law, a retirement age of 65, and an actuarial reduction for early claiming relative to a Social Security Full Retirement Age of 66. The Georgia State denominator is pre-retirement earnings. For consistency with Munnell, Orlova, and Webb (2013) we use a slightly different denominator, the sum of Average Indexed Monthly Earnings (AIME) of both spouses at the time the head turns age 62.<sup>2</sup> For typical households, AIME approximates to the last five years of substantial earnings, essentially the Georgia State rate denominator (Goss, Clingman, Wade and Glenn, 2014). In retirement, households receive income from Social Security, employer pensions, annuitized financial wealth, and in one specification, income from a reverse mortgage. The construction of the income sources is described in the appendix.

We use an alternative absolute target of 200 percent of the Federal Poverty Level, \$12,140 for a single individual and \$16,460 for a couple in 2019. We view an income of 200

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<sup>2</sup> The AIME calculations are capped at the Social Security taxable maximum (\$132,900 in 2019) and may therefore overstate the financial preparedness of very high earners. The Georgia State replacement rate targets will be too high for households whose earnings increase rapidly with age and too low for households whose earnings decline at older ages.

percent of the Federal Poverty Level as the minimum required to avoid de-facto poverty. The Federal Poverty Level excludes imputed rent and since homeowners need lower cash incomes than renters to stay out of *de facto* poverty we deduct imputed rent from our yardstick (we assume imputed rent is 4 percent of the house value).<sup>3</sup> Since deducting imputed rent may leave owners of valuable houses with inadequate cash incomes we cap the deduction for imputed rent at three sevenths of cash income, equivalent to spending 30 percent total income on housing, and to a house value of \$350,000 for a couple with a cash income of 200 percent of the Federal Poverty Level.

We divided individuals over age 62 into four groups, those who are 1) financially prepared for retirement and working; 2) prepared for retirement and retired; 3) not prepared for retirement and working; and 4) retired and not prepared. Although we focus on individuals, we determine household financial preparedness for retirement at the household level. Among the sample of men and women ages 66, 11 percent are in the first group; 22 percent in the second; 24 percent in the third, and 43 percent in the last. At age 66, 67 percent, retired or not, are financially unprepared for retirement (see Table 1).

Insert Table 1

We examined the characteristics of each group and focus on educational attainment and race – used as proxies for socioeconomic class – and retirement plan coverage and type (see Appendix Table 2A and 2B for the sample descriptive statistics for men and women at ages 62, 66, and 70). In the following two paragraphs we focus on men. Women and men’s patterns are similar. Unless otherwise noted, the highlighted differences are significant at the 5 percent level.

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<sup>3</sup> For a discussion of imputed rent, see Poterba and Sinai (2008). Our 4 percent is net of maintenance, insurance, and property taxes, which must be paid by homeowners, but not renters.



At all ages, workers who are financially prepared for retirement have the highest level of educational attainment (65 percent have a college degree). The next-highest group are financially prepared retirees (49 percent with a college degree), then unprepared workers (29 percent), and finally unprepared retirees (15 percent). The ordering is reversed for men with less than a high school education.

The share of men age 62 having both DB and DC plans follows the same ordering as for college education (39, 25, 24, and 14 percent; the middle two figures are not significantly different from each other), and the same reverse ordering is observed among men with no retirement plan at age 62 (8, 13, 27, and 37 percent). Among workers and non-workers, Blacks constitute a larger share of the financially unprepared. At age 62, black men constitute 9 and 7 percent of financially prepared workers and non-workers, respectively, but 18 and 12 percent of unprepared workers and non-workers.

## **Methodology**

*Econometric analysis.* We investigate the impact of work at older ages on financial preparedness for retirement as follows: first, to identify correlates of preparedness in cross section, we estimate the following probit model using a cross section of workers at all ages:

$$P(Y=1 | \mathbf{X}) = \Phi(\mathbf{X}\mathbf{B}) \quad (1)$$

where  $Y$  takes the value one if the household can meet its replacement rate target (and its absolute target of 200 percent of the Federal Poverty Level), zero otherwise, and  $\mathbf{X}$  is a vector of socioeconomic variables that may be correlated with financial preparedness for retirement.

People working at older ages may become a more select group as they age, but the direction of bias is unclear. Older workers may be either highly-educated and financially well-prepared; or just as possible, those most desperate for extra income. To control for selection, our second analysis uses the HRS data in panel format to calculate the age-related

change in the share of workers that is financially prepared for retirement. Preparedness can improve for factors not related to work, such as increases in housing and financial asset values and preferences for consumption at older or younger ages. To control for these factors – which we assume do not systematically differ between workers and non-workers – we compare the increase from age 62 to age 70 in the share of workers that is financially prepared for retirement with a control group of workers who retired prior to age 62.

Our third analysis employs a median regression model to identify the pathways through which working longer improves retirement financial preparedness. The dependent variable is the percentage point increase in the replacement rate from 62 to 70. We focus on how many years an individual worked after age 62, the age at which workers claimed Social Security benefits, and the quality of post-age 62 jobs. We control for typical socioeconomic factors and spousal work effort. We estimate the model on a pooled sample of workers who delay retirement and those who do not. (As with our panel analysis, we assume that changes in housing and financial asset values affect workers and non-workers alike).

***Financial preparedness for retirement in cross section.*** The first column of Table 2 reports probit marginal effects estimated on a pooled sample of workers and non-workers aged 62. The dependent variable takes the value one if the individual is a member of a household that is financially prepared for retirement, zero otherwise, using the Georgia State definitions. A positive coefficient signifies that the explanatory variable is associated with an increased probability that the individual is prepared. Columns 2 and 3 report corresponding results at ages 66 and 70 and columns 4-6 report results using the Federal Poverty Level adequacy yardstick.

At age 62, after controlling for socioeconomic differences between workers and non-workers, workers making less than \$15 an hour in 2008 dollars<sup>4</sup> (53 percent of all workers at age 62) are 9 percentage points less likely to be financially prepared than non-workers. These relationships persist at older ages; at ages 66 and 70, workers making less than \$15 an hour are 9 and 8 percentage points less likely to be prepared than non-workers, respectively. An F-test shows that the sum of the worker and \$15/hour or more coefficients is not significantly different from zero at ages 62 and 66 but is significantly negative at age 70. Higher earning older workers are about as prepared as non-workers at ages 62 and 66, but less prepared at age 70. We conclude low-wage older workers work for the same reason most other people work: economic necessity. The stereotype of the older person working solely for intellectual and social stimulation is likely an accurate description for only a minority.

Education is a marker for class position and stability in the labor market. At age 62, individuals with a college degree are 19 percentage points more likely to be prepared than those with high school education or less. Relative to a base case of having no retirement plan, being covered by a DB alone or a combination of a DB and DC plan is associated with substantially improved preparedness, with DC only coverage having a much smaller effect that is significant only at ages 66 and 70. Patterns are broadly similar with the Federal Poverty Level definition of preparedness, with the college, earning \$15 an hour, and pension coefficients substantially larger, reflecting the absolute rather than relative standard of preparedness.

Insert Table 2

***Panel results.*** The above probit is instructive about correlations and magnitudes but does not answer the focal research question - does working longer improve preparedness? -

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<sup>4</sup> We report in 2008 dollars throughout the study, to align with Palmer (2008).

because remaining workers may become a more or a less select group as they age. To determine whether working longer improves preparedness, we follow workers in panel. As some of those working at age 62 retire at age 63, others at 64, and yet others at 70, we report separate results for those who worked to age 63, age 64, and so on, out to age 70. We address two potential concerns. The first is that since we observe labor force participation for individuals and financial preparation for retirement for households our results may be biased by changes in spousal labor supply – although most couples retire around the same time (Coile, 2004). We address this concern by restricting our sample to households in which the other spouse did not change their labor supply.

The second potential concern is that the decline in the prepared share may have been affected by financial shocks, for example, better than expected stock market returns. We address this concern by adopting a difference in difference approach – comparing the change in the share of prepared workers with the change in the share of prepared retirees. Our assumption is that financial shocks affect both groups equally and that the two groups do not differ in their preference for consumption earlier or later in retirement.

We also incorporate the effects of the Social Security earnings test. For the year 2000 onwards, this withholds all or part of the Social Security benefits of workers who have not attained their Full Retirement Age and who earn less than specified amounts. When the worker reaches their Full Retirement Age, benefits are actuarially increased to compensate for benefits withheld. Prior to the year 2000, the test applied up to age 70. We calculate the dollar amount of monthly benefits using administrative data on the date of initial claim, and then subtract benefits withheld as a result of the operation of the earnings test. Once the worker attains their Full Retirement Age, we increase benefits by the amount of the actuarial adjustment. Appendix Table 3 reports the shares of workers wholly or partly affected by the earnings test and the shares of benefits withheld.

To illustrate, consider a worker with a Full Retirement Age of 66 who claimed benefits at age 62 but earned sufficient to have all benefits withheld from age 62 to age 66. The Social Security Administration would actuarially adjust their benefits so that they received full benefits at age 66, notwithstanding their age 62 claim. For the purposes of our analysis, we would deem them to have claimed at age 66 and calculate their post-retirement benefits accordingly. If they had half of their benefits withheld, we would deem them to have claimed at age 64.

Among those who worked from age 62 to 70, the share financially prepared for retirement increases by 24 percentage points, from 21 percent to 45 percent (Table 3 row 8). Selection based on differences between those who work to advanced ages and those who retire at younger ages seems minimal: the share prepared at (say) age 66 of those who work to age 70 is almost identical to the share prepared at 66 of those who retired at 66. Therefore, the remainder of Table 3 focuses on those who work until age 70. We obtain similar patterns to those described below when we analyze those who worked only until age 65. (We acknowledge the possibility that individuals who work at older ages come in equal numbers from the extremities of the spectrum between those exceptionally well-prepared for retirement and those woefully unprepared).

The percentage point increase in preparedness from age 62 to age 70 is an almost identical 22 percentage points when we restrict the sample to only those workers whose spouse did not change their labor force attachment (Table 3 row 9). Retaining the above restriction, we find the college-educated are better prepared than the non-college educated at all ages but both groups have an almost identical 21-23 percentage point increase in preparedness from age 62 to age 70 (Table 3 rows 10 and 11). Including reverse mortgages increases the prepared share at all ages and increases the change in preparedness by 3

percentage points to 25, reflecting the more advantageous reverse mortgage terms available to older borrowers (Table 3 row 12).

The share of workers who retired before age 62 that are prepared for retirement increased from 22 percent at age 62 to 26 percent at age 70, an increase of four percentage points (see Table 3 row 13). Assuming non-work related factors affected the financial preparedness of workers and retirees to the same extent, the true effect of work at older ages is to increase preparedness by 18 percentage points (22 minus 4), using the specification that excludes reverse mortgages.

The Munnell, Orlova, and Webb (2013) projections, assuming no reverse mortgage and no change in spousal labor supply are reported in Table 3 row 14. At age 62, the share prepared for retirement aligns loosely with Munnell, Orlova, and Webb (compare our 23 percent prepared in row 9 with the 26 percent in row 14).<sup>5</sup> But Munnell, Orlova, and Webb (2013) predict an increase in preparedness of more than twice that observed in the data. Their study predicts a 46 percentage-point increase in the share prepared from age 62 to 70 (26 to 72 percent), compared to our calculations of a more modest increase of 18 percentage points, a gap of 28 percentage points. Projections based on models overstate the effect of working longer on financial well-being in retirement.

Different assumptions about drawdown strategies or replacement rate targets did not affect our estimates of the share financially prepared for retirement. Few households voluntarily annuitize and many may instead follow the widely-repeated advice that households can consume 4 percent a year of their initial wealth at relatively low risk of outliving that wealth (Bengen, 1994). When we assume households withdraw 4 percent of wealth at retirement, regardless of retirement age, the increase from age 62 to age 70 in the

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<sup>5</sup> We do not expect the two shares to be identical because the age 62 numbers reported in Munnell, Orlova, and Webb (2013) are projections from ages 51-56, not realized outcomes.

share of households financially prepared for retirement changes from 18 to 16 percentage points. We test the sensitivity of our findings to an alternative replacement rate target following Munnell, Webb, and DeLorme (2006) who classify households as financially prepared if they fall less than 10 percent short of their target. This changes the increase from age 62 to age 70 from 18 to 20 percentage points.<sup>6</sup>

Insert Table 3

*Comparing actual behaviour with spreadsheet model predictions.* The 28 percentage-point gap between observed and counterfactual behavior can be explained almost entirely by early claiming behavior and lower than predicted retirement account wealth accumulations. We create a counterfactual where all workers delayed claiming Social Security benefits until they retired. In this counterfactual, the gap would shrink to 8 percentage points, and if, in addition, their DC wealth increased in accordance with the predictions of spreadsheet models, the gap would only be 2 percentage points. Whereas Munnell, Orlova and Webb (2013) predict an increase in median DC wealth of 21.4 percent from age 62 to age 70, we find the average increase is only 3.7 percent.

*Most workers age 62 or older claim Social Security benefits while working.* Our key finding stands in stark contrast to the assumption in spreadsheet models that all workers postpone claiming Social Security benefits until they retire. We reiterate that this finding is after adjusting claim ages for the effect of the Social Security earnings test. Although the share of workers claiming benefits has declined across succeeding birth cohorts, most workers combine work with benefit receipt.<sup>7</sup> In the birth cohort born 1931-37, only 24

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<sup>6</sup> Our difference in difference results are almost identical. We cannot compare with Munnell, Orlova, and Webb (2013) because they do not report projections using these benchmarks.

<sup>7</sup> Labor force participation at older ages has increased in the past decades. In theory, these trends could result in either an increase or a decrease in the share of workers claiming benefits even though average Social Security claim ages have increased.

percent of workers age 62 have already claimed benefits, but at age 64, 40 percent of remaining workers have claimed benefits, and 89 percent of workers at age 65 (see Table 4 upper panel).<sup>8</sup> After age 66 almost all remaining workers have claimed Social Security benefits. This means that people who continue to work at older ages do not benefit from the generous Delayed Retirement Credit (DRC). Moreover, workers with college degrees, a group more likely to reach and exceed their retirement income targets, are most likely to benefit from the DRC. But even college graduates claim early; 86 percent had filed for Social Security benefits by age 65.

The shares of workers in the 1943-47 birth cohort claiming benefits are almost identical to the shares of workers in the 1931-37 birth cohort claiming benefits, one year younger (compare Table 4 upper and lower panels). Thus, 25 percent of workers in the 1943-47 birth cohort had claimed at age 63, compared with 24 percent of workers in the 1931-37 birth cohort who had claimed at age 62 and 89 percent of workers in the 1943-47 birth cohort had claimed at age 66, identical to the percent of workers in the 1931-37 birth cohort who had claimed at age 65. Among the 1931-37 birth cohort, the share of workers claiming benefits jumped from 40 percent at age 64 to 89 percent at age 65. Among the 1943-47 birth cohort, the jump occurs one year later, from 43 percent at age 65 to 89 percent at age 66.

An investigation of the factors contributing to the increase in the share of workers delaying claiming is beyond the scope of this paper. But we note that a one-year delay in claiming would permit the 1943-47 birth cohort to offset the benefit reduction resulting from the increase in the Social Security Full Retirement Age. If claim ages increase yet further, as the Social Security Full Retirement Age is increased to age 67, work at older ages may have

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<sup>8</sup> Table 4 reports the shares of participants working at age  $t$  and who had not claimed benefits by age  $t$ . We assign labor force status based on self-reported labor force status at the interview closest in time to the birthday. An alternative of classifying workers based on labor force and claim status at the date of the interview yields almost identical results.



larger effects on financial preparedness than those we report. But work will only yield the benefits projected by Munnell, Orlova, and Webb (2013) if those who work till age 70 also delay claiming till age 70, and that would require a far larger change in behavior than that observed to date.

Insert Table 4

*Many workers are not making a mistake by claiming benefits.* We now consider whether workers are making a mistake by claiming benefits. In a simple version of the life-cycle model, households with labor market earnings exceeding projected post-retirement income should be adding to their retirement wealth by postponing claiming Social Security and contributing to their retirement plans. Conversely, households whose labor market earnings fall short of projected post retirement income should be drawing down retirement wealth.

We find that the share of workers in households with labor market earnings that fall short of the income they would receive were both spouses to retire and claim benefits immediately increases from 39 percent at age 62 to 69 percent at age 70 (Table 5, first row). We reiterate that these claim ages are after actuarial adjustments resulting from the Social Security earnings test. Table 5 rows two and three also separately reports the shares of workers claiming benefits among those whose household earnings are greater than or less than post retirement earnings. The share of workers with earnings exceeding retirement income who are claiming benefits increases from 10 percent at age 62 to 55 percent by age 65. These claimants are likely making a mistake. The share claiming among those whose earnings are less than potential retirement income is higher at all ages – 33 percent at age 62 and 75 percent at age 65. These claimants are likely not making a major mistake.

The two lower sections of Table 5 repeat the above analysis separately for full and part timers. Full time workers are more likely to be in households with labor market earnings

that exceed projected post-retirement income. To illustrate, at age 62, 72 percent of full-time workers have earnings exceeding post-retirement income, compared with 38 percent of part timers. The share claiming Social Security is lowest among full time workers earning more than projected post retirement income. The next lowest claim share is among full time workers earning less than projected post-retirement income, followed by part time workers earning more than projected post retirement income, with the share being highest among part time workers earning less than projected post retirement income. But by age 66, almost everyone has claimed in all four groups.

#### Insert Table 5

Workers wanting to tap their retirement resources to supplement current consumption will generally be better off drawing on financial assets and preserving Social Security wealth than claiming Social Security benefits early (Sun and Webb, 2010). But claiming Social Security is not necessarily a big mistake and it is the sensible thing to do for those with few assets and whose earnings fall short of the income they would receive if they retired. Of the 57 percent of workers age 66 whose labor market earnings fall short of the income they would receive were they to retire, three quarters (77 percent) have less than \$20,000 financial wealth and have little choice but to tap Social Security to smooth consumption. Financial education may convince some of the remaining quarter of the 57 percent to change the order in which they draw down Social Security and financial wealth. But the goal of financial education is to induce households to behave optimally and is unlikely to induce households to preserve their retirement wealth if they are behaving optimally in drawing down rather than adding to their retirement wealth.

*DC Wealth.* Data limitations prevent us from decomposing the factors contributing to DC wealth accumulations falling so far short of spreadsheet projections.<sup>9</sup> Plan withdrawals, shrinking contribution and participation rates, and lower than projected net-of-fee returns are all plausible causal factors. Lower than projected wealth accumulation at younger ages has been well-documented (Munnell and Webb, 2015, Biggs, Munnell, and Chen, 2019), and it would be surprising if outcomes were any better at older ages.

***Work past 62 not as helpful for increasing replacement rates as predicted.*** A median regression on a pooled sample of workers and non-workers helps identify the circumstances and behaviors associated with increases in financial preparedness for retirement between ages 62 and 70. One of the advantages of median regressions is that they suppress the effects of outliers, often an issue with wealth data. A further measure we take is to exclude non-retirement wealth in this analysis; the data for these figures are spread across many variables and can be quite noisy. Median regression is more robust than least squares regression and is semiparametric so the technique avoids making assumptions about the parametric distribution of the error process.

The dependent variable is the percentage point change in the household level replacement rate from 62 to 70. Our explanatory variables of interest include delayed claiming of Social Security, work after age 62, and indicators of post-62 job quality, separately for self and spouse where applicable. The coefficients measure the impact of one year's delay, work, etc. as appropriate, and we examine post age-62 work histories to determine the number of years spent in high quality jobs. We include a variable indicating whether the worker or their spouse experienced involuntary job-loss from their career job.

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<sup>9</sup> Investment returns are not reported and the self-reported data on contributions and withdrawals are incomplete and suffer from reporting error. Administrative data are only available for employee, not employer contributions, and only for some participants and years (Ghilarducci, Radpour, and Webb, forthcoming).

Involuntary job-loss is often associated with substantial pay reductions (Johnson and Kawachi, 2007) that we hypothesize may disrupt financial preparation for retirement. We only include involuntary job loss prior to age 62 as workers who extend their careers past age 62 have greater exposure to the risk of job loss than those who retire prior to age 62. We control for educational attainment, race, birth cohort, health at age 62, marital status at age 62, and widowhood or divorce between ages 62 and 70. We experimented with specifications that included industry, occupation, firm size, and union membership. None of these variables were statistically significant and thus we do not report results. Reflecting the fact that the husband is usually the primary earner in this birth cohort, we refer to husbands, higher earners in a same sex couples, and all unmarried people as “self” and to wives and lower earners in a same sex couples) as “spouse.”

Our key finding is that work at older ages does little to improve replacement rates. Individually, the work-related coefficients for self are small and nonsignificant. The sole exception is a significantly negative coefficient for college educated spouses. One possible explanation is that households where the wife is college educated and working are disproportionately well-off, with a median replacement rate of 97 percent. Not only are these workers unlikely to have any of their top 35 earning years after age 62, the progressivity of the Social Security benefit formula means that even if they do, they have least to gain from increasing their benefits in this fashion. The best case scenario – a college-educated worker working full time in a job with retirement benefits and paying more than \$15 an hour – yields an annual increase in replacement rate of 1.9 percentage points (the sum of the coefficients in row one and rows 3-5 in Table 6 after rounding), or 15.2 percentage points over eight years (1.9 times 8), which an F test reveals is significantly different from zero.<sup>10</sup> However, just 9

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<sup>10</sup> Coefficients at the 25<sup>th</sup> and 75<sup>th</sup> percentiles are similar to those at the median.

percent of the sample at age 62 falls under this best-case scenario, and most of the 9 percent stop working before age 70. Spousal work-related coefficients are individually small and lack statistical significance, as does a similar best-case scenario.

Delaying Social Security by one year increases replacement rates by a statistically significant 3.1 percentage points per year. This increase is very close to the penalty for early claiming and benefit of the Delayed Retirement Credit (DRC). The DRC is an annual 8 percent, so a worker with a 40 percent Social Security replacement rate should increase their replacement rate by 3.2 percentage points (8 percent of 40 percent) a year.

The controls for marital status, race, education and health all lacked statistical significance. The only significant control was for birth cohort: those born 1937-41 and 1942-1947, most of whom were ages 62-70 during the stock market decline precipitated by the Great Recession experienced 2.9 and 5.3 percentage points smaller increases in their replacement rates than the 1931-36 birth cohort, all of whom attained age 70 prior to the decline. The variable indicating whether workers experienced involuntary job-loss from their career job is not significant, surprisingly.

Insert Table 6

***Robustness. Alternative definition of work.*** We test the sensitivity of our results to various methods of identifying a person as working or retired. We found insignificant differences between using a self-identified measure and actual work effort, reflecting the strong correlation between subjective and objective measures of labor force participation mentioned previously.

***Excessive consumption.*** Households that work at older ages expand their lifetime budget constraint by the amount of their after-tax earnings. We consider the possibility that households combine work at older ages with Social Security benefit receipt to temporarily

and unsustainability increase consumption. To evaluate whether consumption is sustainable, we need a benchmark, and a measure of consumption.

Our benchmark is the annuity value of total age 62 wealth, inclusive of Social Security and the present value of future earnings, expressed as a percentage of AIME.<sup>11</sup> We assume that households perfectly anticipate when they will retire. In practice, the age of retirement is uncertain and risk-averse households might adopt a lower benchmark. We assume households do not substitute home production for market purchases on retirement (Aguiar and Hurst, 2005). Our approach understates optimal pre-retirement consumption to the extent that households plan to increase home production on retirement.

We considered and rejected measuring consumption using the HRS Consumption and Mail Survey (CAMS). Although Hurd and Rohwedder (2008) show that CAMS consumption data closely match Consumer Expenditure Survey data, our analyses reveal what we regard as an implausibly small marginal propensity to consume. To figure out whether households are overspending, we proceed in four steps:

Step one involves figuring out the lifetime resources available to each household in our sample. Resources comprise the value of financial assets, and the expected present value of remaining lifetime labor market earnings and income from Social Security and defined benefit retirement plans. As previously, we adjust Social Security benefits to reflect the operation of the earnings test. We ignore housing wealth because households rarely trade down or tap a reverse mortgage.

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<sup>11</sup> Under plausible assumptions, households financing post-retirement out of unannuitized wealth will plan for consumption to decrease with age reflecting their lower probabilities of being alive at advanced ages. In contrast, the same households would choose an inflation indexed annuity providing level real consumption in preference to a nominal annuity providing decreasing real income. We assume households use financial assets to purchase a level nominal annuity that pays a higher initial income, increasing our benchmark.

Step two is to calculate the household's consumption target. This is the level lifetime income the household's lifetime resources can produce. Although households rarely annuitize and are unable to purchase annuities with future labor market earnings, we use current joint life and survivor annuity rates as a proxy for the lifetime income the household's resources can produce. So if the lifetime resources are \$1 million and the annuity rate 5 percent, the household can spend \$50,000 a year. We calculate the median consumption target for all households.

Step three is to calculate each household's consumption while working.

$$\frac{\left( \sum_{t=62}^{t=62+k} SS_t + W_t \right) + A_{t=62} - A_{t=k} + R_{62 \rightarrow 62+k}}{k} \quad (2)$$

where  $k$  is the number of years the household delays retirement past age 62,  $SS_t$  is the household's Social Security benefits at time  $t$ ,  $W_t$  is labor market earnings at time  $t$ ,  $A$  is the sum of housing and financial wealth, and  $R_{62 \rightarrow 62+k}$  is the return on that wealth from age 62 to age 62 plus  $k$ . Almost none of our sample sold or bought their home between ages 62 and 62 plus  $k$ , and for non-movers, the return on housing wealth is simply the increase in self-reported house value. For movers, we use self-reported data on the sale proceeds of their age-62 house and purchase price of any replacement house. We adopt two approaches to returns on financial assets. The first is to assume that households earn a four percent real return on all asset classes. The second is to assume market returns for each asset class using Ibbotson Associates (2018) data and allocating IRA and 401(k) wealth across asset classes based on self-reported data.

We observe considerable heterogeneity in consumption, likely reflecting both reporting error and unobserved heterogeneity in investment returns. Therefore, we focus on

medians. Step four is to compare median consumption calculated in step three with the median consumption target calculated in step two.

Insert Table 7

The key finding is that regardless of whether we use a four percent return or market returns, median consumption is less than the median benchmark. Although some workers may combine work with benefit receipt to live it up, this behavior does not appear to be typical. Our findings are consistent with Poterba, Venti, and Wise (2011) who report limited drawdown of unannuitized financial wealth in the early decades of retirement.

### **Discussion and Policy Implication**

The U.S government since the Reagan Administration has sought to encourage work at older ages in five key ways. First, the U.S. implemented anti-age discrimination laws. Second, the 1983 Social Security reform gradually increased the Social Security Full Retirement Age from 65 to 67 for people born between 1933 and 1945, equivalent to an across-the-board 13.3 percent cut, anticipating that workers would respond by delaying retirement. Third, the Social Security earnings test was relaxed in 2000 and; fourth, the Social Security Delayed Retirement Credit (DRC) increased from 5-8 percent a year. Fifth, Congress also encouraged defined contribution (DC) plans that eventually displaced defined benefit (DB) plans in the private sector. DB plans incent early retirement because benefit-accrual stops at the plan's normal retirement age. In contrast, DC plans lack such incentives. Switching from DB to DC boosted elderly work effort (Friedberg and Webb 2005, Gustman and Steinmeier 2008) as did the Social Security benefit cuts (Hou, Munnell, Sanzenbacher, and Li 2017). But as we have shown, people who work past 62 to 70 rarely get the benefit of the generous DRC.

The share of older male workers in part time jobs increases with age, from 21 percent at age 62 to 44 percent at age 70 (Table 8 first row). At all ages, financially unprepared



workers are somewhat more likely to work part time as the prepared (compare rows four and seven). Only small shares of both financially prepared and unprepared men are working part time involuntarily, defined as reporting that they cannot increase their hours but would like to do so. Just over half of part time men report they could increase their hours in their current job, and presumably even more could increase their hours if they changed jobs. Patterns among women are similar. Thus, there is clearly substantial scope on the demand side for older workers to increase their hours and improve their financial preparedness for retirement.

#### Insert Table 8

An investigation of why older workers restrict or reduce their hours or switch to a less demanding job is beyond the scope of this paper. For some, it may be a rational choice, reflecting a high disutility of work, perhaps resulting from poor health or domestic responsibilities. Other research has argued that workers face high actual or perceived fiscal disincentives. An extensive literature (for example Friedberg and Webb, 2006) has documented the disincentive effect of the Social Security earnings test, with earnings clustered around the level above which benefits are reduced, even though claimants are actuarially compensated for benefits withheld once they attain their Full Retirement Age. Goda, Shoven, and Slavov (2007) argue that the implicit tax on Social Security contributions increases with age because contributions at older may not result in increased benefits.<sup>12</sup> Auerbach, Kotlikoff, Koehler, and Yu (2016) argue that the Social Security earnings test, means tested benefits, and federal and state income taxes interact to create extremely high work disincentives. But Auerbach, Kotlikoff, Koehler, and Yu (2016) requires workers to be sufficiently ill informed to mis-perceive the earnings test as a tax yet sufficiently well-

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<sup>12</sup> The starting point of the benefit calculation is the average of the highest 35 years wage-indexed earnings. If the highest 35 years do not include earnings after age 62, those earnings will not increase benefits.

informed to be aware of the more arcane tax rules discussed in their paper. Our reading of the literature is that educating workers about the operation of the earnings test would likely increase labor supply, as would reducing high marginal tax rates, but that it would require implausibly high labor supply elasticities for these interventions to induce all or most unprepared part timers to work full time.

For workers with low earnings who are forced to claim benefits to smooth consumption, policy should aim to improve working conditions and pay so older workers are less tempted to supplement their earnings with Social Security. Currently, workers whose labor market earnings fall only slightly short of their needs must claim full benefits and may be tempted to spend rather than save the excess. Policymakers could allow workers to claim part of their Social Security benefits so that workers do not face an all or nothing choice between inadequate pre-retirement income and a large permanent reduction in Social Security benefits. We acknowledge that the Social Security earnings test already has a similar effect in that workers whose earnings exceed the Social Security earnings test threshold but who do not earn enough to result in all benefits being withheld receive partial benefits. However, partial claiming might increase labor supply to the extent that workers perceive the earnings test as a tax.

Financial literacy programs may encourage some people to delay claiming Social Security, refrain from drawing down financial assets, and work more. However, financial education does not change the reality that that workers whose labor market earnings fall short of the income they would receive were they to retire should be drawing down, not adding to, their retirement wealth.

## **Conclusion**

Workers who are financially unprepared for retirement are advised to work longer. We question the efficacy of this advice. Thus far, the effect of work at older ages on financial

preparedness for retirement has been far smaller than predicted by spreadsheet models because most older workers combine work with Social Security benefit receipt and thus forego the Delayed Retirement Credit. Although work at older ages expands the lifetime budget constraint by the amount of the after-tax earnings, for work at older ages to have a substantial effect on financial preparedness for retirement, older workers need to earn enough to be able to afford to save for retirement. Strengthening Social Security and expanding employer-sponsored retirement plan coverage-would give those with poor labor market options a real choice between work and retirement.

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## **Appendix**

Insert Appendix Table 1

### ***Data***

Insert Appendix Tables 2-A and 2-B

Retirement income includes Social Security benefits, DB income or the DB income a worker would receive if they were to retire immediately, annuity income that could be purchased with DC plan and IRA balances, other financial assets and, in one scenario, the proceeds of a reverse mortgage. (We exclude spousal labor market earnings, because joint retirement is common and labor market earnings decline rapidly with age.) Social Security benefits are likely accurate because they are based on administrative data on earnings and claim ages. The HRS data permit somewhat reliable estimates of DB and DC wealth.

### ***Social Security***

We give priority to administrative data on earnings and claim ages and when not available, fill in with self-reports. This approach is reasonable because the correlation between self-reported and actual claiming ages is 0.85. Administrative data are not available for some participants, for Social Security earnings records after 2013, or for claims records after 2012.

For workers for whom we have both summary earnings records and administrative data on claim ages, we calculate self and spousal Primary Insurance Amount (PIA) based on their earnings records and benefits based on their claim ages. Spouses receive their own retired worker benefit plus a spousal benefit based on their spouse's earnings record to the extent that it exceeds their own retired worker benefit.

We use self-reported claim age for workers lacking administrative data on claim age. For those who lack both administrative and self-reported claim age, but do report benefit receipt, we derive a claim age based on the wave in which they first report benefit receipt.



We drop workers lacking an administrative claim age, self-reported claim age, and self-reported benefit receipt. For those who have not claimed, we assume eligibility for Social Security. Some workers of this type may be state and local government workers ineligible for Social Security, but the HRS lack data to identify these workers, and many will have retired prior to age 62.

We drop people who have ever claimed SSDI, but for married people whose spouses have claimed SSDI, we add those SSDI benefits to the household's potential retirement income. For workers for whom earnings records are not available, we impute earnings histories using current earnings, earnings at the first HRS interview, and final earnings in the individual's previous job.<sup>13</sup> We use self-reported earnings for years subsequent to 2013. When available, we use administrative data on claim ages, otherwise we use self-reports. For the purposes of calculating financial preparedness for retirement, we assume workers not yet receiving Social Security benefits claim immediately.

Actual or imputed earnings for years prior to the year in which the worker turned age 60 are indexed by the Average Wage Index to age 60 and the highest 35 years of indexed wages are used to calculate Average Indexed Monthly Earnings (AIME). The benefit formula is then applied to the AIME to derive the individual's Primary Insurance Amount (PIA). An actuarial reduction or increase is applied to the PIA to reflect early or delayed claiming, and finally, the actuarially adjusted benefit is increased to reflect changes in the Consumer Price Index. In these birth cohorts, the husband is typically three years older than his wife.

Although the younger spouse of a worker who claims retired worker benefit at age 62 will be ineligible to claim spousal or retired worker benefits, the younger spouse will usually become

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<sup>13</sup> The procedure follows Gustman and Steinmeier (2001) using estimated returns to tenure from Anderson, Gustman, and Steinmeier (1999).

eligible in the near future. To avoid understating the degree of preparedness, we use a projected age 62 retired worker or spousal benefit for the younger spouse.<sup>14</sup>

### ***Retirement plan wealth and income***

For years up to 2010, we use the Gustman, Steinmeier, and Tabatabai (2010) estimates of DB and DC wealth, constructed from self-reported data. For the 2012, 2014 and 2016 waves, we wrote our own program, using an identical methodology. Each spouse is asked to report actual or anticipated income from DB plans and account balances in DC plans from a current job, last job, or any significant job that lasted more than five years. In the case of DB plans, participants can report benefits as a dollar amount or as a percentage of final pay. Gustman, Steinmeier, and Tabatabai (2010) convert DB pension income into its lump-sum expected present value, and we do the same for the three most recent survey years.

We re-annuitize these expected present values using the same 5.8-percent nominal interest rate used by Gustman, Steinmeier, and Tabatabai (2010) and ourselves to calculate the lump sum.<sup>15</sup> Regardless of when participants expect to start collecting DB income, that amount is included in the household's pension income at the assumed retirement age. We assume households use their DC wealth to purchase a nominal annuity. Although few DC participants annuitize, annuities proxy for the amounts households could consume through a drawdown of unannuitized wealth.<sup>16</sup> We assume married couples purchase a joint life and two-thirds survivor annuity.

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<sup>14</sup> We include prospective age 62 benefits for younger spouses under age 62 provided the age difference is less than seven years.

<sup>15</sup> Our calculations overstate financial preparedness to the extent that workers who are initially financially prepared may become unprepared as their annuity income is eroded by inflation.

<sup>16</sup> We calculate the current actuarial unfairness of nominal annuities given current interest and cohort population average mortality rates and estimate historic annuity prices assuming the same level of actuarial unfairness, a 5.8 percent nominal interest rate, and historic cohort population average mortality rates. We do not adjust for fluctuations in interest rates as we want to exclude the effect of fluctuations on financial preparedness for retirement.

### ***Financial assets***

The starting point is the household's financial wealth at the wave closest to the assumed retirement age. Wealth comprises stocks, bonds, short-term deposits, and balances in IRA accounts. To ensure comparability across households with respect to their mortgage status, we assume households use financial assets to repay remaining mortgage debt. If mortgage debt exceeds financial assets, DC assets are used to eliminate the remaining mortgage. For the roughly 20 percent of households with a mortgage that exceeds their combined DC and financial assets, we amortized the remaining mortgage over the household's life expectancy and subtract the amortization payments from income from Social Security and DB plans. As with DC accounts, we assume households with positive financial assets annuitize at retirement.

### ***Net home equity***

Apart from Social Security, housing equity is the most valuable asset for most middle-income households. Few households liquefy their housing wealth absent a precipitating shock such as nursing home entry (Venti and Wise, 2002). But a reverse mortgage can convert home equity to cash income. Though only about 1 percent of eligible households take a reverse mortgage we calculate income as if they all do so as to yield a conservative estimate of unpreparedness. The amount households can borrow on a reverse mortgage depends on the age of the younger spouse, the house value, and the yield on the 10-year Treasury bond.

Accessing home equity improves retirement preparedness modestly. In 2014, the median house value of households ages 62-70 was \$185,500, which would permit monthly drawings of \$349 at age 62 using our assumption that they paid off any pre-existing

mortgage.<sup>17</sup> (The calculations are based on self-reported house values up to the relevant cap used for reverse mortgages and the current yield on the 10-year Treasury bond and assume the household uses the proceeds to purchase an annuity as described above.<sup>18</sup>)

### ***Social Security earnings test***

The Social Security earnings test withholds benefits from workers between age 62 and their Full Retirement Age (FRA) who earn more than an exempt amount. The first row of Appendix Table 3 reports the share of workers who had claimed Social Security benefits, by age. This share increases from 30 percent at age 62 to 93 percent at age 66. The following three rows show the shares of working Social Security claimants whose own retirement benefits and any spousal benefit are not withheld, partly, or wholly withheld due to the earnings test, by age. At age 62, 37 percent of benefit claimants earn enough to have all their benefits withheld and an additional 23 percent earn enough to have some benefits withheld. At age 65, the corresponding shares are 27 percent and 25 percent. On average, working Social Security claimants subject to the earnings test limit have a substantial share of benefits withheld (row six). However, averaged over all workers, including those who have not yet claimed benefits, the share of benefits withheld is much smaller because not all workers receive benefits and many who have claimed benefits earn too little to be affected by the earnings test.

Insert Appendix Table 3

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<sup>17</sup> Technically, outstanding mortgage debt must be repaid out of the proceeds of the reverse mortgage, but the previous exercise eliminated the mortgage. The \$349 is based on authors' calculations using HRS data on house values and the National Reverse Mortgage Lenders Association reverse mortgage calculator <https://www.reversemortgage.org/About/Reverse-Mortgage-Calculator>

<sup>18</sup> HUD lowered lending limits and raised premiums in 2017, the latest in a series of reforms (Mouton, Haurin, & Shi, 2016). We assume current rules throughout but disregard the introduction of a limit on the share of the line of credit that can be withdrawn within one year of loan origination.

We conduct an external validity test of our estimate of the effect of the earnings test on Social Security benefits. We compare our estimate of benefits net of the earnings test with self-reported data on benefits received. We find that mean retired worker benefits differ by a mere three dollars a month.

## Tables and Figures

Table 1. Sample size at age 66 by gender, retirement status, and financial preparedness.

	Financially Prepared to Retire		Not Financially Prepared to Retire	
	Working	Retired	Working	Retired
Men	532	823	1,227	1,722
Women	560	1,318	1,080	2,470
Total	1,092	2,141	2,307	4,192
Percentage	11	22	24	43

Source: Authors' calculations.

Notes: Georgia State definition of financial preparedness. Percentages are weighted using HRS sample weights.

Table 2. Marginal effects from probit explaining financial preparedness for retirement

Income Target Age	Replacement Rate Threshold			200% Federal Poverty Level		
	62	66	70	62	66	70
Working Past Age 62	-0.090** (0.015)	-0.091** (0.013)	-0.081** (0.017)	-0.176** (0.018)	-0.122** (0.015)	-0.078** (0.019)
Working Past Age 62 for \$15/hr or More	0.063** (0.018)	0.066** (0.018)	0.039 (0.023)	0.241** (0.022)	0.237** (0.017)	0.139** (0.023)
Single Male	0.057* (0.025)	0.095** (0.021)	0.040 (0.023)	0.032 (0.028)	0.078** (0.022)	0.006 (0.023)
Single Female	0.057** (0.017)	0.148** (0.014)	0.122** (0.015)	-0.189** (0.018)	-0.235** (0.014)	-0.184** (0.015)
Nonwhite	-0.077** (0.014)	-0.109** (0.012)	-0.110** (0.015)	-0.172** (0.017)	-0.173** (0.015)	-0.125** (0.017)
College	0.187** (0.017)	0.189** (0.013)	0.140** (0.015)	0.249** (0.020)	0.261** (0.013)	0.255** (0.015)
Fair or Poor Health	-0.101** (0.013)	-0.096** (0.011)	-0.090** (0.013)	-0.199** (0.016)	-0.189** (0.013)	-0.173** (0.014)
Any Involuntary Job Loss Before Age 62	-0.044* (0.018)	-0.050** (0.016)	-0.043 (0.023)	0.005 (0.025)	-0.032** (0.020)	-0.051 (0.025)
DC only	0.010 (0.021)	0.045** (0.017)	0.049* (0.020)	0.221** (0.025)	0.221** (0.016)	0.225** (0.017)
DB only	0.139** (0.016)	0.153** (0.012)	0.182** (0.013)	0.347** (0.017)	0.300** (0.012)	0.279** (0.013)
Both DB+DC	0.154** (0.022)	0.192** (0.017)	0.232** (0.020)	0.437** (0.021)	0.381** (0.012)	0.332** (0.015)

Source: Authors' calculations.

Notes: Table reports probit marginal effects on the probability of being financially prepared for retirement, holding all remaining explanatory variables constant at their respective means. Standard errors listed in parentheses. One and two stars indicate statistical significance at the five or one percent level, respectively. DC and DB coverage is based on whether one has any wealth associated with plans from any current or past job. Sample sizes are 10,011 at 62, 9,732 at 66, and 7,554 at 70. HRS sample weights.

Table 3. Percent of workers financially prepared for retirement by retirement age.

Worked until at least age...	62	63	64	65	66	67	68	69	70
Replacement Rate Target									
63	23	25							
64	22	24	28						
65	22	24	27	30					
66	22	24	28	30	33				
67	22	24	27	30	32	35			
68	22	24	28	30	32	36	38		
69	21	24	27	29	32	35	37	40	
70	21	24	27	29	32	34	36	40	45
70, spouse's labor supply unchanged 62 to 70	23	25	28	32	36	38	40	44	45
College educated	35	41	44	49	50	50	51	54	56
Less than college	18	19	20	22	27	30	32	40	41
All, with a reverse mortgage	27	31	34	37	42	43	45	50	52
Retired before age 62	22	22	22	23	23	23	24	25	26
62-70 from Munnell, Orlova, Webb (2013)	26	30	35	41	47	53	60	66	72
200 percent of Federal Poverty Level Target									
Worked until at least age 70	39	45	52	55	60	62	64	64	60

Source: Authors' calculation and Munnell, Orlova and Webb (2013).

Note: HRS sample weights.



Table 4. Percentage claiming retired worker benefits at age.

Age	62	63	64	65	66	67	68	69	70
<i>1931-37 birth cohort</i>									
All workers	24	33	40	89	93	96	97	98	100
Full-Time Workers	9	14	21	83	90	95	97	98	100
Part-Time Workers	54	65	71	96	97	97	98	98	100
College-educated workers	13	19	27	86	91	96	97	99	100
Non-college educated workers	31	42	50	90	94	97	98	98	100
All retirees	59	70	78	98	99	99	99	99	100
<i>1938-42 birth cohort</i>									
All workers	17	30	42	81	96	98	98	98	100
Full-Time Workers	8	16	27	74	94	96	97	98	100
Part-Time Workers	34	57	66	89	98	99	99	99	100
College-educated workers	9	17	26	72	92	96	97	98	100
Non-college educated workers	17	37	49	85	97	98	99	99	100
All retirees	55	72	79	94	99	99	99	99	100
<i>1943-47 birth cohort</i>									
All workers	17	25	32	43	89	94	95	96	100
Full-Time Workers	9	11	15	23	85	91	94	94	100
Part-Time Workers	35	51	61	73	95	98	98	98	100
College-educated workers	15	19	22	36	84	92	90	93	100
Non-college educated workers	23	30	40	54	93	95	98	99	100
All retirees	48	65	75	78	99	99	99	99	100

Source: Authors' calculations.

Note: HRS sample weights. The table reports the shares of workers who have attained their Social Security claim age, after any actuarial adjustment resulting from the application of the Social Security earnings test, at specified ages, not the share of workers who had claimed benefit by specified birthdays.

Table 5. Share of workers by age, retired worker claim status and whether earnings exceed potential retirement income.

Age	62	63	64	65	66	67	68	69	70
<b>All workers</b>									
Share with earnings less than post retirement income	39	42	46	53	57	60	65	67	69
Share of workers claiming benefit									
Earnings more than post retirement income	10	16	22	55	91	90	97	94	100
Earning less than post retirement income	33	45	54	75	95	98	97	99	100
<b>Full-time Workers</b>									
Share with earnings less than post retirement income	28	31	35	39	43	47	50	54	55
Share of workers claiming benefit									
Earnings more than post retirement income	4	7	12	46	86	91	94	96	100
Earning less than post retirement income	18	26	34	64	91	96	98	98	100
<b>Part-time Workers</b>									
Share with earnings less than post retirement income	62	61	64	71	72	74	76	76	77
Share of workers claiming benefit									
Earnings more than post retirement income	29	44	53	79	93	96	96	92	100
Earning less than post retirement income	48	66	72	86	97	99	99	99	100

Source: Authors' calculations.

Notes: Potential retirement income comprises income from Social Security benefits, DB plans and annuitized balances in DC plans and other financial assets, assuming both spouses retire and claim Social Security immediately. This figure is compared to a average of the calendar years they are that particular age, weighted based on the birth month. and earnings denotes earnings. HRS sample weights. We classify a worker as having claimed benefits if they have attained their Social Security claim age, adjusted to reflect any actuarial adjustment resulting from the application of the Social Security earnings test.

Table 6. Median regression on increase in replacement rate between ages 62 and 70.

Variable	Coefficients	Standard Errors
Years Worked After 62, Self		
All	0.005	(0.003)
Part-Time	-0.000	(0.004)
\$15/hr or more	0.001	(0.004)
With Pension Coverage	0.001	(0.003)
All x College	0.012	(0.004)
Years Worked After 62, Spouse		
All	-0.001	(0.004)
Part-Time	0.001	(0.005)
\$15/hour or more	0.000	(0.005)
With Pension Coverage	0.004	(0.004)
All x College	-0.012**	(0.004)
Claim Age – 62		
Self	0.031**	(0.004)
Spouse	0.010**	(0.002)
Involuntary Job Loss		
Self	-0.025	(0.029)
Spouse	0.001	(0.029)
Demographics		
Single Male	0.014	(0.024)
Single Female	-0.029	(0.025)
Divorced or Widowed Between 62 and 70	0.007	(0.059)
Nonwhite	-0.031	(0.016)
College, Self	-0.015	(0.022)
College, Spouse	0.021	(0.016)
Born 1937-1941	-0.029*	(0.012)
Born 1942-1947	-0.053*	(0.015)
Fair or Poor Health		
Self	0.011	(0.021)
Spouse	0.006	(0.022)
Constant	0.039	
Pseudo r-squared	0.012	

Source: Authors' calculations

Notes: HRS sample weights. Dependent variable is the percentage point increase in household level replacement rate from age 62 to 70. The replacement rate numerator includes Social Security, defined benefit pension income, and the annuitized value of DC wealth, but not the annuitized value of non-retirement financial assets or the proceeds of a reverse mortgage. Self is a single individual, married male, or higher lifetime earner in a same sex couple. One and two stars indicate that a coefficient is statistically significant at the five or one percent level,

respectively. Pension coverage denotes participation in a defined benefit or defined contribution plan sponsored by the current employer. The claim age is adjusted to reflect any actuarial adjustment resulting from the application of the Social Security earnings test. Standard errors in parentheses.

Table 7. Median annual income, consumption, and consumption target of households working and claiming Social Security.

Returns	4% Real			Historical Returns		
Marital Status	All	Married	Single	All	Married	Single
Total Consumption	\$42,040	\$47,570	\$30,998	\$41,220	\$47,010	\$30,777
Consumption Target	\$49,040	\$53,393	\$34,417	\$49,040	\$53,393	\$34,417

Source: Authors' calculations

Notes: Sample comprises households containing workers who have claimed Social Security benefits. Consumption and spending are annual averages over the period from benefit claim to cessation of work. All amounts are in 2008 dollars.

Consumption targets are based on the annuity value of age 62 wealth, including Social Security wealth and the present value of future earnings to the time of retirement.

Table 8. Part time workers and their ability to increase hours.

Age	62	63	64	65	66	67	68	69	70
All Men Working for Pay									
Share working part time	0.21	0.22	0.24	0.26	0.31	0.36	0.40	0.41	0.44
Share of part timers who:									
Are part time involuntarily	0.14	0.14	0.12	0.11	0.11	0.13	0.15	0.13	0.14
Can increase hours	0.54	0.51	0.52	0.57	0.52	0.56	0.56	0.53	0.51
Men Working for Pay - Financially Prepared									
Share working part time	0.30	0.28	0.29	0.32	0.35	0.41	0.43	0.42	0.48
Share of part timers who:									
Are part time involuntarily	0.02	0.08	0.15	0.14	0.13	0.09	0.05	0.05	0.05
Can increase hours	0.51	0.54	0.61	0.57	0.58	0.59	0.57	0.59	0.57
Men Working for Pay - Financially Unprepared									
Share working part time	0.18	0.20	0.22	0.24	0.29	0.34	0.38	0.41	0.42
Share of part timers who:									
Are part time involuntarily	0.20	0.22	0.19	0.11	0.13	0.22	0.28	0.22	0.11
Can increase hours	0.56	0.50	0.49	0.50	0.49	0.54	0.55	0.50	0.48
All Women Working for Pay									
Share working part time	0.31	0.34	0.37	0.39	0.43	0.47	0.51	0.55	0.57
Share of part timers who:									
Are part time involuntarily	0.21	0.18	0.14	0.15	0.18	0.20	0.17	0.17	0.17
Can increase hours	0.52	0.54	0.55	0.57	0.55	0.55	0.57	0.56	0.56
Women Working for Pay - Financially Prepared									
Share working part time	0.37	0.39	0.41	0.45	0.46	0.48	0.57	0.58	0.58
Share of part timers who:									
Are part time involuntarily	0.11	0.10	0.11	0.08	0.21	0.21	0.13	0.14	0.14
Can increase hours	0.62	0.65	0.62	0.61	0.62	0.60	0.59	0.59	0.61
Women Working for Pay - Financially Unprepared									
Share working part time	0.29	0.32	0.35	0.37	0.42	0.46	0.47	0.51	0.57
Share of part timers who:									
Are part time involuntarily	0.24	0.20	0.16	0.18	0.17	0.20	0.19	0.19	0.19
Can increase hours	0.49	0.51	0.53	0.55	0.52	0.53	0.56	0.54	0.53

Source: Authors' calculation

Notes: Sample includes working men. Working part-time defined as fewer than 30 hours per week. Involuntary part-time work is further defined as reporting having not having an ability to increase hours as well as reporting a desire to increase hours. HRS sample weights.

Appendix Table 1. Replacement rate targets by household type (in percentages).

Household earnings	One-earner couple	Two-earner couple	Single worker
Up to \$24,999	94	94	88
\$25,000 to \$34,999	90	90	84
\$35,000 to \$44,999	85	85	83
\$45,000 to \$54,999	81	81	80
\$55,000 to \$64,999	78	80	79
\$65,000 to \$74,999	77	78	81
\$75,000 to \$84,999	77	78	81
\$85,000 or more	78	78	81

Source: Adapted from Palmer (2008).

Appendix Table 2-A. Descriptive statistics, men (in percentages except sample size).

Age: Prepared to Retire Working	62				66				70			
	Yes		No		Yes		No		Yes		No	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Education												
Less than HS	8	10	28	40	12	16	26	38	15	21	23	36
HS/Some Col.	26	40	42	46	27	42	44	46	29	42	46	48
College	66	50	30	14	61	42	30	16	56	37	31	16
Race												
White	85	84	74	69	85	82	75	69	85	81	76	70
Black	7	12	13	17	10	9	12	18	9	10	13	16
Hispanic	5	2	10	12	4	6	11	11	5	7	10	11
Other	3	2	3	2	1	3	2	2	1	2	1	3
Retirement Wealth												
No Accounts	10	15	30	39	21	21	34	43	26	27	42	50
DB Only	14	5	22	7	17	7	21	10	17	7	16	12
DC Only	41	60	27	41	32	52	25	35	35	49	27	30
Both DB and DC	35	20	21	13	30	20	20	12	22	17	15	8
Married	84	77	88	79	86	79	88	83	86	81	88	80
\$15+/hr	73	x	55	x	65	x	49	x	51	x	36	x
Sample Size	498	477	1921	1547	532	823	1227	1759	405	934	650	1294

Appendix Table 2-B. Descriptive statistics, women (in percentages except sample size).

Age: Prepared to Retire Working	62				66				70			
	Yes		No		Yes		No		Yes		No	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Education												
Less than HS	10	17	25	42	14	23	23	37	16	24	24	37
HS/Some Col.	49	46	56	48	46	48	55	50	50	52	53	49
College	41	37	19	11	42	29	22	13	34	24	24	14
Race												
White	83	86	71	63	79	80	72	67	80	79	70	67
Black	12	8	20	21	14	12	18	19	13	13	22	18
Hispanic	4	4	7	14	5	7	7	12	4	7	6	13
Other	1	2	2	2	2	1	3	2	3	1	2	2
Retirement Wealth												
No Pension	20	36	32	54	30	39	43	54	37	46	48	62
DB Only	14	6	22	7	17	7	18	8	19	8	21	8
DC Only	42	43	28	31	31	41	24	32	25	37	22	26
Both DB and DC	24	15	18	8	22	13	15	6	19	9	9	4
Married	59	76	60	64	52	64	61	66	50	60	55	59
\$15+/hr	68	x	51	x	53	x	40	x	40	x	37	x
Sample Size	550	775	1800	2443	560	1318	1080	2470	421	1541	494	1815

Source: Authors' calculations.

Notes: Pension coverage includes both current and past jobs. HRS sample weights.



Appendix Table 3. Share of workers subject to earnings test and share of benefits withheld (in percentages).

Age	62	63	64	65	66
Percent of workers claiming Social Security benefits by age	19	28	37	66	92
Percent of workers who claimed:					
Earning less than earnings test limit	40	40	44	48	76
With some benefits withheld	23	24	26	25	17
With all benefits withheld	37	36	30	27	7
Average share of benefit withheld					
Workers who claimed benefits and earned more than test limit	84	83	81	80	64
All workers who claimed benefits	15	20	21	32	14

Source: Authors' calculations

Notes: HRS sample weights.