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Framing and Claiming: How Information-Framing Affects Expected Social Security Claiming Behavior

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Abstract

This paper provides evidence that Social Security benefit claiming decisions are strongly affected by framing and are thus inconsistent with expected utility theory. Using a randomized experiment that controls for both observable and unobservable differences across individuals, we find that the use of a "breakeven analysis" encourages early claiming. Respondents are more likely to delay when later claiming is framed as a gain, and the claiming age is anchored at older ages. Additionally, the financially less literate, individuals with credit card debt, and those with lower earnings are more influenced by framing than others.

Keywords

Retirement Income; Invariance; Annuities; Annuitization; Expected Utility Theory; Breakeven Analysis; American Life Panel; Financial Literacy

Introduction

The assumption that individuals maximize expected lifetime utility is the workhorse model of microeconomics. This is especially true in the literature on financial decisions associated with retirement: life-cycle expected utility models have been widely used in studies of savings and portfolio decisions (e.g., Hubbard, Skinner, and Zeldes, 1994), retirement behavior (e.g., Rust and Phelan, 1997, Gustman and Steinmeier, 2005, French and Jones, 2011), and retirement income decisions (e.g., Mitchell et al., 1999). As forcefully stated by Tversky and Kahneman (1986, p. S253), however, "an essential condition for a theory of choice that claims normative status is the principle of invariance: different representations of the same choice problem should yield the same preference."[1],[2] In this paper, we provide

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evidence that consumers violate the invariance principle when making an extremely important financial decision near retirement: when to claim Social Security benefits.

That important economic decisions can be substantially altered by the way in which information is framed has been known at least since Kahneman and Tversky (1981) famously reported that presenting a public policy choice in terms of "lives saved" versus "lives lost" dramatically shifted the proportion of the respondents who supported a given policy. Closer in context to this paper, Payne et al. (2011) show that estimates of life expectancy differ depending on whether individuals are asked the age they expect to "live to," or the age that they will "die by." More generally, numerous studies indicate that individuals make decisions based not only on their consequences – as would be predicted by expected utility theory – but also based on how the choices are framed.[3]

Despite a vast literature on retirement income security, researchers have only recently begun to explore whether framing affects decisions related to retirement income. This is especially surprising given the enormous influence that behavioral economics has had in other areas of retirement research and practice, such as automatic enrollment (e.g., Madrian and Shea, 2001). In any study of retirement income security, Social Security plays a central role because, in aggregate, it is the single largest source of retirement income for retirees in the U.S. and the only meaningful source of inflation-indexed income. As such, the decision of when to claim benefits is one of the important financial decisions faced by individuals age 62 and older. Approximately 93% of all U.S. workers are covered under the U.S. Social Security system,[4] and although individuals can claim as early as age 62, they can also defer claiming to as late as age 70. Monthly benefit levels are adjusted for the claiming age, and these adjustments are substantial: for example, an individual who stops working at age 62 but waits to claim benefits at age 70 will receive 76% more (real) dollars per month for the rest of her life, than if she claimed benefits at age 62.[5] Although these adjustments are designed to be approximately actuarially neutral for the Social Security system,[6] the date of claiming has important implications for income replacement rates and benefit adequacy, particularly at older ages.

Of course, even though the Social Security system is approximately actuarially neutral on average, the claiming age adjustments are not actuarially fair for each individual because of

[1]We will use the "invariance" terminology in this paper. One could also refer to this as a form of "consequentialist" behavior, i.e., that only the consequences matter, not how they are presented. However, the term "consequentialist" is often used (e.g., Hammond 1988) to refer to the idea that and individual's choice should be invariant to the structure of the decision tree. In our context, we are changing only the presentation of the information, rather than the structure of the choice.

[2]The property of invariance is not restricted to expected utility theories, but also holds for various generalizations. See e.g., Starmer (2000).

[3]A few examples of how framing influences a wide range of other economic decisions are Andreoni (1995), Bateman et al. (1997), and Shafir et al. (1997), among many others. Bruine de Bruin (2010) and references therein discuss specific issues related to framing in a survey context. De Martino et al. (2006) use fMRI to study brain activity while subjects perform decision tasks presented in either a gain or a loss frame.

[4]http://www.ssa.gov/pressoffice/basicfact.htm

[5]In a recent survey, 75% of respondents indicated that they understand that Social Security benefits need not be claimed at the time they stop work (Greenwald et al. 2010).

[6]Our calculations suggest that at interest rates currently assumed by SSA, the decision to delay claiming is actually slightly better than actuarially fair for a person who has average population mortality. Naturally, such a calculation is dependent upon interest rate assumptions. We also note that we abstract here from the question of whether additional years of work would change future benefits, as well as the question of how delayed claiming might influence spousal and survivor benefits.

heterogeneity in life expectancy and other factors. Further, even if the two benefit streams (i.e., one associated with earlier claiming, and the other associated with later claiming) are actuarially equivalent for a given individual, they need not be equivalent when evaluated in an expected utility framework. Heterogeneity of demographics (e.g., marital status, family size), economic circumstances (e.g., whether the household is liquidity constrained), and/or preferences (e.g., risk aversion), can lead to different optimal claiming ages for different individuals (c.f., Coile et al., 2002; Hurd et al., 2004). Indeed, because the optimal claiming decision is a function of both observable and unobservable factors, the researcher cannot determine each individual's optimal claiming age. This makes it difficult to infer from observed claiming behavior whether individuals behave in a manner consistent with expected utility theory or not.

Fortunately, we can test whether claiming age decisions violate the invariance principle, and thus expected utility theory, without actually knowing the optimal claiming age. To do this, we leverage the insight of Tversky and Kahneman (1986) that if the axiom of invariance holds, then all different ways of presenting the same outcome will lead to the same choice. Thus, for any given individual's circumstances, preferences, and subjective beliefs, we can reject expected utility theory if we can show that his expected claiming age is sensitive to inconsequential changes in how the information is framed.

We do this using an experimental design in a survey setting, testing how expected claiming ages vary according to the way in which benefits are described when the claim age changes. We do this first by randomly assigning individuals to different frame exposures or ways of explaining how benefits would be adjusted if they were to claim benefits earlier versus later. Respondents are then asked the age at which they expect to claim Social Security benefits. As is well-known in the experimental literature, randomization allows us to compare the average expected claiming age across groups and treat any differences as a causal effect of the frame. Second, we also expose each individual in our sample to multiple frames. This allows us to directly test for causal effects of framing *within* an individual (rather than across individuals), thus controlling for all observable *and* unobservable characteristics. In both cases, because the different frames contain the same underlying information and differ only in the presentation, a finding of significant differences in expected claiming ages across frames is sufficient to reject the null hypothesis that claiming age preferences abide by the invariance principle. Thus a finding of significant framing effects allows us to reject the hypothesis that claiming decisions are consistent with expected utility maximization.

We implement this experimental design in the RAND American Life Panel (ALP), an internet-based survey.[7] For purposes of showing that claiming behavior violates the invariance principle, it is sufficient to show a difference across any two frames. We do this by first comparing a "break-even frame" to what we call a "symmetric" frame. The breakeven frame emphasizes the minimum number of years one would need to live so that the nominal sum of the additional monthly payments attributable to delay would offset benefits forgone during the delay period. This approach implicitly frames the decision as a risky bet on one's length of life, while downplaying the longevity insurance aspects of the

[7]https://mmicdata.rand.org/alp/index.php/Main_Page

choice. Such a breakeven approach is consistent with how Social Security field representatives presented the choice to potential claimants for many decades,[8] and it is also widely used today in the private sector financial advice and planning industry (c.f., Charles Schwab, 2011; GG&G, 2011). Our second frame explains the effect of early or later claiming in a symmetric manner by simply stating the facts about how benefits would change for an earlier or later claiming date.

Our results show that these frames generate economically and statistically significant differences in expected claiming ages. For example, using a simple comparison of means of the expected claiming age between the two frames using only our first wave of exposures, we find that the breakeven frame generates an expected claiming age that is roughly 15 months earlier than the symmetric frame. As we discuss below, the magnitude of this result is quite large compared to existing estimates of how changes in economic variables influence retirement dates.

For both policy and research reasons, we tested eight additional experimental frames. From a policy perspective, we were interested in whether we could provide the Social Security Administration (or other parties) with more guidance about how alternative frames would affect claiming ages. From a research perspective, these frames allow us to further document violations of the invariance principle while also testing several secondary hypotheses. The three secondary hypotheses are that claiming age decisions will be sensitive to whether the effect of claiming age on benefits is framed: (i) using *consumption* versus *investment* language; (ii) emphasizing *gains* versus *losses*; or (iii) anchoring at *older* versus *younger* ages. The first of these is motivated by the work of Brown et al. (2008) who found important differences in the reported attractiveness of life annuities depending on whether these were described using "consumption language" or "investment language." The second dimension uses "gain" versus "loss" terminology to portray the actuarial adjustment for later versus earlier claiming. The third dimension varies the initial age used to anchor individuals in the presentation. We have a total of eight additional experimental frames, in addition to the original breakeven and symmetric frames, for a total of 10 frames.

Panel participants were randomized into one of 10 groups, and members of each group were presented with one of the 10 frames.[9] We then asked the participants at what age they would claim benefits given each frame, and we compare results to determine whether the frames seem to alter the anticipated claiming age. In the same wave of the survey, we then exposed each individual to a second frame. Then, in each of two subsequent rounds of surveys (each occurring at two week intervals), we exposed individuals to two additional frames (for a total of six exposures across all three survey waves). For some of our analyses, we use only the first exposure. In other specifications, we will use all waves but control for individual fixed effects as well as the "history" of frames to which the individual was exposed. We also

[8]In 2008, the Social Security Administration revised its instructions to SSA claims representatives in an attempt to downplay the breakeven analysis, although the tool is still available for potential claimants who request it.

[9]In all 10 experimental frames, respondents were provided with a sliding scale showing monthly benefit amounts at all ages between 62 and 70 (in monthly increments). The individual used a computer mouse to slide along the scale and watch how benefits changed at each claiming age. The initial starting point for the claim age indicator matched the reference age provided in the given frame. After viewing a frame, individuals were asked to use the sliding scale to pinpoint the age at which they thought they would claim benefits. (Screen shots of the frames language and slider are available in an online Appendix).

make use of a baseline question from an earlier wave of the ALP that provided no information about benefits; it simply asked individuals at what age they expected to start receiving Social Security benefits. Subtracting off this initial baseline claiming age from the framed claiming ages, and then comparing these differences across frames, is a way to control for both observable and unobservable differences across individuals. As our results will show, the effects that we find are quite robust across all of these various approaches, a finding that confirms the validity of our experimental design and allows us to interpret the differences across treatment groups as being causal effects of the frames.

In addition to our principal finding that a breakeven frame leads to a substantially earlier claiming age than the symmetric frame, we also find smaller but statistically significant differences across some, but not all, of the other frames. We find evidence of an anchoring effect with respect to age: specifically, when we illustrate the effect of framing using an example of age 62, it results in earlier expected claiming decisions than when we illustrate the effects using age 66 or age 70. We find no significant difference between the consumption and investment frames, although we note that the breakeven frame is itself a strong investment frame that emphasizes the time needed for one's decision to recoup one's foregone benefits, and the direction of that effect is consistent with the consumption versus investment framing literature. Finally, we show that framing the decision in terms of gains leads to somewhat later expected claiming than a presentation of losses in several specifications. This finding is contrary to our *ex ante* hypothesis: our intuition based on prospect theory was that individuals would be particularly motivated to avoid losses. In passing, we also note that when individuals are exposed to differing frames within and across survey waves, their expected claiming ages are influenced not only by the current frame, but also by exposure to earlier frames. This latter finding is of practical relevance to the Social Security Administration, as it suggests that claiming behavior may be influenced not only by how the issue is framed at the point of the decision, but also by how the issue has been framed in past exposures (previously by SSA, or by other sources).

One would expect that sensitivity to framing may vary across individuals. Someone who is financially sophisticated and has given much thought to how to prepare financially for retirement is probably less affected by how a Social Security claiming decision is framed, than is someone less financially literate who has given little thought to retirement. Therefore we investigate how sensitivity to framing varies across subgroups, and we find that the financially less literate, individuals with credit card debt, and those with lower earnings are more influenced by framing than others.

In what follows, we first provide a very brief primer on how Social Security benefit claiming works, including a discussion of the actuarial adjustment process. Next, we discuss our research methodology including how we use the RAND American Life Panel. Subsequently we explain the motivation underlying our choice of the 10 frames tested, followed by a Results section and a short Conclusion.

Social Security Benefits and Claiming[10]

A covered worker who has contributed to the U.S. Social Security system for sufficiently long (approximately 10 years) confronts a choice regarding when he can claim his Social Security benefits. Under current law, age 62 (known as the Early Retirement Age) is the earliest that one can claim. The rules also specify a Normal Retirement Age (NRA) at which "full" or unreduced benefits can be paid. The NRA is currently age 66 (for those born 1943–54; under current law it will rise to 67 for people born in 1960 and later).

The SSA computes benefits by averaging a worker's highest 35 years of wage-indexed earnings and dividing by 12 to obtain the worker's Average Indexed Monthly Earnings (AIME). This AIME is then run through a non-linear formula to compute the worker's Primary Insurance Amount (PIA), which is the benchmark amount from which benefits are calculated. If the worker claims benefits at the NRA, his benefit equals 100% of his PIA. If he claims at earlier or later ages, his benefit is actuarially adjusted, and this adjustment continues for the rest of his life. The actuarial adjustments are made to recognize that, on average, early claimants will receive benefits for a longer period than will those who delay claiming. These adjustments therefore seek to be roughly actuarially neutral from the perspective of the government: on average, people who take an earlier, lower benefit would expect to receive about the same total amount in benefits over their lifetimes as those who take the later, higher benefits. The age one stops working need not equal the age at which one claims benefits,[11] although the claiming and retirement ages are highly correlated for a wide range of reasons.[12] We note that if an individual both delays claiming and continues to work, his monthly benefit may rise both because of the actuarial adjustment and because the additional years of earnings may increase his PIA.

The major benefit of our experimental design is that it is simply not necessary for us to know anything about each individual's optimal claiming date, optimal retirement date, or the interaction of the two. Randomization and individual fixed effects ensure that we are finding a causal effect of the frames on expected claiming behavior, and evidence that expected claiming ages are sensitive to framing is sufficient to reject invariance and thus expected utility theory.

Although our paper is the most direct and most comprehensive study on the effect of framing on Social Security benefit claiming behavior, there are two unpublished working papers suggesting that framing effects may matter for claiming. Dominitz et al. (2007) documents differences in expected claiming based on how information is presented, although it is not possible to discern whether their results are due to framing effects or to the implicit advice embedded in their presentation (e.g., their frame tells an individual that if he

[10]We simplify the description of the benefit calculation, actuarial adjustments, and the claiming process in the interest of brevity. Readers interested in more detail on these topics are encouraged to consult the website for the Office of the Chief Actuary of the Social Security Administration (www.ssa.gov/OACT).

[11]This difference is widely appreciated; see Greenwald et al. (2010). In practice, the majority of workers (over 90%) claim when first eligible at age 62; see Hur and Rohwedder (2004) and Coile et al. (2002).

[12]Empirically, Behaghel and Blau (2012) show that the spike in the hazard rate of benefit claiming at age 65 has moved "in lockstep" with the increase in the Normal Retirement Age. There are many reasons to expect them to be correlated, including the role of liquidity constraints as well as the Social Security "earnings test."

expects to live beyond a particular age, "then it would be to your advantage to delay your retirement.")[13] In contrast, our frames provide the *same underlying information* but changes how that information is presented, without telling individuals which decision would be in their interest, thus allowing us to test for a causal effect of the frame as distinct from the provision of advice.

A second working paper which focused broadly on documenting overall knowledge of Social Security program rules also provided suggestive evidence of framing. Liebman and Luttmer (2012) asked survey respondents to choose between claiming at age 62 or age 65 after showing them three frames, and they found that a breakeven presentation reduced the probability of choosing age 65 by 18.5 percentage points. Our paper has several advantages, including that we allow individuals to choose from the full continuum of ages (rather than artificially restricting them to a binary choice between ages 62 and 65): among other things, this allows us to quantify the effect of framing on the average claiming age. We also can control for baseline claiming ages and individual fixed effects, so we can handle unobservable differences across individuals that otherwise might bear results. We also explore a wider range of frames (10 versus 3), examine the effect of multiple frame exposures, and document how sensitivity to framing effects varies with individual characteristics.

Study Design

We used focus groups to qualitatively test our frames,[14] after which we fielded these using survey modules in the RAND American Life Panel (ALP), a sample of U.S. households regularly interviewed over the Internet. An advantage of the ALP relative to most other Internet panels is that it uses a probability sample of the U.S. population to approximate a nationally representative sample.[15] At the time of the study, the panel comprised about 3,000 active panel members. We limited our sample to respondents who had not already claimed a benefit and who had worked at least 10 years (so we could compute a projected Social Security benefit using the Social Security benefit calculator[16]).

Before fielding our experiment, we asked a single question of the panel as part of a different (and unrelated) ALP survey in June, 2010:

[13]We also note that their "breakeven" exposure differed substantially from ours in a number of ways. For example, our breakeven frame explicitly uses language from the SSA procedures manuals whereas theirs did not, and we use a much more accurate personalized estimate of the respondent's expected Social Security benefit levels based on individual earnings histories run through the PIA calculator (see below).

[14]Prior to launching our survey, we conducted focus groups in the Chicago, Los Angeles, Philadelphia, and Washington, D.C. areas to ensure that the language used in the survey was clear and salient to the participants.

[15]Readers interested in more details about how ALP respondents are recruited may consult the American Life Panel website at https://mmicdata.rand.org/alp/. One of many advantages over other online panels is that respondents who lack Internet access are provided with either a laptop and Internet access, or a so-called WebTV that allows them to use their television to participate in the survey. This creates a more nationally representative panel.

[16]To be able to approximate a respondent's earnings history we ask at what age the respondent started working ("start age"). If there are fewer than 10 years between start age and the respondent's current age, the interview terminates. If there are at least 10 years between start age and current age, the period is broken up into 10, 8, 5 or 3 intervals, depending on the number of years he worked. For each interval, we ask if there were periods the respondent did not work. For the remaining periods, we ask average earnings, which were assigned to the whole interval. This constructed earnings history is fed into the SSA calculator to calculate a respondent's PIA at age 62.

> "We would next like to ask you a question about a different topic. As you know, in the United States people can start claiming Social Security benefits between the ages of 62 and 70. At what age would you expect to start collecting these Social Security benefits?"

We will refer to the response to this question as our "baseline claiming age."[17] Because this question was asked months prior to our experiment, responses to this question are completely unaffected by our experiment. By subtracting off this baseline claiming age from the expected claiming age response to our experimental frames, we are essentially implementing a "difference in difference" methodology that helps control for any unobservable differences across individuals being exposed to different frames.

About six weeks later, in the August 2010 wave of the ALP, we randomly assigned individuals to one of the 10 experimental frames (which we describe in more detail below). We refer to the first experimental frame exposure as "wave 1.1." In the same wave of the ALP, we also randomly assigned individuals to be exposed to a second frame (wave 1.2). In two subsequent waves spaced two weeks apart, respondents were shown two additional frames per wave (which we designate waves 2.1, 2.2, 3.1 and 3.2). Through this approach, each respondent was randomly exposed to six different experimental frames over the course of the entire experiment.[18] In the analysis below, we devote special attention to the first frame to which individuals were exposed (i.e., wave 1.1). Analysis of subsequent waves allows us to control for individual fixed effects, and also to examine whether there are dynamic exposure effects – that is, whether earlier exposures affected responses to subsequent exposures.

Our central outcome of interest is whether the frames alter the respondent's expected claiming age. This raises a natural question of whether changes in *expected* claiming behavior will be predictive of changes in *actual* claiming behavior. At the end of the day, this question cannot be definitively answered: indeed, if it were feasible to implement a randomized experiment over many years and track actual claiming behavior response to different frames, we would have conducted that study.[19] What we can do is show that a measure of expected claiming age (similar to the pre-experiment baseline expected claiming age) is closely linked to actual claiming decisions. Evidence from the Health and Retirement Study (HRS) suggests that this is, indeed, the case: for many years, the HRS has asked respondents about each person's expected claiming age every wave, making it possible to correlate such responses with ultimate claiming behavior. For HRS respondents age 62–70, we calculated the simple correlation between an indicator of whether the individual is receiving benefits in a given wave, and an indicator for whether the individual predicted that

[17]Most respondents (95%) provided an answer in the age 62–70 range. When respondents did not answer in this age range, a follow-up question asked why not. Responses outside the age 62–70 interval were often given by younger respondents who believed that, by the time they were eligible, the Social Security claiming age would have moved to a later age, or they believed they would not receive any Social Security benefit at all and expressed this by responding outside the range.

[18]hese frames are randomly assigned in the following way: for each respondent we drew six numbers randomly without replacement from the set {1,2,…10}. These numbers determined which frames were shown to each respondent and in which order. For example, if we drew the vector (5, 7, 3, 9, 10, 6) for a given respondent, then that respondent is shown frames 5 and 7 in the first wave, frames 3 and 9 in the second wave, and frames 10 and 6 in the third wave.

[19]Of note, we did propose a randomized field experiment to the Social Security Administration but it determined that the financial, operational, and political risks of such an experiment were too great.

that he would be claiming benefits by that wave, based on prior wave responses. These two variables are strongly and positively correlated, with coefficients ranging from 0.46 in HRS wave 1 to over 0.6 in HRS waves 6–7. Linear probability models of benefit receipt in HRS wave 8 on predictions of prior waves have an R-squared of about 0.6. Although this does not necessarily mean that *changes* in expectations driven by our frames will be correlated with *changes* in actual claiming behavior, we take some comfort in the fact that respondent expectations and actual claiming behavior are highly correlated in levels.

The Frames

In this section we provide further information about our 10 frames.[20]

a. "Breakeven frame" (anchored at age 62)

Prior to 2008, SSA claims representatives regularly used a simple computer program to calculate a "breakeven" age.[21] This tool provided prospective claimants with information about their benefits if they were to claim at an early age such as 62, versus at some later age such as 63. They were then informed that, by delaying claiming from 62 to 63, they would forfeit a year of benefits.[22] The information also explained that, in return for the deferral, they would receive a higher monthly benefit from age 63 on. However, the information emphasized that people would not breakeven (i.e., come out ahead) unless they lived at least to age X, where X was defined as the age at which the (undiscounted, nominal) cumulative benefit payment amounts would be equal. This approach combines some elements of both the negative annuity framing explored by Agnew et al. (2008), and the investment frame explored by Brown et al. (2008), both of which have been shown to reduce the perceived desirability of annuitization. *Our hypothesis is that a breakeven presentation is likely to bias individuals toward claiming benefits earlier, compared to a more neutrally-worded frame.*

b. "Symmetric frame:" Symmetric treatment of gains and losses (anchored at age 66)

The symmetric presentation of information (see Appendix for the full text) is meant to cleanly and clearly lay out the facts with a symmetric treatment of how earlier versus later claiming affects expected claiming ages. This approach simply describes the benefit increments or decrements associated with claiming a year later or a year earlier than age 66.[23] A comparison of the breakeven frame to the symmetric frame is our primary test for whether framing affects the expected claiming age.

[20]Screenshots of the frames, which include the full text, are available in an online Appendix.

[21]It is worth noting that this breakeven approach was not unique to the Social Security Administration; in fact a widely-referenced article by Spiegelman (2010) also discusses the claiming decision using the same approach and terminology.

[22]Within SSA, the claiming decision is often referred to as "month of election," or MOEL. Numerous conversations with SSA field office representatives suggest that this breakeven analysis was widely used for many decades. Indeed, the use of the breakeven analysis was codified in the training manuals for SSA employees: as recently as 2007, the training manual for Title II Claims Representatives (i.e., SSA employees who help citizens claim benefits, among other responsibilities) included a discussion of documentation required for "Month of Election" cases. It states "if the claimant chooses the later of the two possible MOELs, he will *forfeit* the benefits he could have received with the earlier MOEL" (emphasis added).

[23]Under Social Security rules, age 66 is the Full Retirement Age for workers born 1943–1954 (see http://www.ssa.gov/retire2/retirechart.htm).

c. Consumption versus investment

Brown et al. (2008) found that how individuals view the value of life annuities relative to other financial products depends on whether annuities are presented in a “consumption” or an “investment” frame. When the presentation emphasizes investment features (e.g., by using terms such as “invest” and “return”), life annuities prove to be less attractive than when the presentation emphasizes consumption. The preference for annuities versus a savings account increased from 20% in the investment frame to approximately 70% of the population in the consumption frame. Our hypothesis is that the consumption frame – which has been shown to induce a higher value on annuitized income - will lead to later claiming than the investment frame. However, we note that this study differs from Brown et al. (2008), in that the claiming decision is effectively a choice between “annuitizing now” versus “annuitizing later,” whereas the earlier study was comparing annuitization to non-annuitized financial products.

d. Gains versus losses

Kahneman and Tversky (1981) showed that individuals regularly exhibit asymmetries between gains and losses, where utility is concave in gains and convex in losses. Specifically, in a situation of choice under uncertainty, they found that people sometimes exhibit a preference for a certain gain of \$ $p * X$ to an uncertain gain of \$$X$ with probability p, while at the same time preferring an uncertain loss of \$$X$ with probability p, to a certain loss of \$ $p * X$. Furthermore, losses appear to weigh heavier than gains, so that the increase in utility of a gain of X is less than the decrease in utility caused by a loss of X.

We vary whether we express actuarial adjustments in terms of a *gain* (e.g., delaying claiming by one year will *increase* your benefit by \$$X$ per month) or a *loss* (e.g., claiming one year earlier will *reduce* your benefit by \$$X$ per month). *Our hypothesis is that loss framing will generate later claiming than gain framing*.

e. Age anchors

As discussed at length by Mussweiler et al. (2004), “anchoring effects pervade a variety of judgments … In particular, they have been observed in a broad array of different judgmental domains, such as general-knowledge questions, price estimates, estimates of self-efficacy, probability assessments, evaluations of lotteries and gambles, legal judgment, and negotiation.”[24] In our context, a very natural and salient anchoring point is the age first mentioned in each frame. *Thus, our hypothesis is that a lower initial age presented in the frame will lead to earlier expected claiming ages*.

We note that although one can easily discuss gains in a frame anchored at age 62, it is not possible to anchor a loss frame at 62 because 62 is the earliest claiming age, and thus there is no way to characterize a loss from claiming earlier. Similarly, it is easy to anchor losses at age 70 (the maximum claiming age), but not gains. For this reason, in the experimental treatments described next, the gain frames are anchored at 62, and the loss frames at 70. In

[24]In the interest of brevity, we have excluded the references that were embedded in the original quote. For these, as well as a full description of findings, see http://social-cognition.uni-koeln.de/scc4/documents/PsychPr_04.pdf.

order to distinguish the gain/loss hypothesis from age anchoring, we also include both gain and loss frames anchored at age 66.

f. The 10 frames

Putting these various permutations together results in 10 distinct experimental frames:

- Breakeven
- Symmetric
- Consumption Gain from Age 62
- Consumption Gain from Age 66
- Consumption Loss from Age 66
- Consumption Loss from Age 70
- Investment Gain from Age 62
- Investment Gain from Age 66
- Investment Loss from Age 66
- Investment Loss from Age 70

The full text of these frames is available in the Appendix.[25]

Results

1 Evidence that Framing Matters

Table 1 presents descriptive statistics for the ALP sample used in the experiment, as well as average baseline expected claiming ages by demographic characteristic reported by respondents about six weeks prior to the experiment. Here and in much of our analysis, *claiming ages are expressed in terms of the number of months after the respondent's 62nd birthday* (months>62). Thus, for example, a "claiming age" of 36 means age 65 years and zero months. For ease of comparison, column 4 reports the same expected claiming age in the conventional format, that is, in terms of calendar age in years.

Not surprisingly, Table 1 indicates heterogeneity in the baseline claiming age according to demographic characteristics. For example, women indicate that they plan to claim Social Security benefits about four months later than men (this direction is sensible given their longer life expectancy). Individuals younger than age 50 say they plan to claim about 2–4 months later than respondents over age 55, although this is likely an underestimate of the population difference because our sample is restricted to individuals not yet retired (so anyone over 55 who self-described himself as retired is not included). Planned claiming ages also rise with education and income: in both cases, those in the highest category say they

[25]Frames 3–10 contain a sentence saying that all benefit changes are permanent. This sentence is missing in frames 1 and 2, due to an oversight. However, all individuals also received this wording in the general instructions before seeing any particular frame, so we do not expect this difference to be very consequential. Moreover, a major part of our analysis rests on a comparison of frames 1 and 2, neither of which had the additional sentence included.

intend to claim benefits about 15–16 months later than the lowest category. These summary statistics are offered for general interest only: because we randomize exposure to the frames, these differences do not account for any subsequent differences in claiming ages across frames.

In unreported results, we find that these and other demographic characteristics are not statistically different across the groups exposed to different frames, thus confirming that our randomization was effective. We do note, however, that there are some differences in the average baseline claiming age across exposures in wave 1.1. Although these differences are not statistically significant, the point estimates are as large as several months across some groups. This reinforces our decision to subtract off the baseline claiming age to ensure that our results are not spuriously driven by pre-existing differences.

Under the central null hypothesis of this paper, expected claiming decisions are made by rational actors behaving in accordance with expected utility theory. Hence, we should not observe any significant difference in claiming age when we make a change in how the information is framed. Figure 1 provides graphical evidence consistent with a rejection of this null hypothesis. Specifically, Figure 1 illustrates the average expected claiming age for the pre-experiment baseline, as well for the first treatment exposures (wave 1.1) for each of the 10 experimental frames. One can see quite clearly that the breakeven frame yields the earliest intended claiming age: indeed, it is substantially lower than all of the nine other experimental frames. Focusing for now on the difference between the breakeven frame and the symmetric frame, we can see that the average claiming age under the symmetric frame is 54.5 months beyond age 62, whereas it is only 39.6 months in the breakeven frame. Although not obvious from the figure, we have confirmed that this difference of 14.9 months is highly statistically significant. It is also economically significant, especially in relation to estimates of how various economic and demographic factors affect retirement ages.[26] Based on this evidence, we can clearly reject the null hypothesis that framing does not affect expected claiming decisions.

Table 2 provides a set of regression results that confirm our rejection of the null hypothesis and also provides evidence about our other hypotheses. Columns 1 – 4 report regression results for the full sample, and columns 5 – 8 repeat these regressions on a smaller sample limited to respondents age 50+, the idea being that they are closer to retirement and thus may be more likely to provide meaningful responses.

In columns 1 and 5, we focus only on the response from the first experimental exposure (wave 1.1). Columns 2 and 6 repeat the analysis making use of responses across all six exposures (three waves with two exposures per wave). In columns 3 and 7, we add

[26]There is very little evidence on how characteristics affect the claming age as distinct from the retirement age. However, there is a large literature showing that even large changes in circumstances have relatively small effects on average retirement age. For example, Coronado and Perozek (2003) find that each additional $100,000 of unexpected gains from stocks is associated with retiring only two weeks earlier than expected. Lumsdaine and Mitchell (1999) review the literature on the economic determinants of retirement behavior and conclude that changes in pension and Social Security benefits have small economic impacts on the choice of retirement age, as do Gustman and Steinmeier (2004, 2009). A few analysts (Benitez-Silva and Frank, 2008; Reimers and Honig 1996) examine interactions between claiming and work patterns, but they are interested in rewards to continued employment, whereas here we explore determinants of the claiming decision independent of the return-to-work decision.

individual fixed effects. Finally, in columns 4 and 8, we include individual fixed effects and also add a full set of dummy variables to control for any potential spillover effects from one exposure to the next. We do this by including a control for each treatment in each prior wave (e.g., a dummy frame4_lag1 = 1 if the respondent saw experimental frame 4 in wave 1, and =0 otherwise). This results in over 50 lagged exposure variables, and in the interest of space we omit them from the table.[27]

The dependent variable is the claiming age (in months) provided in response to a particular frame minus the claiming age from the pre-experiment baseline. By subtracting off the baseline claiming age in this specification, we are effectively substituting for the formal use of individual fixed effects to control for both observable and unobservable differences across individuals that might be correlated with claiming age. Note that in columns 3, 4, 7 and 8, we use a full set of individual fixed effects, and thus subtracting off the baseline claiming age is irrelevant because it is differenced out.

We have designed this specification to explicitly test for each of our hypotheses. We include a breakeven frame indicator variable and a symmetric frame indicator variable, and we are especially interested in whether those two coefficients are significantly different from one another. We treat the investment gain at age 66 as the reference category, and then include indicator variables for consumption frames, loss frames, and age anchors at 62 and 70.

Our primary hypothesis is that the breakeven frame will lead to a significantly lower expected claiming age than other frames, including the symmetric frame. Indeed, we find this to be the case. Relative to the excluded frame, the first-row coefficient of approximately -20 across all specifications is highly significantly different from zero. It is also highly significantly different from the coefficient on the symmetric frame, which varies from −3.3 to −12.5 depending on the specification. This simply confirms what we already established in Figure 1 and the accompanying statistical test: using a breakeven frame leads to a statistically significant lowering of the expected claiming age.

Next we test the consumption versus investment frame hypothesis. Here we are unable to reject the null hypothesis that there is no difference: the point estimates are statistically indistinguishable from zero. Given the strength of the investment versus consumption frame in the context of annuity decisions found by Brown et al. (2008), the finding of a zero effect here is of particular interest. We note, however, that we are studying a very different decision here. The Brown et al. paper was framing a choice between a lump sum and an annuity, a setting in which the investment features of the lump sum are very apparent. In contrast, here we are effectively comparing "smaller annuity now" versus a "larger annuity later," and so we do not provide a lump sum alternative. Thus the consumption versus framing distinctions are simply not as salient in the present context.

We also test for differences across gains and losses. As a reminder, the breakeven frame presented the act of *delaying* claiming as a loss (i.e., a forfeiture of benefits during the

[27]We have also controlled for prior exposures by including dummy variables for each frame and the number of waves prior to the current one in which it was viewed. Thus, a dummy frame4_lag1=1 would indicate that the individual saw frame 4 exactly one wave prior to the current wave. The results are virtually identical to those reported here.

period of delay); that frame led individuals to express a desire for earlier claiming. Now, we are instead portraying the act of *earlier* claiming as a loss, by focusing on the reduction in monthly benefits. Based on our breakeven results and on the intuition from prospect theory, we hypothesized that individuals would be more likely to delay claiming when framed as the avoidance of a loss, than when framed as a gain. Our results suggest the opposite: namely, that the loss frame generates earlier claiming than does the gain frame. Thus we are able to reject the hypothesis that claiming decisions are invariant to gain versus loss framing, although the direction of the effect runs counter to our expectation. We have no theoretical explanation for this puzzling result, although we do note that during focus groups, at least one respondent expressed skepticism about the loss frames, suggesting that the government was perhaps trying to steer people into a decision that would favor the government. However, it is unclear why this explanation would apply only to the loss frames and not to other frames. Ultimately, we leave the resolution of this puzzle to future research.

Next we turn to the age anchors, where we find a small but statistically significant effect. Specifically, we find that framing the decision around an initial age of 62 results in approximately a three month earlier claiming age, than when the age portrayed in the frame is set at 66. We do not find a difference between age 66 and age 70. Overall, we are able to reject the null hypothesis that the age used in the discussion of the effect of claiming has no effect on the claiming age.

Recall that in columns (3) and (6) of Table 2, we also include a full set of dummy variables to control for prior frame exposures. In the interest of space, we do not report all of the approximately 50 coefficients on these prior frame exposures. However, we do note that about one-third of them are individually significant, and a joint test of all of these prior frame exposure dummies clearly rejects they hypothesis that they do not matter. To broadly characterize the effects, they go in the same direction as the main effects: for example, prior exposure to a breakeven frame tends to lower claiming ages in subsequent responses, although these effects are small relative to the contemporaneous effect. Nonetheless, this does suggest that any “real world” attempts to alter claiming age by changing framing may be partly attenuated by past exposures to claiming information framed in an alternative manner.

Taken as a whole, our results show that framing matters. The breakeven frame results in substantially earlier expected claiming ages than any other frame, the loss frame leads to earlier claiming than the gain frame, age anchors matter, and the frames have effects that persist across exposures. By finding evidence that framing matters, we conclude that expected claiming decisions are not consistent with expected utility maximization.

2 Heterogeneity in Sensitivity to Framing

Having established that framing matters, a natural next question is whether or not it matters the same for everyone, or whether some types of individuals are more sensitive to framing effects. We provide a first suggestion of an answer in Table 3, which displays the expected claiming age for wave 1.1 by frame and demographics. The last column, showing the standard deviation of the average claiming ages across the 10 frames, offers one way to measure how sensitive respondents are to the different frames. Men appear to be more sensitive to framing than women, and younger people appear to be more responsive to framing than older individuals although the age pattern is non-monotonic. The standard deviation proves to be considerably larger for less-educated respondents than for respondents with a college degree, suggesting that respondents with less education are more susceptible to framing effects. The standard deviation of responses also declines with income. Finally, we find a considerably greater standard deviation of responses for those with lower levels of financial literacy. The financial literacy variable simply counts the percent of correct answers from a sequence of 17 financial literacy questions.[28] Individuals who answered less than one-quarter of the financial literacy questions correctly have far greater standard deviations than those who answered 26–50% correctly. Both of these groups, in turn, exhibited far greater standard deviations than those who got more than half of the answers to the financial literacy questions correct. This suggests that less financially literate individuals may be most susceptible to framing effects.

We explore this heterogeneity further in Table 4. We focus on the differential response to the breakeven frame by interacting (one at a time) the breakeven frame dummy with sex, projected benefit levels, an indicator for whether the respondent reported having credit card debt, and financial literacy. In Table 4, we use the specification from column 3 in Table 2, adding interactions between these demographic variables and the breakeven frame.[29]

In the first column, we see that, compared to men, women are prompted to claim six months earlier when they see the breakeven versus the excluded frame, and the effect is statistically significant. (It will be recalled that these are fixed-effects estimates, so individual-specific factors are differenced out.) On the face of it, this seems at odds with Table 3 where men appeared to be more sensitive to framing than women. But Table 3 is based on wave 1.1 only, and it also does not control for other variables. The second column of Table 4 shows the effect of interacting the respondent's anticipated monthly Social Security benefits at age 62 (the mean of that variable is $1,275). The statistically significant estimate implies that, if the monthly benefit level were to rise from $1,275 to $2,275, this would narrow the gap between the neutral and the breakeven frame by approximately eight months.

The third column shows that persons holding credit card debt are significantly more sensitive to the difference in framing between our neutral and breakeven approaches (the difference widens by about 4.2 months). A possible interpretation of this is that those having credit card debt find financial management more challenging and are thus more affected by framing. Note that the inclusion of individual fixed effects in this regression means that this result is not being driven by liquidity constraints: we are comparing the within person response to different frames.

Finally, the fourth column shows the interaction between the financial literacy measure (the percent of questions correct) and the breakeven frame. The interaction is statistically

[28]The 17 questions measure knowledge in five domains: compound interest (4 questions), inflation (2 questions), risk diversification (3 questions), tax treatment of DC savings (4 questions), and employer matches of DC contributions (4 questions). The responses are taken from a different wave of the ALP aimed at measuring financial literacy, and the questions are similar to those developed by Lusardi and Mitchell (2007). Another study linking financial literacy to retirement topics is Guiso et al. (2013).
[29]We have also repeated the exercise using the specification from column 3 and find very similar results.

significant and positive. In other words, the more financially literate are significantly less likely to be influenced by the way in which the benefit claiming decision is framed.

Conclusions

Our experiment clearly establishes that expected Social Security claiming ages are sensitive to how the information about actuarial adjustments is framed. From this, we draw two primary conclusions, one of interest to researchers, and the other of practical interest to policymakers and financial advisers. The first is that individuals appear to be behaving in a manner inconsistent with expected utility theory. Were people focusing solely on consumption outcomes as the standard economic model posits, such decisions would be unaffected by how information is framed. Instead, our evidence strongly suggests that how the claiming information is framed powerfully influences peoples' anticipated claiming dates.

The second, and more practical, lesson we draw is that the manner in which information is provided to individuals can shape behavior. Our research suggests that Social Security's historical emphasis on "breakeven analysis" may have inadvertently encouraged several generations of American workers to claim benefits earlier than they would have if the information had been presented in a different frame. This is especially relevant because, unlike the Social Security benefit rules, the framing of information can be altered without legislation. We note, however, that individuals are also influenced by exposure to prior frames, a finding that may be important given that the Social Security Administration has previously relied on the breakeven approach for decades. Moreover, people are exposed to information about the effect of delayed claiming from multiple sources, not all of which are consistent.

Social Security benefits represent at least half of income for 65 percent of beneficiaries (Social Security Administration, 2012). Clearly, then, the claiming decision has substantial consequences for the financial well-being of a large part of the U.S. elderly population. The fact that it appears relatively easy to influence the claiming decision by a change in framing is a concern, since it implies that many individuals may be insufficiently equipped to make a decision that affects their financial well-being in their later lives. We have found that the financially less literate, individuals with credit card debt, and those with lower earnings are more influenced by framing than others. These are also the groups that are most financially vulnerable at older ages.

While we have shown above that expected claiming ages are correlated with actual claiming ages subsequently in the HRS, we nonetheless recognize that it would be useful to also study the effects of different framing presentations on actual benefit claiming behavior. For instance, one could conceive of experimental tests of framing on the decision to claim Social Security benefits, particularly now that many benefit claims are processed using an Internet-based claiming calculator. Such field experiments are a promising avenue for future analysis.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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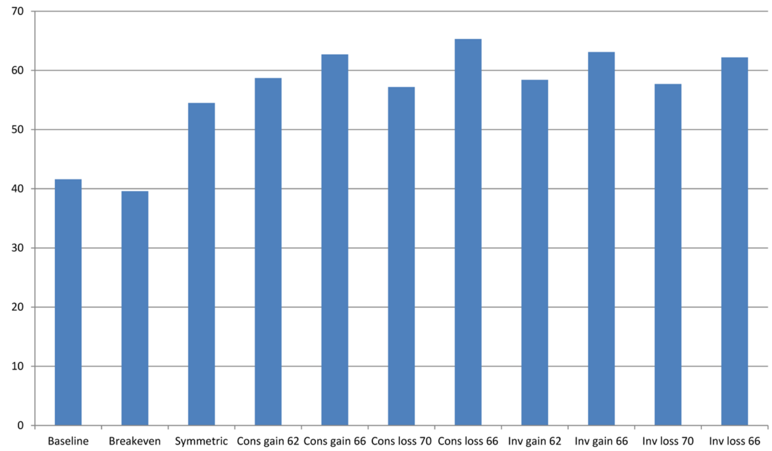

Figure 1. Average Expected Claiming Ages by Frame in Wave 1.1

Note: Expressed as number of months after age 62, unweighted.

Table 1

Descriptive Statistics for the ALP Sample (unweighted data)

			Mean Claiming Age at baseline	
	N	%	Months > 62	Age in years
Sex				
Male	598	41.6	39	65.25
Female	839	58.4	43	65.58
Age				
18–40	388	27	42	65.50
41–50	405	28.2	42	65.50
51–55	275	19.1	38	65.17
>55	369	25.7	40	65.33
Education				
HS or less	232	16.1	35	64.92
Some college/associate degree	577	40.2	39	65.25
College degree	628	43.7	50	66.17
Income ($/year)				
<35000	302	21.1	31	64.58
35000–74999	592	41.2	43	65.58
>75000	541	37.7	47	65.92
Total	1437	100		

Table 2

How Expected Claiming Age Varies with Framing

Note: Dependent variable is expressed as the difference between the expected claiming age and the baseline claiming age in number of months (unweighted data).

	All ages				Age >=50			
Frames	**Wave 1.1**	**All waves**	**All waves**	**All waves**	**Wave 1.1**	**All waves**	**All waves**	**All waves**
Breakeven	−20.11*** (3.384)	−20.52*** (1.523)	−19.04*** (0.913)	−21.95*** (1.166)	−20.71*** (4.028)	−19.93*** (1.880)	−17.83*** (1.232)	−20.39*** (1.582)
Symmetric	−9.809*** (3.359)	−6.303*** (1.533)	−3.307*** (0.915)	−3.876*** (1.183)	−12.49*** (4.109)	−7.233*** (1.893)	−3.546*** (1.235)	−3.820** (1.595)
Consumption	−0.85 (1.922)	−0.169 (0.832)	0.325 (0.494)	0.70 (0.634)	0.88 (2.323)	−0.212 (1.031)	0.375 (0.671)	1.12 (0.869)
Loss	−4.761* (2.679)	−3.966*** (1.177)	−2.271*** (0.703)	−1.854** (0.894)	−6.394** (3.250)	−4.546*** (1.466)	−2.361** (0.957)	−1.191 (1.228)
Age 62	−5.655** (2.572)	−4.470*** (1.160)	−2.695*** (0.691)	−3.073*** (0.891)	−3.22 (3.133)	−2.608* (1.440)	−2.342** (0.941)	−2.687** (1.214)
Age 70	4.34 (2.852)	0.740 (1.196)	1.169 (0.721)	0.78 (0.899)	2.99 (3.421)	1.753 (1.475)	1.444 (0.978)	−0.05 (1.212)
Constant	20.76*** (2.075)	20.88*** (0.927)	19.13*** (0.546)	19.13*** (0.825)	17.90*** (2.482)	18.32*** (1.139)	16.68*** (0.734)	15.95*** (1.126)
Fixed effects	No	No	Yes	Yes	No	No	Yes	Yes
Prior frame controls	No	No	No	Yes	No	No	No	Yes
N	1,236	6,818	6,818	6,818	617	3,394	3,394	3,394
R-squared	0.036	0.029	0.093	0.11	0.058	0.038	0.091	0.122
Number of id			1,442	1,442			707	707

Notes: Consumption is an indicator equal to 1 if frame is a consumption frame, Loss is an indicator equal to 1 if frame is a loss frame, Age 62 is an indicator equal to 1 if anchoring age in the frame is 62, Age 70 is an indicator equal to 1 if anchoring age in the frame is 70. Standard errors in parentheses.

*** p<0.01,

** p<0.05,

* p<0.1.

In columns 3,4, 7 and 8, “number of id” refers to the number of unique individuals in the fixed effects analysis.

Table 3

Expected Claiming Ages by Frame and Respondent Characteristics, Wave 1.1

Note: Expressed as number of months after age 62, unweighted data. See Table 2 for additional definitions.

				Consumption frames				Investment frames				St. Dev.
	Baseline	**Breakeven**	**Symmetric**	**62 gain**	**66 gain**	**70 loss**	**66 loss**	**62 gain**	**66 gain**	**70 loss**	**66 loss**	
Sex												
Male	43.4	35.8	55.6	62.6	64.7	53.8	81.8	55.9	62.2	64.2	61.1	12.0
Female	40.3	42	53.6	55.9	61.4	59.7	58	60.2	63.8	52.9	63.1	7.9
Age												
18–40	41.6	35.8	65.7	65.9	66.2	64.2	73	60.5	66.6	61.2	69.8	11.6
41–50	43.7	43.6	57.1	56.9	66.5	54.7	66.9	63.4	64.3	67	65.8	8.8
51–55	41.4	37.4	54.5	55.7	61.1	57.7	61.2	52.9	72.7	66.9	57.5	10.1
>55	39.2	40.9	41.5	56.9	53.2	52.7	58.7	52.3	53.3	41.1	52.8	7.1
Education												
HS or less	33.8	30.8	54	56.4	60.4	52.9	62.1	60.1	45.4	52.1	56.1	10.5
Some college	38.1	34.2	56.1	55.3	61.1	52.7	58.8	59.4	64.1	54.1	62.2	9.6
College	47.6	48.2	53.4	63.1	65.4	63.3	71.5	56.8	68.8	63	64.3	7.9
Income ($/year)												
<35000	34.9	39.3	55.8	57.4	60.7	58.1	61	56.2	65.3	61.9	66.2	10.0
35000–74999	39.6	36.7	51.9	57.2	67.1	56.7	64.2	53.6	63.9	52.4	59.8	9.6
>75000	47.1	42.1	56.2	61.4	57.7	57.3	68	64	61	60.3	62.2	7.4
Financial Literacy												
0 – 25% correct	32.5	40.1	29	38	52.3	63.4	85	45.3	56.5	66	74	17.9
26–50% correct	34.6	43.6	76.1	65.4	51.6	50.3	40.2	69.7	63.9	54.8	58.4	12.9
51–75% correct	40.4	41.4	57.4	57.9	63.1	50.6	61.8	52	65.3	52.6	65.5	8.8
76–100% correct	43.1	39.8	52.3	58.7	63.7	58.1	68	59.6	61.8	60.1	61.2	8.6
Overall												
Average	41.6	39.6	54.5	58.7	62.7	57.2	65.3	58.4	63.1	57.7	62.2	
SD	32.2	28.7	29.6	30.8	30.6	28.7	31.3	29.7	30.8	29.8	30.5	

	Baseline	Breakeven	Symmetric	Consumption frames				Investment frames				St. Dev.
				62 gain	66 gain	70 loss	66 loss	62 gain	66 gain	70 loss	66 loss	
N	1443	147	150	145	171	154	136	157	151	95	130	

Table 4

How Framing Effects Vary with Individual Characteristics

Fixed Effect Models with Interactions, All Waves, controlling for prior frames.

Note: Dependent variable is expressed as the difference between baseline and expected claiming age in number of months (unweighted data). Reference frame is Age 66, neutral (see text).

	(1)	(2)	(3)	(4)
Breakeven	−18.77*** (1.423)	−32.60*** (3.204)	−19.86*** (1.396)	−28.39*** (3.311)
Symmetric	−3.863*** (1.181)	−3.872*** (1.181)	−3.903*** (1.182)	−3.942*** (1.185)
Consumption	0.687 (0.633)	0.689 (0.633)	0.707 (0.634)	0.568 (0.637)
Loss	−1.791** (0.893)	−1.823** (0.893)	−1.869** (0.893)	−1.874** (0.896)
Age 62	−3.042*** (0.890)	−3.065*** (0.890)	−3.101*** (0.890)	−3.044*** (0.893)
Age 70	0.727 (0.898)	0.754 (0.898)	0.756 (0.898)	0.568 (0.902)
Female *breakeven	−5.957*** (1.531)			
SS Benefit *breakeven		0.00821*** (0.00230)		
Credit card debt *breakeven			−4.161*** (1.527)	
Fin. Lit. Index *breakeven				0.0809** (0.0394)
Constant	19.16*** (0.824)	19.09*** (0.825)	19.11*** (0.825)	19.42*** (0.831)
Observations	6,818	6,818	6,818	6,722
R-squared	0.113	0.112	0.111	0.110
Number of id	1,442	1,442	1,442	1,405

Note: Standard errors in parentheses. Fixed effects included in all models. See also Table 2.

*** $p<0.01$,

** $p<0.05$,

* $p<0.1$