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# Framing and Retirement Age: The Gap between Willingness-to-Accept and Willingness-to-Pay

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# Framing and Retirement Age: The Gap between Willingness-to-Accept and Willingness-to-Pay*

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**Abstract**

In a large online experiment, we relate the retirement timing decision to the disparity between the willingness-to-accept (WTA) and the willingness-to-pay (WTP). In the WTP treatment, participants indicate the maximum amount of monthly benefits they are willing to give up in order to retire early. In the WTA treatment, the minimum increase of monthly payments in order to delay retirement is elicited. Our results reveal that the framing of the decision problem strongly influences participants' reservation price for early retirement. The willingness-to-accept for early retirement is more than twice as high as the corresponding willingness-to-pay. Using actual values from the German social security system as market prices, we demonstrate that the presentation in a WTA frame can induce early retirement. In this frame, the implicit probability of retiring early increases by 30 percentage points. We further show that the disparity between WTA and WTP is correlated with loss aversion. Repeating the analysis with data from a representative household survey (German SAVE panel), we find similar results.

*JEL-Classification Codes*: D03, D14, H55, J26

*Keywords*: Retirement Timing, Willigness-to-pay, Willigness-to-accept, Social Security.

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# 1 Introduction

Today, the typical German retiree spends about twenty years in retirement. The length of the time in retirement has steadily increased due to a longer life expectancy, which is not matched by an equivalent increase in retirement age. The decision of when to retire and when to claim social security benefits thus influences personal and financial well-being for many years. Social security systems typically allow some flexibility in the choice when to claim benefits but set a statutory or full retirement age (FRA). The FRA has been raised in many countries in recent years and now is at age 67 in the U.S. and Germany. The German social security system allows people to claim benefits when they first reach the age of 63 (U.S.: 62). However, retiring before the full retirement age results in lower monthly benefits for the rest of one's lifetime. For example, retiring at age 63 instead of age 67 reduces benefits by about 28%, which illustrates the economic importance of the retirement timing decision.[1]

Despite the financial incentives to delay retirement, the majority of employees in most developed countries choose to retire early (Boersch-Supan, 2000; Gruber and Wise, 2004; Behaghel and Blau, 2012). In Germany, about 56% of the people retiring in 2014 did so before reaching their full retirement age (Deutsche Rentenversicherung, 2015). The possibility to delay retirement after the FRA is rarely used (only by about 2% of retirees), although one earns credits on retirement benefits. This implies that the reduction in monthly social security payments is not enough of an incentive to postpone retirement. Put differently, the price for early retirement is smaller than the reservation price of many individuals.

In this paper, we focus on the reservation price for early retirement to study retirement timing decisions. The reservation price for almost any good can be elicited in two ways: 1) the minimum price someone would accept to sell the good for and 2) the maximum price someone would be willing to pay for the good. According to standard economic theory, the willingness-to-accept (WTA) and willingness-to-pay (WTP) should not differ (e.g., Willig, 1976). However, experimental results show that the willingness-to-accept usually exceeds the willingness-to-pay. For example, Kahneman, Knetsch, and Thaler (1990) endow participants with a coffee mug and elicit selling prices (WTA), which leads to reservation prices about twice as high as when participants are asked for a buying price (WTP) for the same mug. This finding is often referred to as the endowment effect.

[1]The total reduction of 28% is calculated as the sum of the reduction due to an earlier entry into retirement than the FRA and the reduction due to less accumulated earnings. See Section 2.1 for a detailed description.

Accumulated evidence suggests that the WTA can be between 2 and about 100 times larger than the WTP, depending on the good for which reservation prices are elicited (for a detailed review of the WTA/WTP literature, see Horowitz and McConnell, 2002). To our knowledge, we are the first to study the effect of framing the retirement timing decision as either WTA or WTP.

An advantage of the retirement context is that every employee is naturally endowed with a full retirement age and an earliest possible retirement age. In our study, we consider early retirement as the good that is traded. The price for early retirement is measured by the amount of monthly social security benefits one has to give up to retire early. A "market price" can be defined using the official conversion rate provided by the German social security system. Depending on whether the FRA or the earliest retirement age is used as the reference age, the decision can be interpreted as a WTP or WTA problem. In its standardized information letter on social security benefits, the German government communicates benefits at the FRA and reductions for earlier retirement. This is the current decision frame presented to retirees, and we discuss in Section 7, why policy makers might want to modify this framing.

To study the WTA-WTP difference in a retirement context, we conduct a large online experiment in cooperation with one of the major German newspapers, *Frankfurter Allgemeine Zeitung* (FAZ). Participants are randomly assigned to one of two different treatment groups (between subjects). In the WTP treatment, participants indicate the maximum amount of monthly benefits they are willing to give up in order to retire at the earliest age possible (63) instead of the FRA (67). In the WTA treatment, the minimum increase of monthly payments in order to delay retirement from age 63 to age 67 is elicited. Thereby, the treatments only differ in the elicitation method of the reservation price. As a consequence, differences in the outcome result from the elicitation method, i.e., the framing as either WTA or WTP. Participants further answer a set of demographic and retirement related questions.

Our data show that the reservation price for early retirement in the WTA treatment group is about two times higher than in the WTP treatment group. Most importantly, when compared to the market price (according to the social security system), the WTA on average lies above the market price whereas the average WTP is below the market price, indicating that early retirement is attractive only in the WTA treatment group. Using logistic regressions, we find that the implicit probability of retiring early on average increases by about 30 percentage points in the WTA

treatment group. This result is robust to the inclusion of various control variables including risk aversion, loss aversion, financial literacy, and the planned retirement age.

As a second dataset we use a German household survey (SAVE panel), which also includes questions on WTA and WTP. It complements our own experiment as it provides us with a representative sample of German employees, less vulnerable to potential selection effects. In contrast to the highly financially literate newspaper respondents, SAVE participants more closely resemble the average future German retiree. We can confirm our results on the gap between the WTA and WTP using this data. In two additional experiments, we test the robustness of the result to income effects and modify benchmarks.

Finally, we examine the cause of the WTA-WTP gap. In most studies, the disparity is attributed to loss aversion (Thaler, 1980; Kahneman et al., 1990; Bateman et al., 1997). We compare participants self-reported loss aversion with their WTA and WTP, respectively. The WTA/WTP ratio indeed increases strongly with loss aversion; however, this increase is solely driven by a decreasing WTP as the WTA is not found to be influenced by loss aversion. Participants seem to perceive the exchange of money for early retirement as a loss and the more loss-averse they are, the less they are willing to pay.

Our study is related to two strands of literature. First, we contribute to research in economics on the willingness-to-accept, the willingness-to-pay, and the endowment effect. In particular, we show that the disparity between WTA and WTP exists in the retirement context for the good of early retirement. We further relate a direct measure of loss aversion to reservation prices elicited in WTA and WTP treatments and can confirm loss aversion as a driver of the disparity. Secondly, we contribute to research on retirement planning and financial decision making, by showing that the way in which the retirement decision is presented can influence the decision on when to retire. This has interesting implications for policy makers which we discuss in detail. It is a timely topic, as the European Commission (2013) currently runs a review on the form and content of retirement information in the European Union. It reveals that many countries are expanding their information provision (particularly online) and may employ various forms of presentations that entail WTA or WTP frames.

# 2 Literature and Hypotheses

## 2.1 The WTA-WTP Disparity

In general, a reservation price for a good can be defined in two ways: 1) as the maximum price a person would be willing to pay for this good (WTP) or 2) the minimum price a person would demand to sell the good (WTA). In both cases, the economic rent for the person who buys or sells the good would be zero. Standard theory implies that for most goods the WTA should equal the WTP (Willig, 1976). Empirical studies, however, report a significant difference with the WTA typically exceeding the WTP. For example, Kahneman et al. (1990) conduct an experiment in which half of the participants are given a coffee mug and are allowed to trade the mugs among all participants. The average minimum selling price (WTA) was more than two times greater than the average maximum buying price (WTP), resulting in a very low trading volume. This finding of high WTA/WTP-ratios has been widely observed and given the low value of the used items cannot be explained by an income effect.

The WTA-WTP difference has been reported for numerous goods including ordinary private goods (e.g., mugs, pens, or chocolate), public or non-market goods, health and safety goods, risky and ambiguous lotteries, and intangible goods. Horowitz and McConnell (2002) conduct a meta-analysis including 45 studies, which all report WTA/WTP ratios significantly greater than one. They find that the effect becomes even stronger for goods that are not ordinary market goods, potentially because in absence of a salient market price participants are even more influenced by the framing of the question.

## 2.2 WTA and WTP in a Retirement Context

The retirement timing decision provides an interesting application, which to our knowledge has not been studied in relation to WTA and WTP. Every contributor to social security is naturally endowed with a full retirement age and an earliest possible retirement age. We assume *early retirement* is the good to which a reservation price is assigned, as for most people early retirement is desirable and therefore has a positive value. It can be treated as the good in the classic money-good exchange of the WTA-WTP literature. Depending on how retirement information is provided, the retirement decision takes the form of a WTA or WTP problem. If the information on social security benefits

takes the FRA as a starting point, people automatically find themselves in a WTP framework. The FRA acts as a reference age and the good *early retirement* is mentally not in possession of the decision maker. In that sense, the framing is weaker as for ordinary goods such as mugs or pens, which are often handed over in physical possession of participants. In the WTP frame, people ask themselves: "What amount of monthly benefits am I willing to give up in order to retire early?" On the other hand, if the earliest possible retirement age is used as a starting point, the analogous question would be: "What amount of monthly benefits would compensate me for retiring later (working longer)?" This alternative design can be interpreted as a WTA frame. Our first hypothesis states:

> *H1a: The reservation price for early retirement in the WTA treatment will be significantly higher than the reservation price in the WTP treatment.*

Most related to our work are the studies by Fetherstonhaugh and Ross (1999) and Brown, Kapteyn, and Mitchell (2016), who also investigate framing effects in retirement decisions. Fetherstonhaugh and Ross (1999) let people choose their preferred retirement age in either a gain or a loss frame. Benefit differences between two possible retirement ages are described as a credit or a penalty, respectively. Although no WTA and WTP are elicited, the two frames can be interpreted along these lines (in a robustness check we use a similar design, see section 6.1). At least for one pair of reference ages, they find that participants are less likely to choose early retirement in a loss frame. Brown et al. (2016) confront people with several different frames of how retirement benefits are presented (including a loss and a gain frame). They further provide different age anchors which can be interpreted as reference ages. Again, participants choose a preferred retirement age. In their analysis, higher reference ages indeed induce later retirement, while their results for the gain and loss frame are opposite to the findings by Fetherstonhaugh and Ross (1999).

The major difference between these studies and our design is that we do not ask for a planned or expected retirement age but for a WTA or WTP for early retirement. By not quoting a price for early retirement, we expect to gain more insights on how people subjectively value early retirement depending on the decision frame. The procedure still allows us to compare participants' reservation prices with the market price of the German social security system. This comparison reveals whether at a given market price an individual would choose to retire early. Hereby, we only consider an implicit retirement decision. Participants are not asked directly whether or not they are willing to

retire at a given age. We make the assumption that a participant with a reservation price greater than the market price would retire early and test in which treatment this is more likely:

> *H1b: Participants in the WTA treatment are more likely to choose early retirement than participants in the WTP treatment.*

### 2.3 Explanations for the WTA-WTP Gap

Although the disparity between WTA and WTP has been studied for almost forty years, its sources are still not very well understood. Several explanations have been put forward, which can be categorized as either economic, psychological, or methodological. We will review these categories one by one and then discuss whether the proposed reasons are likely to apply in a retirement context.

Economic explanations usually build on the premise that a disparity between WTA and WTP can occur even under rational behavior. Randall and Stoll (1980) suggest that *transaction costs* can cause the maximum amount one would be willing to pay to be smaller than the amount one would be willing to accept. They argue that when evaluating the price for a good in a WTA treatment, one adds the transaction or search costs associated with replacing that good to the reservation price. Hanemann (1991) proposes an *income effect* to be responsible for the higher WTA. If the value of the considered good is high, owning the good (WTA) causes an income effect, which then leads to a higher reservation price. However, a strong disparity between WTA and WTP is also found for low value goods such as mugs or pens, which challenges this explanation.

In addition to these economic explanations, psychological reasons have been proposed. The most prominent explanation for the disparity between WTA and WTP, is the *endowment effect* in combination with *loss aversion* (Thaler, 1980). Individuals are argued to have a higher reservation price for a good that is in their possession because giving up this good is perceived as a loss. This interpretation is given in most studies on WTA and WTP (Knetsch and Sinden, 1984; Coursey, Hovis, and Schulze, 1987; Kahneman et al., 1990; Borges and Knetsch, 1998; Knetsch, Tang, and Thaler, 2001). Often experimenters physically endow participants with the good that is traded, but simple modifications in framing the questions have a similar effect. Loomes and Sugden (1982) argue that *ambiguity* can cause the disparity between WTA and WTP. When the true value of a

good is uncertain, a risk-averse agent might increase the selling price and reduce the buying price of a good to avoid an unfavorable trade.

Finally as a methodological concern, researchers point out how features of the experimental design might produce the WTA-WTP gap. Plott and Zeiler (2005) suggest *subject misconception* as an alternative explanation, meaning that participants do not understand the experiment correctly. They conduct an experiment in which they simultaneously control for several possible subject misconceptions suggested in the literature and find no difference between elicited WTA and WTP.

It is beyond the scope of our study to test for all suggested explanations for the WTA-WTP gap. We will focus on loss aversion as the most prominent one and discuss below the plausibility of other explanations. Surprisingly, with the exception of Gächter, Johnson, and Herrmann (2007), the WTA/WTP ratio has not been linked to a direct measure of loss aversion. The more loss averse a person is, the lower should be her willingness to give up a good. For the WTA/WTP ratio, we therefore hypothesize:

*H2a: The more loss averse participants are, the higher is their WTA/WTP ratio.*

In a second step, we separately examine the effect of loss aversion on the WTA and on the WTP. A rise in the WTA/WTP ratio can come from an increase in WTA, a decrease in WTP, or both. The endowment effect posits that selling a good creates a loss and buying a good creates a gain (Brown, 2005). Hereby it is mostly assumed that money outlays are not subject to loss aversion. Giving up goods, which are intended to be exchanged (e.g., money), is not perceived as a loss (Kahneman et al., 1990; Novemsky and Kahneman, 2005). As a consequence, loss aversion should only impact the WTA decision as this is the situation in which one has to give up the good. In contrast, Bateman et al. (1997) and Bateman et al. (2005) find that the disparity between WTA and WTP is caused by both: loss aversion in the good (WTA) and in money (WTP).

In the retirement context, the role of money in the exchange between retirement benefits and a good (early retirement) is not obvious. Kahneman's intended-for-exchange argument seems not applicable. Although retirement benefits are ultimately used for transactions in consumption goods, one's level of monthly benefits is typically not intended for trade. Early retirement (or leisure) and retirement benefits can both have the character of a good. It would then depend on the reference point for which of the two goods loss aversion is felt. In the WTA frame the good in possession

is early retirement, in the WTP frame it is (higher) retirement benefits. Abdellaoui and Kemel (2014) show that loss aversion is smaller for time than for money. The endowment effect is also reported to be rather small in exchanges involving time such as travel or leisure (Horowitz and McConnell, 2002; Tuncela and Hammitt, 2014). This implies that the effect on WTA could be weak. In the retirement decision, it is thus possible that, contrary to the usual money-good exchange, loss aversion is stronger in the WTP frame. In Hypothesis 2b, we consider opposite effects of loss aversion on the WTA and the WTP and make no prediction on their relative strength:

> *H2b: The increase of the WTA/WTP ratio in loss aversion is caused by an increase of the WTA and a decrease of the WTP.*

Among the other potential explanations, some are not applicable or unconvincing in the retirement context. For the transaction cost argument, it is not clear whether the analogy from the money-good exchange carries over to retirement timing. While in the classic experiments the low transaction cost decision is to retain the good (or status quo), in the retirement decision any claiming age is associated with the same transaction cost (contacting the social security administration). Moreover, claiming retirement benefits is a decision with first-order consequences for the rest of one's life to which transaction costs must pale in comparison. In retirement timing, there neither is an income effect, as—independent of framing—individuals are equally rich. They always face the same feasible set of income-leisure combinations.[2]

The ambiguity argument of setting a higher reservation price to avoid selling too cheap is only plausible in a market, where there is the risk to be exploited by other market participants. For social security a fixed conversion rate is set by the government. What remains are potential subject misconceptions, which we cannot fully exclude, as the nature of our survey does not allow to implement practice rounds, incentive compatibility, or a market mechanisms, which are all used in lab studies to reduce misconception. We instead rely on a detailed description of the retirement decision problem and concentrate in the survey on this specific topic. The requested trade-off between benefits and time in retirement has a high real life relevance, which should further facilitate to relate to the problem and to avoid misconceptions. As we run a large-scale survey, we cannot provide incentives except for some low value prizes (books and restaurant vouchers) raffled among partici-

[2]However, income effects can arise in our experimental design. In particular when asking for WTA and WTP, not all possible income-leisure combinations are revealed, but one is given as a starting point. Participants might objectively be richer and/or subjectively feel richer in some of these situations.

pants. Besides, it is unclear how to provide meaningful incentives in the presented decision context. However, Horowitz and McConnell (2002) find in their meta-analysis that the WTA/WTP ratio is not significantly different between experiments with real incentives and hypothetical questions.[3]

# 3 Experimental Design and Summary Statistics

## 3.1 Experimental Design

### 3.1.1 Recruitment and Methodology

The online experiment was conducted from October 14 to November 5, 2012, in cooperation with the newspaper Frankfurter Allgemeine Zeitung (FAZ). The experiment was announced to cover retirement savings and planing. In this section, we give an overview of the questions related to WTA and WTP, and provide summary statistics and control variables. The complete experimental materials can be found in the Online Appendix.[4]

Participants were recruited through a link on the newspaper's website and two announcements (on October 14 and 28) in the print edition. 3,077 participants completed the experiment, which took them on average 11 minutes. Participants answered hypothetical questions about retirement planning, demographics, risk preferences, and financial literacy. They were randomly assigned to one of two treatment groups. Between subjects, they were either asked for a reservation price regarding early retirement in a WTA or in a WTP setting. Additionally, they respond to a set of questions on time preferences, which are analyzed in Schreiber and Weber (2016).

The hypothetical (non-incentivized) design was necessary to recruit a large pool of participants including many people in the age group between 50 and 65. Unlike in a typical laboratory experiment with students, for these participants the decision when to retire lies in the nearer future. We take comfort in Rubinstein (2001) replicating more than 40 experiments without monetary rewards and in almost all cases finding no qualitative differences in results compared to incentivized experiments. More specific to our research question, framing effects in hypothetical and real decisions do not

[3] More generally, the role on incentives in experiments is often limited (Camerer and Hogarth, 1999). Low incentives might even have the negative effect of destroying intrinsic motivation (Gneezy and Rustichini, 2000). Most other surveys on consumer finances or retirement are also unincentivized (e.g., the SCF and HRS in the US, SAVE in Germany, or the recently established ECB Household Finance and Consumption panel).

[4] For the Appendix, German instructions are translated to English.

substantially differ (Kuehberger, Schulte-Mecklenbeck, and Perner, 2002). In addition, Horowitz and McConnell (2002) report that this extends to the difference between WTA and WTP. The recent experimental literature on retirement decisions uses non-incentivized surveys for similar reasons (Brown et al., 2016; Brown et al., 2013; Beshears et al., 2014; Brown et al., 2015).

### 3.1.2 Willingness-to-Accept Treatment

In the experimental elicitation of reservation prices, one has to distinguish between choice-based and matching-based approaches (Hardisty et al., 2013). Choice methods ask participants to choose between two outcomes. Depending on the response, one of the outcomes is repeatedly adjusted to determine a participants' switching point. The matching approach, in contrast, directly asks for an indifference point. Participants have to state which outcome or price would make them indifferent to obtain a second outcome. In our experiment, we use the matching-based approach. It has the advantage that it needs only a single question and that it does not require to define values, which people might anchor on. The choice-base approach is used in a robustness test (see section 6.1).

In the WTA treatment, participants are asked for an amount of money by which their monthly retirement benefits need to be increased to make them indifferent to retire four years later (reservation price for early retirement):

> *Suppose you have the opportunity to retire at age 63. At this time you would receive a pension of EUR [hypothetical pension value] per month. Please imagine that you would be able to delay retirement by four years and retire at age 67. This would lead to an increase in monthly pension payments. What would the minimum monthly increase have to be, so that you would be willing to delay retirement from age 63 to age 67?*

The inserted hypothetical pension value depends on the participant's income. In a first scenario, it is set to 65% of the stated income (=Level 1) and in a second scenario (within subjects) to 110% (=Level 2). Participants then enter the amount they demand to delay retirement (WTA). We choose these values for two reasons: 1) the average social security benefits for an individual, who has been employed for 40 years with an income of 1.5 times the German average income, amounts to about 65% of their monthly income.[5] 2) Multiplying participants' current income by 0.65 has

[5]Monthly benefits are calculated according to the German pension formula. This calculation is sensitive to assumptions regarding tax payments, martial status, number of children and other demographic factors. We chose a

the disadvantage that real income growth until retirement is neglected. In particular, younger participants might face a decision problem with a very low hypothetical pension. Therefore, the higher benefit level of 110% is introduced for robustness.

### 3.1.3 Willingness-to-Pay Treatment

In the WTP treatment, participants are asked to state an amount of monthly retirement benefits they would be willing to give up in order to retire four years earlier:

> *Suppose you have the opportunity to retire at age 67. At this time you would receive a pension of EUR [hypothetical pension value] per month. Please imagine that you would be able to speed up retirement by four years and retire at age 63. This would lead to a decrease in monthly pension payments. What maximum amount of monthly pension payments would you be willing to give up in order to be able to retire at age 63 instead of age 67?*

The inserted hypothetical pension value is calculated in the same way as for the WTA scenario. In the Level 1 (Level 2) question, it amounts to 65% (110%) of participants' income. Participants then enter the amount they would be willing to pay to retire early.

### 3.1.4 Loss Aversion and Controls

We use participants self-reported loss attitude to measure loss aversion. On a seven-point Likert scale, participants have to indicate whether they agree to the statement "I am very afraid of losses". Participants' risk aversion is elicited similarly by agreement to the statement "I am a risk-averse person." Simple scales might currently be the best available measurement, as lottery based approaches such as Holt and Laury (2002) have mostly proved unsuccessful in predicting behavior in non-lottery tasks. Likewise, Erner, Klos, and Langer (2013) show that carefully elicited prospect theory parameters including loss aversion have low predictive power in a WTP setting. These approaches have the further disadvantage of a demanding and lengthy elicitation procedure. In a robustness test, we validate our loss aversion measure using a quantitative measure based on

higher than average income as a starting point, as the readers of the FAZ typically earn a higher than average income (Müller and Weber, 2014).

Gächter et al. (2007). The correlation between the verbal and the quantitative measure is 0.41, suggesting that the verbal question indeed measures loss aversion. For risk aversion, earlier studies report that self-reported values on a Likert scale are a good predictor of actual risk taking (Nosic and Weber, 2010; Lönnqvist et al., 2015; Falk et al., 2016). Acknowledging the limitations of these simple self-reported measures, we maintain that they provide a good proxy for participants' loss aversion and risk aversion.

We directly elicit the planned retirement age by asking participants "At what age do you plan to retire?" In addition, they answer six financial literacy questions consisting of one of the basic questions from Lusardi and Mitchell (2007), three advanced questions from van Rooij, Lusardi, and Alessie (2011), and two even more advanced questions developed by us (see Online Appendix). The section of the FAZ, where the announcement for the study appeared focuses on financial markets, and (Müller and Weber, 2014) report that participants recruited in a similar way are highly financially literate. Additional control variables are: participants subjective life expectancy (elicited directly), whether or not participants own private pension insurance, and how they rate the certainty of guaranteed social security benefits.

### 3.2 Summary Statistics

Table 1 presents summary statistics. The number of observations ranges from 2,142 to 2,297 depending on submitted answers. The following observations were excluded: participants who were already retired, participants with zero or missing income,[6] and participants below age 18.

The average reservation price for early retirement is about EUR 550 per month for Level 1 and about EUR 970 for the Level 2. The increase from Level 1 to Level 2 is almost linear, with the mean being 1.77 times larger for Level 2 and the hypothetical monthly pension being $\frac{110\%}{65\%} = 1.69$ times larger. The average planned retirement age of about 64.6 years is close to the former FRA in Germany (age 65).

[Table 1 about here.]

The average age of participants is about 40 years. Men are overrepresented (84% male), reflecting that the majority of FAZ readers are male (62%). Participants report a relatively high after tax

[6] This was necessary as the income was used to calculate a hypothetical pension value, see section 3.1.

income of about EUR 3,400 (median EUR 3,000) per month (compared to a German average after tax income of about EUR 1,470 in 2011.[7] They are well educated with 92% having received the German equivalent to a high school diploma, and 68% having graduated from a university. Half of the participants are married. Brown et al. (2016) find that framing effects in retirement timing become weaker for participants who are more educated and have higher earnings. Consequently, results found with our subject pool can be seen as conservative. In addition, we provide robustness tests for participants who are less educated and have lower earnings.

Asking participants about their risk-aversion and loss-aversion on the seven-point Likert scales leads to an average of 3.9 and 4.3, respectively. As expected, participants do extremely well in the standard financial literacy questions with on average 3.5 out of 4 correct answers. However, only 0.6 of the two additional questions are answered correctly. Estimates of subjective life expectancy are on average 83.3 years for male participants and 84.3 for female participants. While these estimates are above the average life expectancy in Germany at birth (for the respective cohorts), they are in line with the conditional life expectancy for people, who have already reached age 40. Given the on average wealthier and more educated sample, a relatively high subjective life expectancy might be justified.

In addition, Table 1 reports summary statistics split by treatment. As participants are randomly assigned to either the WTA or the WTP treatment group, no differences in demographic variables and controls demonstrate that the randomization worked well. Indeed for most variables, the difference is insignificant and economically small. There are three exceptions: on average, more women are assigned to the WTP treatment compared to the WTA treatment (87% vs. 83%). Participants in the WTP treatment group report on average a significantly higher number of children (0.86 vs. 0.73) and the average subjective life expectancy of women in this group is higher (85.3 vs. 83.6). However, we are confident that the results in the next section are not driven by this small imbalance for two reasons: 1) we include all demographic and control variables in the regression analysis, and therefore account for the difference; 2) none of the three variables that exhibit differences between the two treatments proves to be an important predictor of the reservation price.

[7]Source: German Federal Statistical Office (2012).

# 4 Experimental Results

## 4.1 The Market Price of Early Retirement and a Benchmark WTA/WTP-Ratio

Analyzing the disparity between WTA and WTP in a retirement context has the advantage that reservation prices can be compared to a market price provided by the social security system. The German social security system is based on earnings points (EP) where the accumulated points determine the monthly social security payments after claiming. For each year a person is employed, he or she pays contributions and earns points in relation to the yearly gross income ($EP_t = \frac{\text{gross income}_t}{\text{average gross income in Germany}_t}$).[8] When claiming retirement benefits, the sum of accumulated earnings points is multiplied by the current pension value (CPV) in Germany and an entry coefficient (EC), which depends on the individual claiming age. The pension value is determined on July 1 each year and amounts to EUR 30.45 in 2016. The entry coefficient equals 1 for people who claim benefits at their FRA and is reduced by 0.003 for each month a person claims earlier than the FRA. Delayed claiming, however, increases the entry coefficient by 0.005 per month delay. [9]

In the following, we make three simplifying assumptions to calculate a market price for the shift between retiring at age 63 and age 67: 1) each participant has been employed for 40 years when reaching age 63; 2) the relation between a participants' income and the average income in Germany remains constant; 3) the FRA is age 67. Assumptions 1 and 2 imply, that the accumulated earnings points will increase by 10% when contributing 4 years longer to an employment history of 40 years. Assumption 3 harmonizes the entry coefficient at age 63 to 0.856 ($= 1 - 48\text{months} \cdot 0.003$). Using the parameters of the German social security system, we arrive at a conversion rate of $\frac{\text{Benefits at age 67}}{\text{Benefits at age 63}} = \frac{1.1 \cdot EP \cdot CPV \cdot 1}{EP \cdot CPV \cdot 0.856} = 1.285$. Of course, conversion rates can vary due to individual circumstances. However, relaxing these assumptions does not qualitatively change our results.

In the experiment, we decide to provide participants in both treatments (WTA and WTP) with the same monetary benefit amounts. I.e., a participant with a net income of EUR 1,500 will be offered EUR 975 at age 63 in the WTA treatment (level one). Applying the conversion rate calculated above, expected benefits when retiring at 67 would be EUR 1253. This means a preference in line with this market price would be a WTA of EUR 278. For the WTP treatment, the

[8] The EP per year are currently capped at 2.0515, contributions are likewise capped.

[9] For example, a retiree, who has had an average income during 40 years of employment, and claims benefits one year before full retirement age will receive monthly benefits of $EP * CPV * EC = 40 * EUR30.45 * 0.964 = 1174.15 EUR$. The pension formula is explained in detail in the following legal text: §64, SGB VI.

amount of EUR 975 is offered at age 67, which implies a reduced benefit level of EUR 759 at age 63 ($\frac{975}{1.285}$). The WTP based on the market price would be EUR 216. Consequently, the use of constant monetary amounts across treatments results in a WTA/WTP-ratio different from one even when applying the official conversion rate. It corresponds to the value of 1.285 calculated before ($= \frac{278}{216}$), but now has a second function in predicting the WTA-WTP gap due to the described feature in the experimental design.

We thus use this expected WTA/WTP-ratio of 1.285 as a stricter benchmark for our experimental results. While personal preferences can of course differ from the market price, for example, people might demand more compensation for additional years of work than the social security system offers; this should be the case for WTA and WTP alike. Systematic differences are a sign of a framing effect. The benchmark should also capture most of a potential income effect, arising from the fact that participants in the WTA frame are richer being awarded the same monthly benefits at an earlier point in time. In a robustness test, we offer participants in the WTP treatment higher benefits to further control for an income effects (see section 6.2).

### 4.2 Hypothesis 1a - The WTA-WTP Difference

Figure 1 presents the reservation price for early retirement of participants in the WTA and WTP treatment, as well as the WTA/WTP ratio and, for comparison, the benchmark of 1.285. The average minimum monthly amount participants would accept to retire at age 67 instead of age 63 (WTA) is EUR 763.56 if the hypothetical pension value amounts to 65% of participants' income (Level 1). On the other hand, the monthly amount participants are willing to give up in order to retire at age 63 instead of age 67 (WTP) amounts only to EUR 327.09 at Level 1. This difference is highly significant (t-value of -12.7). The WTA/WTP ratio is 2.33. The p-value of a Wald test, comparing the WTA/WTP ratio to a ratio of 1.285, is smaller than 0.0001. Almost the same picture emerges for the Level 2 question, in which the hypothetical pension value is increased to 110% of participants' income. The reservation price in the WTA treatment (1275.38) is about 1.9 times larger than in the WTP treatment (668.66). Again the difference is significant on the 1%-level (t-value: -9.3), and the ratio of 1.9 is again significantly higher than 1.285 (Wald test: $p < 0.0001$). The full distribution of WTA and WTP responses is displayed in the Online Appendix.

[Figure 1 about here.]

The difference between WTA and WTP is further tested in a regression framework. Table 2 presents coefficients and t-values of OLS regressions with the (logarithmized) reservation price as the dependent variable, separately for Level 1 and 2. In addition to a treatment dummy, the regressions include demographic variables, the (logarithmized) market price, and further control variables.[10] Regression results confirm the impression from Figure 1. For both benefit levels, the reservation price is significantly higher in the WTA treatment group (at the 1%-level). The treatment effect survives the inclusion of the market price and other controls. Due to logarithmization, the interpretation of the magnitude of the treatment dummy is not straightforward. Therefore, we calculate effects according to Halvorsen and Palmquist (1980) and Kennedy (1981).[11] For the Level 1 regression, this leads to a reservation price for early retirement in the WTA treatment group that is about 314% higher compared to the WTP treatment group.[12] For Level 2, the reservation price increases by 110.3%. Therefore, the difference between WTA and WRP is not only robust in a multivariate setting but gets stronger.

[Table 2 about here.]

In addition to the treatment, the market price for early retirement influences participants' reservation price. The market price is calculated based on the social security formula and depends on participants' benefit level and the treatment. A 1% increase in this market price (roughly corresponding to a 1% increase in income) will increase the reservation price on average by 0.51% for Level 1 and by 0.45% for Level 2. This means that participants do not adjust their reservation price proportionally.

Also, participants who graduated from university indicate a reservation price that is on average 12.1% (Level 1) or 17.8% (Level 2) higher, compared to participants with no university degree. In both regressions, being married increases the reservation price. This is in line with Lund, Iversen, and Poulsen (2001), who find that having a partner is a significant predictor of transition to early retirement. In our analysis, being married (dummy variable) increases the reservation price for early retirement by about 30%. Only one of the eight control variables in Table 2 is statistically significant.

[10] Income is not included in this regression as the market price by construction is highly correlated (0.99) with income.

[11] While for a continuous variable, the coefficient multiplied by 100 gives the percentage effect of that variable on the dependent variable, this is not true for dummy variables. Instead, the effect is calculated as $exp(\widehat{d} - \frac{1}{2}V(\widehat{d})) - 1$. In this expression, $\widehat{d}$ is the estimated coefficient of the dummy variable and $V(\widehat{d})$ is the variance of the estimate.

[12] $exp(1.4226 - \frac{1}{2}0.077344^2) - 1 = 313.6\%$. For all following regressions, with a logarithmized dependent variable, the effect of dummy variables are calculated similarly.

Participants planned retirement age has a significant and negative effect on the reservation price. For each year a person plans to retire later, the reservation price decreases by about 6%. This effect makes sense intuitively. Participants who have already planned to retire later should have a weaker preference for early retirement compared to a person who plans to retire early and therefore should have a lower reservation price.

### 4.3 Hypothesis 1b - Probability of Early Retirement

Whether or not the disparity between WTA and WTP can induce early retirement depends on the reservation price in relation to the market price. If the market price is smaller than the reservation price, people are willing to buy the good (i.e., retire early). As demonstrated, the market price for early retirement can be calculated using the official social security formula. Figure 2 shows the average WTA, WTP, and the average market price in both treatments and for both benefit levels. As the average income in the sample is high, market prices of 631 and 500 (WTA and WTP treatment, Level 1) and 1068 and 846 (Level 2) are obtained. These market prices are calculated as explained in section 4.1. The average reservation price in the WTA treatment is for both levels above the average market price, meaning that in the WTA treatment, early retirement should be attractive to many participants. In contrast, the average reservation price in the WTP treatment is for both levels below the market price. This gives a first impression on how the framing might affect the retirement timing decision.

[Figure 2 about here.]

To test Hypothesis 1b in a regression framework, we construct an indicator variable, *late retirement*. For each participant, the individual market price of early retirement is calculated and compared to the submitted reservation price. The indicator equals one if the reservation price is smaller than the market price, which means that early retirement is not desirable. For a reservation price higher than or equal to the market price, the indicator equals zero. Not surprisingly, given the higher reservation price in the WTA treatment, fewer people would accept retiring late under the conditions offered by German social security (51%-55%) depending on the benefit level. In the WTP treatment most participants would retire late (74%-81%).

Table 3 presents coefficients and z-values of a logistic regression with *late retirement* as the dependent variable. Explanatory variables are the treatment dummy, demographic variables, and additional control variables. The WTA treatment dummy is statistically highly significant and negative, indicating that the propensity of late retirement decreases in WTA treatment group. Also in terms of magnitude, the effect is strong. The average marginal effect of a change in the WTA dummy is -29.5% (Level 1) and -17.8% (Level 2), respectively. This can be interpreted as a 29.5% (17.8%) decrease in the probability to retire later for an average participant if the decision is framed in terms of WTA. Income and having graduated from a university are the two demographic variables with a significant effect in both regressions. Even though income increases the reservation price for early retirement (see Table 2), it also increases the probability of late retirement. While the market price of early retirement increases linearly with income, the reservation price only increases under-proportionally. Therefore, a net-positive effect of income on the propensity of late retirement is obtained. Previous research also finds that wages are inversely correlated with the acceptance of early retirement (Ruhm, 1989; Kim and Feldman, 1998).

[Table 2 about here.]

In summary, our results confirm Hypothesis 1b. The probability of a later retirement is significantly reduced when the retirement decision is presented as a WTA problem. This result is to some extent at odds with Brown et al. (2016), who find a higher retirement age in a gain frame which resembles our WTA frame. However, they ask for an expected claiming age, while we ask for a reservation price, which potentially shifts attention to the good that is given up in exchange. Our WTA frame on delaying retirement for additional benefits may even invite a break-even type of thinking for which (Brown et al., 2016) find the lowest claiming age. Given the differences in design, there are limits to the comparability between the treatments of the two studies.[13] Interestingly, the ex-ante hypotheses of Brown et al. (2016) is consistent with our findings, while they provide no explanation for their contradicting result.

We analyze the robustness of the presented results using additional datasets (see sections 5 and 6). We also perform several robustness tests using the data of the main experiment. In particular, we repeat the main analyzes with three subsamples. We exclude participants who state a WTP

[13]To make things more complicated, Brown et al. (2016) use different age frames they combine with their scenarios. They show a strong effect of these age anchors or reference points. In our survey, the WTA frame provides age 63 as a starting point and the WTP age 67.

of zero, participants who state a WTA larger than the hypothetical retirement benefits offered to them, and participants who are more than ten years younger than their planned retirement age. We further construct alternative measures of the reservation price and the WTP. The main finding of a gap between WTA and WTP remains robust, and we present regression results in the Online Appendix.

### 4.4 Hypothesis 2a - WTA/WTP Ratio and Loss Aversion

To analyze the effect of loss aversion on the WTA/WTP ratio, participants are sorted according to their self-reported loss aversion. We calculate the WTA and WTP for each of the seven loss aversion categories (1-7), by averaging and normalizing the values of each respondent across the two benefit levels. The number of observations ranges from 60 (loss aversion of 1) to 501 (loss aversion of 5). Figure 3 shows the resulting WTA/WTP ratio depending on the loss aversion category. We also report for each category p-values of a Wald test with the null hypothesis of the WTA/WTP ratio to equal 1.285. The WTA/WTP ratio increases almost monotonically with loss aversion. The lowest ratio of 1.39 is found for participants who indicate to be "not at all" loss averse and it is not significantly different from 1.285. The highest ratio is observed for the most loss averse participants (2.70). Overall, the results provide support for Hypothesis 2a and can be confirmed in a multivariate regression.

[Figure 3 about here.]

### 4.5 Hypothesis 2b - WTA, WTP and Loss Aversion

According to Hypothesis 2b, the increase in the average WTA/WTP ratio by loss aversion can result from both an increase in WTA and a decrease in WTP. Figure 4 shows the average WTA and WTP depending on the seven loss aversion categories. The relationship between loss aversion and the WTA appears to be rather flat with no distinct increase of WTA with loss aversion. However, the average WTP strongly and monotonically decreases with loss aversion. Participants who respond to be "not at all" loss averse state on average the highest WTP of EUR 848. The WTP decreases by almost 50% to EUR 452 for the most loss-averse participants.

[Figure 4 about here.]

Table 4 presents the results of two OLS regressions that analyze WTA and WTP multivariately. The dependent variable is the logarithm of the WTA (columns 2 and 3) and the logarithm of the WTP (columns 4 and 5), respectively. Demographic and control variables are as before. For WTA, the coefficient for loss aversion is positive, but weak and statistically insignificant. For the WTP, we find a highly significant and economically strong effect of loss aversion. On average, the WTP for early retirement decreases by 10% for a one unit increase in loss aversion. The effect is robust to the inclusion of demographic variables and controls.

[Table 4 about here.]

In summary, we partly find support for Hypothesis 2b. However, we observe the predicted effect of loss aversion only for the WTP but not for the WTA. This can be viewed as evidence for loss aversion in money (Bateman et al., 1997; Bateman et al., 2005), as people are averse of a reduction in their retirement benefits. Participants may not see the retirement decision as a classic money-good exchange. Instead, the decision can be interpreted as an exchange of future consumption for future leisure. Future consumption may then resemble a good and is not intended-for-exchange. The low effect of loss aversion on leisure is in line with findings by Abdellaoui and Kemel (2014). Additionally, it is likely that our measure of loss aversion is associated with monetary losses and therefore correlates more strongly with giving up money.

## 5 The SAVE Household Survey

For additional robustness, we use a second dataset from a representative household survey for Germany. The German SAVE panel has been conducted since 2001 by the Munich Center for the Economics of Aging (MEA). The panel focuses on savings behavior, financial assets, and old-age provision. We use two waves of the SAVE panel: 1) the cross-section of the 2009 wave in which 2,222 households participated and 2) the cross-section of the 2011 wave with 1,660 participants. The two different waves are combined as the 2011 wave contains the main variables of interest, but misses some important control variables, which are included in the 2009 wave. Household identifiers allow to match participants from both waves.

Using the SAVE panel for robustness comes with the advantage of a representative sample of the German population (Boersch-Supan et al., 2009; Bucher-Koenen and Ziegelmeyer, 2014).

Representativeness is ensured by a careful sampling technique and extensive field work of conducting interviews. The response rate in the SAVE survey is close to 50% which is comparable to other household surveys. To improve representativeness weights are applied using data from the German census. The item non-response rate is very low for most survey items. Without reaching perfect representativeness, the SAVE data can be considered as representative according to conventional standards of household surveys (Groves, 2006).

The SAVE sample thus represents a useful addition to the self-selected sample analyzed before. It allows us to test whether the results obtained so far are driven by readers of the FAZ representing a population of high income and high education. The combination of the two datasets alleviates concerns one might have which each dataset in isolation. While the SAVE respondents might be less financially competent to answer a question for their willingness to pay, they resemble more closely the average future retiree in Germany. There are three main differences between the two datasets: 1) the WTA and WTP questions in the SAVE panel are not identical to our questions, but refer to a percentage change in retirement benefits for working one year longer or one year shorter compared to an expected retirement age; 2) the questions for WTA and WTP are asked within subjects; and 3) the survey does not include a measure for loss aversion. As a consequence of the last point, we are only able to test robustness of Hypotheses 1a and 1b. The SAVE data nevertheless provides a valuable test for the external validity of our survey experiment.

In the 2011 wave of the SAVE panel, the following question for participants who in the future expect to receive social security benefits was included: "In order to retire one year earlier than the expected retirement age, would you be willing to give up a part of your monthly benefits?" Participants could then state a percentage of their monthly benefits they would be willing to give up, or could respond with "No" or "I don't know." We treat this question as a WTP frame as participants offer a reservation price for early retirement from a reference point of retiring later. A second question (within subjects) is formulated in a WTA frame: "Would you be willing to retire one year later if your social security benefits would be increased?" Again participants could enter a percentage value or answer with "No" or "I don't know."

Of the participants in the SAVE 2011 wave, 775 were already retired and 60 indicated that they will not receive social security benefits in the future.[14] Of the remaining 825 participants,

[14] Although this is a substantial decrease in sample size, it does not affect representativeness, as the question is not relevant for survey participants, who are already retired or do not expect to receive social security benefits. The

152 provide a percentage value in the WTP frame, 345 indicate that they would not be willing to give up any monthly benefits, and 332 answer with "I don't know." In the WTA question, 87 participants provide a percentage value, 459 indicate that they would not be willing to work longer, and 279 respond they do not know. Only the observations indicating a percentage value enter the analysis.

The low fraction of numeric (percentage) responses clearly is a liability of the SAVE survey. About a third of respondents answer that they do not know, which might be either due to the difficulty of the question or to the fact that participants do not *yet* know, because retirement is still far away. We indeed find that those, who respond that they do not know, are significantly younger than the other non-retired participants. More problematic is the response "No" as it implies that even an increase of 100% in retirement benefits would be insufficient to compensate for another year of work, or even a decrease of merely 1% would deter from earlier retirement. Potentially, people responding "No" did not think about their personal reservation price, but instead had in mind the existing conversion rates at which they would be unwilling to change their retirement age.

Robustness is therefore tested using the relatively small sample of participants, who state a reservation price in terms of a percentage decrease or increase in social security benefits. Excluding participants who respond that they would not at all consider retiring earlier or later than planned leads to a fairly conservative estimate of the WTA/WTP ratio.[15] Similarly to our experiment, the SAVE survey includes a set of financial literacy questions (nine questions, see Online Appendix), and questions for subjective life expectancy, planned retirement age, and whether or not participants own private pension insurance.

### 5.1 Descriptive Statistics

Table 5 presents summary statistics for the SAVE and FAZ respondents. Column (1) shows means and standard deviations for the full sample of non-retired SAVE participants. In Column (2), the sample is restricted to participants who submit a percentage value either for WTA or WTP question.

resulting sub-sample is, within the mentioned bounds, representative for the non-retired population contributing to social security.

[15] Theoretically, in the WTA question, a participant not at all willing to retire later has an infinitely high reservation price for early retirement. In the WTP question, a participant, who would by no means retire earlier, has a reservation price of zero. We are aware that with more careful elicitation, also for this group a reservation price within these extremes might be found. However, the WTA-WTP gap would likely be large given their apparent focus on the reference age.

Since this is a self-selected sub-sample, we test whether these participants systematically differ from participants who answer "No" or "I don't know." A logistic regression shows that gender, subjective life expectancy, and financial literacy are significant predictors for submitting a percentage value (regression results can be found in the Online Appendix). A mean comparison test confirms these results. There are 55% males among the participants stating a percentage value, whereas only 40% in the other categories are male. The statistically significant differences in life expectancy and financial literacy are economically smaller. Participants who enter a percentage value report a life expectancy that is on average 8 months longer compared to the other groups. The number of correct responses in the financial literacy questionnaire is higher by 0.2. Overall, the sub-sample does not differ dramatically from the representative SAVE dataset.

[Table 5 about here.]

Column (3) of Table 5 for comparison repeats the summary statistics of the FAZ sample. It can be seen that the SAVE participants differ strongly from the FAZ sample with respect to demographic and control variables. In the SAVE panel more participants are female, average monthly income is lower, participants tend to be less educated and have lower financial literacy.[16] FAZ respondents also have a higher subjective live expectancy and are more likely to own private pension insurance. Therefore, the SAVE survey presents an opportunity to test the robustness of our results with a different and more representative sample.

### 5.2 Robustness Test of Hypothesis 1

Figure 5 presents the reservation price for early retirement in the SAVE panel under the WTA and WTP treatment, as well as the WTA/WTP ratio and the t-value of a test for differences in means. The average reservation price in the WTA treatment (23.3%) is about three times larger compared to the WTP treatment (7.1%). This difference is highly significant, with a t-value of -7.2.

[Figure 5 about here.]

[16] Although the financial literacy questionnaires are not identical, the FAZ participants do better on a harder set of questions.

Table 6 presents the results of an OLS regression with the logarithmized reservation price as the dependent variable.[17] The regression specification mirrors the approach used before including a treatment dummy as well as demographic variables and controls.

[Table 6 about here.]

As in the prior analysis, the effect of the WTA dummy is negative and highly significant. The reservation price increases on average by 216% in the WTA treatment. The magnitude of the effect is in between the percentage effects found for Level 1 and Level 2 in the experiment (see Section 4.2). The main result can therefore be confirmed using the SAVE panel. In addition, gender is now significant; women seem to have a stronger preference for early retirement and therefore state a higher reservation price. This result is in line with Munnell, Triest, and Jivan (2004) and Moen and Flood (2013), who report that women are more likely to retire early. In the male dominated experiment this effect could not be found, either due to the low variation in the gender dummy or to female FAZ readers more resembling more their male counterparts.

The actual increase of social security benefits for an additional year of employment depends on two factors: 1) the age of the employee relative to the FRA determines whether the benefits are increased by 3.6% (for every year before FRA) or 6.0% (for every year after the FRA), 2) the income in the additional year of employment. The question in the SAVE survey refers to working one year longer or shorter than planned. Therefore, to determine whether or not a participant is likely to retire late given the observed market prices, the planned retirement age and the FRA of each participant is taken into account. We assume that all participants are employed since the age of 25 and that the income in an additional year of work would equal their average income. Therefore, the percentage change in earning points is calculated as $\frac{1}{PRA-25}$, with PRA being the planned retirement age. The indicator variable *late retirement* equals one if a participant's reservation price is smaller than the individually determined market price and zero otherwise. The indicator is positive for 121 of the 239 observations (50.6%).

Table 7 presents the result of a logistic regression with *late retirement* as dependent variable. Asking participants for a WTA significantly decreases the likelihood of a late retirement. The coefficient of -2.69 is significant on the 1%-level. With an average marginal effect of -47.4%, the

[17] Similarly to the Euro values in the experiment, the percentage values are not normally distributed but skewed to the right.

effect is also economically strong. It means that in the WTA frame participants are only about half as likely to retire late. In summary, both Hypotheses, 1a and 1b, can be confirmed using the SAVE dataset. Therefore, the results seem not to be specific to a relatively affluent and highly educated sample in the FAZ survey.

[Table 7 about here.]

# 6 Further Robustness Tests

## 6.1 Choice of Retirement Timing

One might argue that retirees usually do not face a situation in which they have to state a reservation price. Instead, they have to choose a retirement age based on the prices provided by the social security system. For robustness, we test whether there also exists a disparity between WTA and WTP in such a choice task.[18] Participants either get a quote of their expected retirement benefits at age 63 (WTA) or at age 67 (WTP). They are then asked whether they would prefer to work four years longer for given additional benefits (WTA) or whether they would prefer to retire four years earlier with reduced benefits (WTP). While this is not a WTA/WTP treatment in a literal sense, respondents still need to think about which addition or reduction in benefits seems acceptable. We aim to explore whether the shift in reference age is sufficient to produce a similar effect as observed for the elicitation of WTA and WTP.

To avoid income effects, we set the benefit level at age 67 for both groups to the 65% of stated net income used before. We vary the reduction participants face when retiring earlier. It is either set at 14.4%, which corresponds to the benefit loss in German social security solely due to the earlier retirement entry (the entry coefficient EC). In a second scenario, we set the difference to 28.5%, which also accounts for the loss in additional contributions (additional earnings points EP). We use the small and large difference in random order to test for participants' reaction to a variation in the size of the monetary consequences of early retirement.[19] Besides, the questionnaire includes

[18] We thank an anonymous referee for this suggestion.

[19] The German social security information only includes the reduction due to the entry coefficient (see Appendix B), because it does not depend on projected individual income. Therefore, it remains unclear whether retirees consider this value or the full costs of early retirement. In the US, entering retirement four years earlier leads to a direct benefit reduction of 25%. However, the loss in contributions tends to be smaller as only the 35 years of highest

the control variables used before, with the exception of planned retirement age as it might interfere with the treatment variation of reference ages.

For this robustness test, we contact again the participants of our main experiment. We obtained e-Mail addresses from those participants, who entered the draw of prizes offered as an incentive. 1,117 of these addresses appear valid at the point in time of the robustness test. Of those, 404 respond to the new questionnaire, which corresponds to a response rate of 36%. 20 questionnaires are incomplete, 73 respondents are already retired, and finally two participants provide income values in a format that did not allow to calculate benefits. The final sample thus consists of 309 observations, which are allocated about equally to the two treatments.

Our main variable of interest is the proportion of participants who decide to retire early. Table 8 reports this proportion separately for the different frames and scenarios. Unsurprisingly, a higher fraction of participants opt for early retirement, when the difference in benefits is relatively small. However, while 55% do so in the WTA frame, only 39% choose early retirement in the WTP frame. When differences in benefits become larger, the attractiveness of early retirement goes down, but the framing affect persists. A probit regression with a WTA dummy variable confirms this result (unreported), it remains unchanged by the inclusion of control variables. We conclude that the WTA-WTP gap is also present when retirement timing is presented as a choice task with different reference ages.

[Table 8 about here.]

### 6.2 Income effects

It is possible that income effects drive our results. In the original experiment, we keep the monthly benefits constant at 65% (or 110%) of net income irrespective of the decision frame. We intend to make sure that participants in both treatments, WTA and WTP, have about the same monetary amount at their disposal. This implies that participants in the WTA group, who are offered these benefits at age 63, are richer, as the present value of their payment stream is higher. We adjust for this by using the official conversion rate of the German social security system including projected

earnings are considered. This means rather than accumulating additional earnings points, there will typically be at most a replacement of years with lower relative earnings by years with higher earnings. As a result, a total reduction of about 30% seems reasonable also in the case of the US.

contributions as a benchmark (1.285), instead of a benchmark of one used in most other WTA-WTP contexts. However, this adjustment might not be correct, if peoples' preferences differed widely from this rate.

The choice experiment on retirement timing described before already takes this into account and confronts participants with an income-neutral variation of decision frames. It confirms that the strong framing effect persists. In an additional experiment, we extend this idea to the original experimental design of directly eliciting WTA and WTP. We now change the monthly benefits offered in the WTA and WTP frame to reflect the lower benefits when retiring earlier. Besides the original 65%, we reduce these benefits by 10% and 20% in the WTA frame, and increase the benefits by 10% and 20% in the WTP frame. As before, participants are randomly assigned to either the WTA or the WTP treatment. Each participant responds to two of the three benefit levels. We thus generate ratios between the benefit levels ranging from 1 to 1.5. Additionally, we include a comparison of the original experimental data *across* benefit levels, i.e., comparing the 65% WTA result to the 110% WTP result, which corresponds to a benefit ratio of 1.69.

The design thus covers possible income effects far beyond the official conversion rate of 1.285. It also covers the preferred benefit ratios the participants in the main experiment reveal through their reservation prices.[20] If in the additional comparisons the WTA/WTP ratio was greater than one, this would be a strong indication for a framing effect. However, we go one step further and include a within subjects comparison of WTA and WTP. After we elicit the reservation prices as either WTA or WTP, we ask for several control variables to distract participants from their previous responses, and then follow-up with a question using the respective other decision frame. We hereby use the reservation price provided by participants to calculate the offered benefit level. E.g., the benefit level at age 67 in the WTP question is the benefit level at age 63 plus the stated WTA. The only rational response is then to state a WTP that equals the WTA.

With this modified experimental design we cannot contact the original participants, as it is very similar to the main experiment. We thus access a pool of participants first used in (Heuer, Merkle, and Weber, 2016). They took part in an unrelated experiment on fund managers, and we restrict ourselves to participants invited via a different newspaper than in the current study. We send out e-Mails to 374 valid addresses and received 92 responses (response rate 25%). Among these 15 are

[20] In the WTA treatment, participants demanded on average 1.54-times (level 1) and 1.32-times (level 2) the amount they were offered to retire later. Due to the lower WTP, ratios in the WTP treatment were smaller.

incomplete and 24 already retired, which leaves us with a final sample of 53 participants. We thus obtain much fewer observations than in the main experiment, but as it is used for a robustness test only, we still rely on this smaller sample.

First, we test whether our main result replicates by comparing the responses in the baseline scenarios with identical benefit levels (65% of net income). The WTA/WTP ratio of 2.54 is well in line with the original result of 2.33. Table 9 shows the ratios for all possible comparisons. While the WTA-WTP ratio becomes smaller with increasing differences between the benefit levels, it remains well above one even for the largest difference in benefit levels. Even for the extreme benefit levels of 110% vs. 65% in the main experiment, we find a WTA/WTP ratio of 1.14, which is significantly larger than one.[21] We conclude that an income effect is present, but it is not strong enough to overturn the framing effect.

[Table 9 about here.]

We finally examine, whether the disparity between WTA and WTP is also present *within* subjects. Participants find themselves in a situation, where they are offered the exact amount of benefits they demanded to change their retirement timing decision. However, to switch back they are not satisfied with the same amount. Instead their average WTA/WTP ratio is 2.57, which is almost the same as in the between subjects design. Figure 6 shows the distribution of results for the 26 participants, who submit a monetary response to both questions (the other possibility was to refuse a change in retirement age for any amount). About 7 participants are reasonably close to one allowing for a margin of error of 30%, as one might not remember the exact sum entered before. But the majority is subject to a framing effect in this income-neutral reversal of frames. This lends further support to the generality of the effect.

[Figure 6 about here.]

[21] Obviously, it should be possible to drive the WTA/WTP ratio below one by increasing the difference between benefit levels even further. However, we question the realism of such an exercise as it is far away from prices attainable on a market. Likewise, in trading coffee mugs an additional $1,000 paid out to the WTP group might change results as well.

# 7 Policy Implications

The individual decision on when to retire is complex, but at the same time one of the most important decisions in later life. It demands a careful evaluation of benefit levels, the subjective value of additional years of leisure, and consumption preferences in retirement. However, many people lack understanding and information on how social security benefits are calculated (Gustman and Steinmeier, 1999). And at the same time they are influenced by a multitude of behavioral factors (Knoll, 2011). It is thus not surprising that a seemingly innocuous change in the framing of the decision can have large effects.

From our results, we can infer who is susceptible to different framing of the decision when to retire. If a person's WTA is smaller than the market price of early retirement, the option to retire early is not attractive. A shift to WTP will not change this decision as it in general further reduces the reservation price. On the other extreme, a person with a WTP that is already higher than the market price would retire early independent of presentation. Consequently, a survey participant can be classified as *possibly affected* by the framing of the retirement decision if the market price is in between their WTA and WTP. According to this classification, in the Level 1 scenario of the main experiment 1,538 (65%) and in the Level 2 scenario 1,469 (59%) participants are possibly affected. This is a substantial fraction and demonstrates the power of a variation in decision frames.

An obvious policy response is to make retirement information as neutral as possible with regard to these frames and to educate people on the trade-off between retirement benefits and retirement age. This could even include raising the awareness for framing effects and to dissuade people from clinging to certain reference ages. The aim would be to minimize the mistakes people make in their retirement decision. Policy makers would abstain from any normative conclusions on when people should retire. Whether this is effective, however, depends on the individual ability to reach an optimal decision in this neutral environment. This is an interesting question for future research.

An alternative view is that our results open up potential for political intervention by framing the individual retirement decision. Using the terminology of libertarian paternalism, politicians might want to "nudge" people in a particular direction. We will entertain the notion of a benevolent government acting in the best interest of its citizens, being fully aware that behavioral interventions can also be used to the detriment of people. Given that in most countries people retire on average significantly earlier than the FRA (Behaghel and Blau, 2012; Boersch-Supan, 2000), there

is especially room to induce a delay in retirement. A benevolent government might use framing to nudge people into claiming retirement benefits late, as the implicit rates of return in social security are much higher than alternative low risk investments. For the U.S., depending on age and gender, inflation-adjusted implicit annual returns are as high as 8% (Scott, 2012; Shoven and Slavov, 2014).

Additionally, retiring from work and claiming retirement benefits can be decoupled. It is often profitable to live the first years after retirement from private savings before claiming retirement benefits. But as only very few people view retirement claiming as an investment decision, these benefits might be overlooked. Framing can then be used as an effective alternative to induce later retirement. It may also help to reduce individual poverty risk, as early retirement and lower benefits increase the risk of not being able to afford, e.g., care in a retirement home or increasing health costs. However, more research is needed to examine whether people have a tendency to underestimate these costs and policy intervention is necessary.

More controversial than supporting people to reach a personally optimal retirement decision is to expand the idea of benevolence to a societal level. In this case framing would be used by policy makers to reach goals identified as beneficial to society, but not necessarily for each individual (violating Pareto-efficiency). Among such objectives would be to ease the burden on social security systems. Pay-as-you-go pension systems in many developed countries are put under pressure by increasing life expectancy, decreasing birthrates, and the baby boomer generation entering retirement. As a result, the ratio of active workforce to retirees is constantly decreasing. The governments of the U.S., Germany, the U.K., France, and many other countries have reacted to this development by increasing the FRA. But such changes are typically met with high resistance in the population.

It could be tempting for politicians to use choice architecture in combination with adjusting the relative price of early retirement to reduce the direct costs for the social security system. It is possible to exploit the WTA/WTP-frame to steer people into a superior (or inferior) option from the perspective of social security spending. Social security systems differ in whether they provide conversion rates that are actuarially fair.[22] Systems that deviate from actuarially fair conversion generate obvious fiscal incentives to propel people into earlier or later retirement.

[22] As reported, the reduction in Germany is 3.6% for every year of early retirement. In the U.S. it is much higher with 6.7%. Gruber and Wise (2007) argue that the U.S. conversion rate is close to actuarially fair, while the German reduction is too low.

We will now abstract from these direct costs to social security and concentrate on additional economic and political motives to influence retirement timing. Even if an actuarially fair conversion rate makes retirement timing more or less cost-neutral for social security systems, it is certainly not from a tax perspective. Later retirement results in additional years of income tax revenues, in particular as older employees typically are on salary levels close to their career maximum. Moreover, tax revenues after retirement will be higher as well, as in progressive tax systems the higher monthly pension will be taxed more heavily than the longer but lower pension stream after early retirement.

With lower monthly retirement payments it is also more likely that early retirees will need additional government aid (closely related to the poverty risk argument made above). For example in Germany, retirees with retirement benefits below a certain level can apply for "Grundsicherung", which is a social benefit financed by taxes. This especially applies to people with a discontinuous employment history or low income. If their already low claims to social security are further reduced by deductions due to early retirement, they might fall below subsistence levels.

Taking in a broader perspective, the retirement decision impacts the overall workforce of an economy. This is particularly important for countries with low birth rates, which present a demographic challenge in most of Europe and elsewhere. An early retirement of the baby-boomer generation will lead to a loss of qualified workers that is not easily replaced externally (i.e., by immigration). This might have negative consequences for economic output and growth. An increase in FRA will counteract this to a certain extent, but is unpopular as it effectively represents a cut in social security benefits. Furthermore, it succeeds only partially if the sensitivity of the actual retirement age to an increase in FRA is less than one. To push the actual retirement age closer to the FRA, decision framing might be a used.

While the so far presented arguments point into the direction of delayed retirement (or at least delayed claiming of retirement benefits), there is also the opposite reasoning given high youth unemployment in some countries (e.g., Spain, Italy). It is argued that early retirement of older, higher paid employees could help the young to enter the workforce. It thus depends on the individual demographic and labor market situation of a country, whether early or late retirement is desired by policy makers. But the WTA-WTP framework provides a tool to influence the decision either way. The European Commission (2012) in a White Paper states its goal to "review good practice with regard to individual pension statements with the aim of encouraging Member States to provide better information to individuals for their retirement planning and decisions on how much to save

through supplementary pension schemes." The quote reveals an interest of governments in how to disseminate retirement information.

We will now point out in what way the framing of the retirement decision could be modified in practice using the examples of the U.S. and German social security statements (see Appendix A and B). In the U.S., the social security statement provides monthly benefits under the assumption of continued contribution until claiming. It lists the $-amounts for retiring at the FRA, at the latest, and at the earliest possible retirement age. Except for the choice and order of reference ages, the presentation is neutral and does not indicate a deliberate framing.[23] In the German example, only the monthly benefits at FRA are explicitly stated. Not until several pages later, the deductions for earlier retirement are given in percentage terms and the possibility of later retirement is not mentioned at all. Stating deductions resembles a willingness-to-pay framing, although the way the information is buried in legal text suggests that it is not intended choice architecture.

A clearer WTP frame is offered by the US Consumer Financial Protection Bureau (CFPB). In their planning for retirement tool people find information about the estimated benefits for different claiming ages.[24] The tool aims at helping people with their retirement decision and points out more strongly the reductions associated with early claiming than official documents by U.S. social security. For ages earlier than the FRA it states that claiming "reduces your monthly benefit by x%". It induces people to think about what they have to give up (WTP) when retiring early. In light of our results, this design makes retiring early less attractive. As the CFPB calculation is always relative to the FRA, for late retirement the framing turns from WTP to WTA. It might thus be less effective than possible in promoting retirement after the FRA.[25]

The European Commission (2013) has initiated a review on the form and content of retirement information provided by its member states. One result is that many countries either do not state or only on request state benefits for ages other than the FRA. This leaves room for including

[23]Until 2008, the approach used by the U.S. social security administration (SSA) was the so-called "break-even analysis". It stated the amount of monthly benefits one would receive when claiming benefits at the earliest age possible. This was then compared to later claiming ages with higher monthly benefits, and the analysis provided information how long one would have to live to break even. The approach puts individuals in a WTA frame, as the reference point of the analysis is the earliest possible claiming age. In 2009, the SSA adopted the more neutral way of presenting benefit information. However, according to Brown et al. (2016), the break-even analysis is still widely used (not only by SSA offices but also by private financial advisers). They find a tendency for earlier retirement among people presented with this frame, consistent with our results.

[24]The tool can be found online under www.consumerfinance.gov/retirement/before-you-claim/ (retrieved 11/24/2015).

[25]The alternative would be to express everything relative to the latest possible claiming age (70). However, we realize that this design would feel somewhat artificial, as the FRA is the natural reference point for many people.

this information in a deliberately chosen design, in particular, as many countries have developed or are currently developing online tools, which enable contributers to review their accumulated or projected benefits. These tools in some cases allow adjusting parameters for the calculation, including the individually planned retirement age. Online communication further extends the possibilities for decision framing, as graphical displays or comparisons between different scenarios can be implemented. It also makes the information more relevant as it is flexible to consider personal circumstances and preferences.

# 8 Conclusion

In this paper, we relate the retirement decision to the disparity between willingness-to-accept and willingness-to-pay. In an online survey, participants reveal their reservation price for early retirement either in a WTA frame or in a WTP frame. In line with the literature on the WTA-WTP gap, we find that the WTA is about twice as large as the WTP. When comparing participants' reservation prices to the market price for early retirement, measured as reduction of monthly social security benefits according to the German pension system, we find that early retirement seems much more attractive for participants in the WTA frame. The average probability of early retirement is about one third higher when the reservation price is elicited as a WTA compared to a WTP. Additionally, we analyze the drivers of the high WTA/WTP-ratio and find that loss aversion significantly increases this ratio. However, it does so not through the often assumed channel of an increase in WTA but by a strong decrease in the WTP. This contradicts an endowment effect caused by loss aversion—at least if early retirement (or leisure) is regarded as the good in a standard money-good exchange. In the retirement context, participants rather seem to perceive the reduction of monthly benefits in exchange for early retirement as a loss. The more loss averse they are, the less willing they are to give up part of their benefits.

# References


Abdellaoui, M., and E. Kemel, 2014, "Eliciting Prospect Theory When Consequences Are Measured in Time Units: "Time Is Not Money," *Management Science*, 60(7), 1844–1859.

Bateman, I., D. Kahneman, A. Munro, C. Starmer, and R. Sugden, 2005, "Testing competing models of loss aversion: an adversarial collaboration," *Journal of Public Economics*, 89(8), 1561–1580.

Bateman, I., A. Munro, B. Rhodes, C. Starmer, and R. Sugden, 1997, "A Test of the Theory of Reference-Dependent Preferences," *The Quarterly Journal of Economics*, 112(2), 479–505.

Behaghel, L., and D. M. Blau, 2012, "Framing Social Security Reform: Behavioral Responses to Changes in the Full Retirement Age," *American Economic Journal: Economic Policy*, 4(4), 41–67.

Beshears, J., J. J. Choi, D. Laibson, B. C. Madrian, and S. P. Zeldes, 2014, "What Makes Annuitization More Appealing?," *Journal of Public Economics*, 116, 2–16.

Boersch-Supan, A., 2000, "Incentive effects of social security on labor force participation: evidence in Germany and across Europe," *Journal of Public Economics*, 78(1-2), 25–49.

Boersch-Supan, A., M. Coppola, L. Essig, A. Eymann, and D. Schunk, 2009, "The German SAVE study Design and Results," *Munich Research Institute for the Economics of Aging*.

Borges, B. F., and J. L. Knetsch, 1998, "Tests of market outcomes with asymmetric valuations of gains and losses: Smaller gains, fewer trades, and less value," *Journal of Economic Behavior & Organization*, 33(2), 185–193.

Brown, J. R., A. Kapteyn, E. F. Luttmer, and O. S. Mitchel, 2015, "Cognitive Constraints on Valuing Annuities," *NBER working paper*, 19168.

Brown, J. R., A. Kapteyn, and O. S. Mitchell, 2016, "Framing and Claiming: How Information-Framing Affects Expected Social Security Claiming Behavior," *Journal Risk and Insurance*, 83(1), 139–162.

Brown, J. R., J. R. Kling, S. Mullainathan, and M. V. Wrobel, 2013, "Framing Lifetime Income," *NBER working paper*, 19063.

Brown, T. C., 2005, "Loss aversion without the endowment effect, and other explanations for the WTA-WTP disparity," *Journal of Economic Behavior & Organization*, 57(3), 367–379.

Bucher-Koenen, T., and M. Ziegelmeyer, 2014, "Once Burned, Twice Shy? Financial Literacy and Wealth Losses during the Financial Crisis," *Review of Finance*, 18(6), 2215–2246.

Camerer, C. F., and R. M. Hogarth, 1999, "The Effects of Financial Incentives in Experiments: A Review and Capital-Labor-Production Framework," *Journal of Risk and Uncertainty*, 19, 7–42.

Coursey, D. L., J. L. Hovis, and W. D. Schulze, 1987, "The Disparity Between Willingness to Accept and Willingness to Pay Measures of Value," *The Quarterly Journal of Economics*, 102(3), 679–690.

Deutsche Rentenversicherung, 2015, "Rentenversicherung in Zeitreihen," Statistical report 2015.

Erner, C., A. Klos, and T. Langer, 2013, "Can prospect theory be used to predict an investors willingness to pay?," *Journal of Banking and Finance*, 37(6), 1960–1973.

European Commission, 2012, "An Agenda for Adequate, Safe and Sustainable Pensions," White Paper 02/16/2012.

——— , 2013, "The right to retirement pension information," Synthesis Report 05/2013.

Falk, A., A. Becker, T. Dohmen, D. Huffman, and U. Sunde, 2016, "The Preference Survey Module: A Validated Instrument for Measuring Risk, Time, and Social Preferences," Netspar discussion paper.

Fetherstonhaugh, D., and L. Ross, 1999, *Framing Effects and Income Flow Preferences in Decisions about Social Security. In: Behavioral Dimensions of Retirement Economics*. Brookings Institution Press and Russell Sage Foundation, Washington, DC.

Gächter, S., E. J. Johnson, and A. Herrmann, 2007, "Individual-Level Loss Aversion in Riskless and Risky Choices," IZA discussion paper.

Gneezy, U., and A. Rustichini, 2000, "Pay Enough or Don't Pay at All," *The Quarterly Journal of Economics*, 115(3), 791–810.

Groves, R. M., 2006, "Nonresponse Rates and Nonresponse Bias in Household Surveys," *Public Opinion Quarterly*, 70(5), 646–675.

Gruber, J., and D. A. Wise, 2004, *Social Security Programs and Retirement around the World: Micro-Estimation*. University of Chicago Press, Chicago, 1 edn.

——— , 2007, *Social Security Programs and Retirement around the World: Fiscal Implications of Reform*. University of Chicago Press, Chicago, 1 edn.

Gustman, A. L., and T. L. Steinmeier, 1999, "What People Don't Know About Their Pensions and Social Security: An Analysis Using Linked Data from the Health and Retirement Study," NBER working paper.

Halvorsen, R., and R. Palmquist, 1980, "The Interpretation of Dummy Variables in Semilogarithmic Equations," *The American Economic Review*, 70(3), 474–475.

Hanemann, W. M., 1991, "Willingness to Pay and Willingness to Accept: How Much Can They Differ?," *The American Economic Review*, 81(3), 635–647.

Hardisty, D. J., K. F. Thompson, D. H. Krantz, and E. U. Weber, 2013, "How to measure time preferences: An experimental comparison of three methods," *Judgment and Decision Making*, 8(3), 236–249.

Heuer, J., C. Merkle, and M. Weber, 2016, "Fooled by Randomness: Investor Perception of Fund Manager Skill," *Review of Finance*, forthcoming.

Holt, C. A., and S. K. Laury, 2002, "Risk Aversion and Incentive Effects," *American Economic Review*, 92(5), 1644–1655.

Horowitz, J. K., and K. E. McConnell, 2002, "A Review of WTA / WTP Studies," *Journal of Environmental Economics and Management*, 44(3), 426–447.

Kahneman, D., J. L. Knetsch, and R. H. Thaler, 1990, "Experimental Tests of the Endowment Effect and the Coase Theorem," *Journal of Political Economy*, 98(6), 1325–1348.

Kennedy, P. E., 1981, "Estimation with Correctly Interpreted Dummy Variables in Semilogarithmic Equations," *The American Economic Review*, 71(4), 801.

Kim, S., and D. C. Feldman, 1998, "Healthy, Wealthy, or Wise: Predicting Actual Acceptances of Early Retirement Incentives at Three Points in Time," *Personnel Psychology*, 51(3), 623–642.

Knetsch, J. L., and J. A. Sinden, 1984, "Willingness to Pay and Compensation Demanded: Experimental Evidence of an Unexpected Disparity in Measures of Value," *The Quarterly Journal of Economics*, 99(3), 507–521.

Knetsch, J. L., F.-F. Tang, and R. Thaler, 2001, "The endowment effect and repeated market trials: Is the Vickrey auction demand revealing?," *Experimental Economics*, 4(3), 257–269.

Knoll, M. A., 2011, "Behavioral and Psychological Aspects of the Retirement Decision," *Social Security Bulletin*, 71(4), 15–32.

Kuehberger, A., M. Schulte-Mecklenbeck, and J. Perner, 2002, "Framing decisions: Hypothetical and real," *Organizational Behavior and Human Decision Processes*, 89(2), 1162–1175.

Lönnqvist, J.-E., M. Verkasalo, G. Walkowitz, and P. C. Wichardt, 2015, "Measuring individual risk attitudes in the lab: Task or ask? An empirical comparison," *Journal of Economic Behavior and Organization*, 119, 254–266.

Loomes, G., and R. Sugden, 1982, "Regret Theory: An Alternative Theory of Rational Choice Under Uncertainty," *The Economic Journal*, 92(368), 805–824.

Lund, T., L. Iversen, and K. B. Poulsen, 2001, "Work environment factors, health, lifestyle and marital status as predictors of job change and early retirement in physically heavy occupations," *Am. J. Ind. Med.*, 40(2), 161–169.

Lusardi, A., and O. S. Mitchell, 2007, "Baby Boomer retirement security: The roles of planning, financial literacy, and housing wealth," *Journal of Monetary Economics*, 54(1), 205–224.

Moen, P., and S. Flood, 2013, "Limited Engagements? Womens and Mens Work/Volunteer Time in the Encore Life Course Stage," *Social Problems*, 60(2), 206–233.

Müller, S., and M. Weber, 2014, "Evaluating the Rating of Stiftung Warentest: How good are mutual fund ratings and can they be improved?," *European Financial Management*, 20(2), 207–235.

Munnell, A. H., R. K. Triest, and N. A. Jivan, 2004, "How Do Pensions Affect Expected and Actual Retirement Ages?," *CRR Working Paper*, 27.

Nosic, A., and M. Weber, 2010, "How Risky Do I Invest: The Role of Risk Attitudes, Risk Perceptions, and Overconfidence," *Decision Analysis*, 7(3), 282–301.

Novemsky, N., and D. Kahneman, 2005, "The Boundaries of Loss Aversion," *Journal of Marketing Research*, 42(2), 119–128.

Plott, C. R., and K. Zeiler, 2005, "The Willingness to Pay-Willingness to Accept Gap, the "Endowment Effect," SubjectMisconceptions, and Experimental Procedures for Eliciting Valuations," *The American Economic Review*, 95(3), 530–545.

Randall, A., and J. R. Stoll, 1980, "Consumer's Surplus in Commodity Space," *The American Economic Review*, 70(3), 449–455.

Rubin, D., 1987, *Multiple Imputation for Nonresponse in Surveys*. J. Wiley & Sons, New York.

Rubinstein, A., 2001, "A theorist's view of experiments," *European Economic Review*, 45(4-6), 615–628.

Ruhm, C. J., 1989, "Why Older Americans Stop Working," *The Gerontologist*, 29(3), 294–299.

Schreiber, P., and M. Weber, 2016, "The Influence of Time Preferences on Retirement Timing," Working paper.

Scott, J. S., 2012, "Household Alpha and Social Security," *Financial Analysts Journal*, 68(5), 6–10.

Shoven, J. B., and S. N. Slavov, 2014, "Does it pay to delay social security?," *Journal of Pension Economics and Finance*, 13(2), 121–144.

Thaler, R. H., 1980, "Toward a Positive Theory of Consumer Choice," *Journal of Economic Behavior and Organization*, 1(1), 39–60.

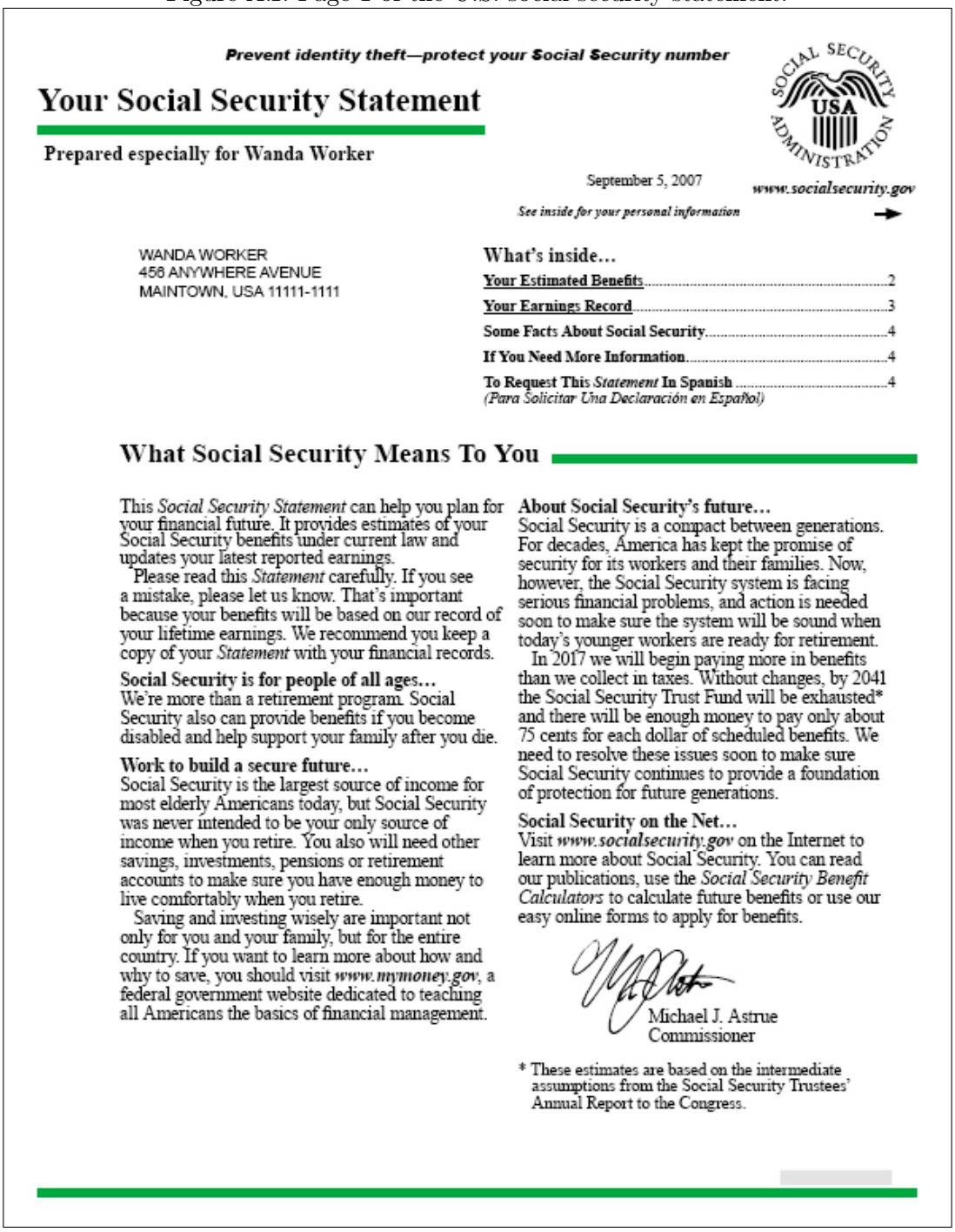
Tuncela, T., and J. K. Hammitt, 2014, "A new meta-analysis on the WTP/WTA disparity," *Journal of Environmental Economics and Management*, 68(1), 175–187.

van Rooij, M., A. Lusardi, and R. Alessie, 2011, "Financial literacy and stock market participation," *Journal of Financial Economics*, 101(2), 449–472.

Willig, R. D., 1976, "Consumer's Surplus Without Apology," *The American Economic Review*, 66(4), 589–597.

# A U.S. Social Security Information

Figure A.1: Page 1 of the U.S. social security statement.



*Prevent identity theft—protect your Social Security number*

## Your Social Security Statement

**Prepared especially for Wanda Worker**

September 5, 2007

www.socialsecurity.gov

*See inside for your personal information* →

WANDA WORKER
456 ANYWHERE AVENUE
MAINTOWN, USA 11111-1111

**What's inside…**



### What Social Security Means To You

This *Social Security Statement* can help you plan for your financial future. It provides estimates of your Social Security benefits under current law and updates your latest reported earnings.

Please read this *Statement* carefully. If you see a mistake, please let us know. That's important because your benefits will be based on our record of your lifetime earnings. We recommend you keep a copy of your *Statement* with your financial records.

**Social Security is for people of all ages…**
We're more than a retirement program. Social Security also can provide benefits if you become disabled and help support your family after you die.

**Work to build a secure future…**
Social Security is the largest source of income for most elderly Americans today, but Social Security was never intended to be your only source of income when you retire. You also will need other savings, investments, pensions or retirement accounts to make sure you have enough money to live comfortably when you retire.

Saving and investing wisely are important not only for you and your family, but for the entire country. If you want to learn more about how and why to save, you should visit ***www.mymoney.gov***, a federal government website dedicated to teaching all Americans the basics of financial management.

**About Social Security's future…**
Social Security is a compact between generations. For decades, America has kept the promise of security for its workers and their families. Now, however, the Social Security system is facing serious financial problems, and action is needed soon to make sure the system will be sound when today's younger workers are ready for retirement.

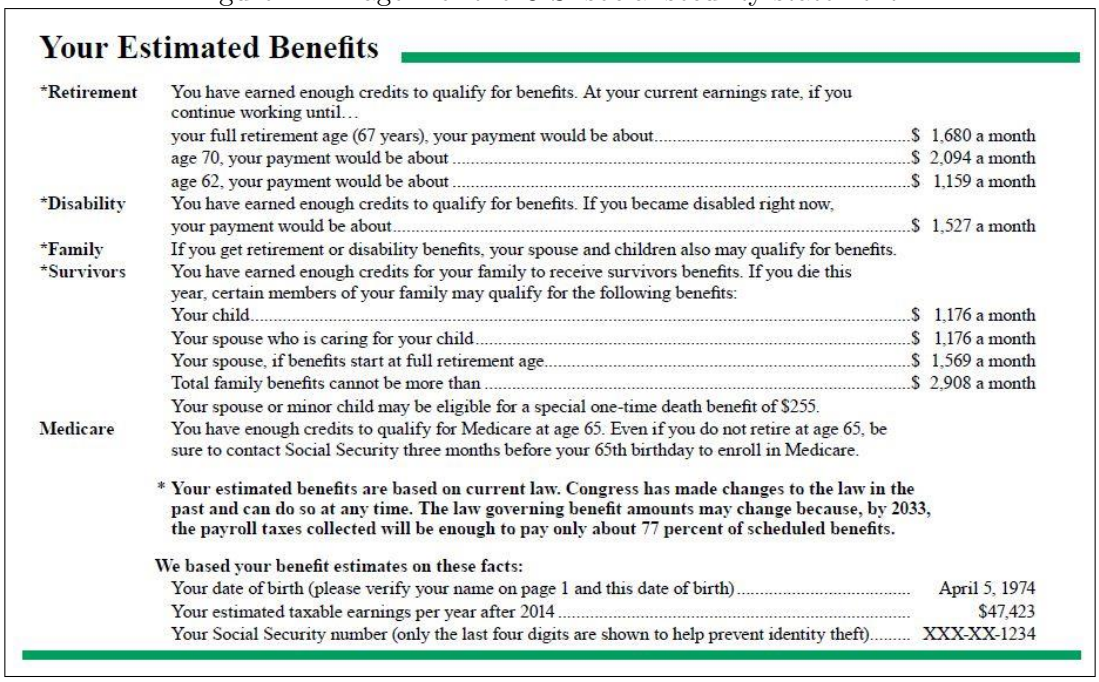
In 2017 we will begin paying more in benefits than we collect in taxes. Without changes, by 2041 the Social Security Trust Fund will be exhausted* and there will be enough money to pay only about 75 cents for each dollar of scheduled benefits. We need to resolve these issues soon to make sure Social Security continues to provide a foundation of protection for future generations.

**Social Security on the Net…**
Visit ***www.socialsecurity.gov*** on the Internet to learn more about Social Security. You can read our publications, use the *Social Security Benefit Calculators* to calculate future benefits or use our easy online forms to apply for benefits.

Michael J. Astrue
Commissioner

* These estimates are based on the intermediate assumptions from the Social Security Trustees' Annual Report to the Congress.

Figure A.2: Page 2 of the U.S. social security statement.



## Your Estimated Benefits

| | | |
|---|---|---|
| ***Retirement** | You have earned enough credits to qualify for benefits. At your current earnings rate, if you continue working until… | |
| | your full retirement age (67 years), your payment would be about | $ 1,680 a month |
| | age 70, your payment would be about | $ 2,094 a month |
| | age 62, your payment would be about | $ 1,159 a month |
| ***Disability** | You have earned enough credits to qualify for benefits. If you became disabled right now, your payment would be about | $ 1,527 a month |
| ***Family** | If you get retirement or disability benefits, your spouse and children also may qualify for benefits. | |
| ***Survivors** | You have earned enough credits for your family to receive survivors benefits. If you die this year, certain members of your family may qualify for the following benefits: | |
| | Your child | $ 1,176 a month |
| | Your spouse who is caring for your child | $ 1,176 a month |
| | Your spouse, if benefits start at full retirement age | $ 1,569 a month |
| | Total family benefits cannot be more than | $ 2,908 a month |
| | Your spouse or minor child may be eligible for a special one-time death benefit of $255. | |
| **Medicare** | You have enough credits to qualify for Medicare at age 65. Even if you do not retire at age 65, be sure to contact Social Security three months before your 65th birthday to enroll in Medicare. | |

*** Your estimated benefits are based on current law. Congress has made changes to the law in the past and can do so at any time. The law governing benefit amounts may change because, by 2033, the payroll taxes collected will be enough to pay only about 77 percent of scheduled benefits.**

**We based your benefit estimates on these facts:**

| | |
|---|---|
| Your date of birth (please verify your name on page 1 and this date of birth) | April 5, 1974 |
| Your estimated taxable earnings per year after 2014 | $47,423 |
| Your Social Security number (only the last four digits are shown to help prevent identity theft) | XXX-XX-1234 |

# B German Social Security Information

Figure B.1: Page 1 of the German social security information letter with short translation.

Deutsche Rentenversicherung
Bund

Deutsche Rentenversicherung Bund · 10704 Berlin

[redacted]

Ruhrstraße 2, 10709 Berlin
Postanschrift: 10704 Berlin
Telefon 030 865-0
Telefax 030 865-27240
Servicetelefon 0800 100048070
www.deutsche-rentenversicherung-bund.de
drv@drv-bund.de

Datum 16.09.2013

[redacted]

**Rentenauskunft - kein Rentenbescheid**

[redacted]

[redacted]

mit dieser Auskunft unterrichten wir Sie
- über die Höhe einer Rente wegen voller Erwerbsminderung
- über die Höhe der Altersrente nach Erreichen der Regelaltersgrenze (Regelaltersrente)
- über die gespeicherten rentenrechtlichen Zeiten (s. Anlage 2)
- inwieweit die Voraussetzungen für verschiedene Rentenleistungen erfüllt sind
- über die persönlichen Entgeltpunkte (s. Anlage 6)

nach jetzigem Stand.

Die **Rente wegen voller Erwerbsminderung** würde **715,86 EUR** monatlich betragen, wenn von einem am **16.09.2013** eingetretenen Leistungsfall ausgegangen würde.

Die Rente wegen teilweiser Erwerbsminderung würde die Hälfte des errechneten Betrages ergeben.
Wir haben nicht geprüft, ob eine Erwerbsminderung vorliegt.

Die **Regelaltersrente**, die nach Erreichen der Regelaltersgrenze gezahlt werden kann, würde **736,79 EUR** monatlich betragen, wenn der Berechnung ausschließlich die bisher gespeicherten rentenrechtlichen Zeiten sowie der bis zum 30.06.2014 maßgebende aktuelle Rentenwert zugrunde gelegt werden. Sie erreichen die **Regelaltersgrenze am 03.08.2017.** a

Die Berechnung der Monatsrente ergibt sich aus der Anlage 1.

Sollten für Sie bis zum Erreichen der Regelaltersgrenze Beiträge wie im Durchschnitt der letzten fünf Kalenderjahre gezahlt werden, bekämen Sie ohne Berücksichtigung von Rentenanpassungen von uns eine monatliche Regelaltersrente von **882,40 EUR.** b

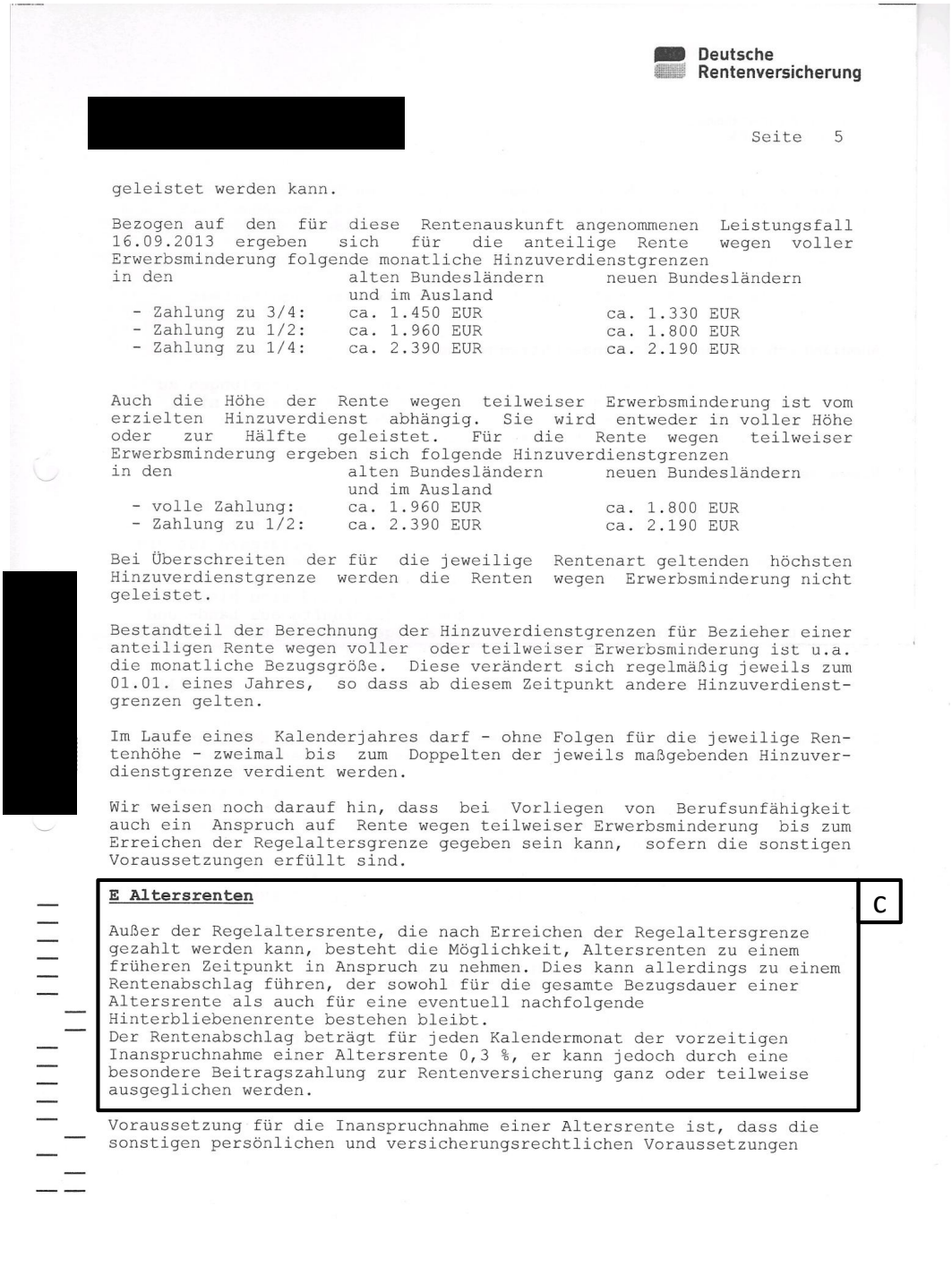
Zukünftige Anpassungen

Aufgrund zukünftiger Rentenanpassungen kann die errechnete

a **Pension benefits** („Regelaltersrente“) that can be paid if the full retirement age is reached amounts to **736,79 EUR** per month. For this calculation only the contributions until today are taken into account. You will **reach full retirement age on 03.08.2017**.

b If you contribution until you reach full retirement age would amount the average contribution of the last five years, pension benefits would amount to **882,40 EUR** per month at full retirement age.

Figure B.2: Page 5 of the German social security information letter with short translation.



Deutsche Rentenversicherung

[redacted]

Seite 5

geleistet werden kann.

Bezogen auf den für diese Rentenauskunft angenommenen Leistungsfall 16.09.2013 ergeben sich für die anteilige Rente wegen voller Erwerbsminderung folgende monatliche Hinzuverdienstgrenzen

| in den | alten Bundesländern und im Ausland | neuen Bundesländern |
|---|---|---|
| - Zahlung zu 3/4: | ca. 1.450 EUR | ca. 1.330 EUR |
| - Zahlung zu 1/2: | ca. 1.960 EUR | ca. 1.800 EUR |
| - Zahlung zu 1/4: | ca. 2.390 EUR | ca. 2.190 EUR |

Auch die Höhe der Rente wegen teilweiser Erwerbsminderung ist vom erzielten Hinzuverdienst abhängig. Sie wird entweder in voller Höhe oder zur Hälfte geleistet. Für die Rente wegen teilweiser Erwerbsminderung ergeben sich folgende Hinzuverdienstgrenzen

| in den | alten Bundesländern und im Ausland | neuen Bundesländern |
|---|---|---|
| - volle Zahlung: | ca. 1.960 EUR | ca. 1.800 EUR |
| - Zahlung zu 1/2: | ca. 2.390 EUR | ca. 2.190 EUR |

Bei Überschreiten der für die jeweilige Rentenart geltenden höchsten Hinzuverdienstgrenze werden die Renten wegen Erwerbsminderung nicht geleistet.

Bestandteil der Berechnung der Hinzuverdienstgrenzen für Bezieher einer anteiligen Rente wegen voller oder teilweiser Erwerbsminderung ist u.a. die monatliche Bezugsgröße. Diese verändert sich regelmäßig jeweils zum 01.01. eines Jahres, so dass ab diesem Zeitpunkt andere Hinzuverdienstgrenzen gelten.

Im Laufe eines Kalenderjahres darf - ohne Folgen für die jeweilige Rentenhöhe - zweimal bis zum Doppelten der jeweils maßgebenden Hinzuverdienstgrenze verdient werden.

Wir weisen noch darauf hin, dass bei Vorliegen von Berufsunfähigkeit auch ein Anspruch auf Rente wegen teilweiser Erwerbsminderung bis zum Erreichen der Regelaltersgrenze gegeben sein kann, sofern die sonstigen Voraussetzungen erfüllt sind.

**E Altersrenten** C

Außer der Regelaltersrente, die nach Erreichen der Regelaltersgrenze gezahlt werden kann, besteht die Möglichkeit, Altersrenten zu einem früheren Zeitpunkt in Anspruch zu nehmen. Dies kann allerdings zu einem Rentenabschlag führen, der sowohl für die gesamte Bezugsdauer einer Altersrente als auch für eine eventuell nachfolgende Hinterbliebenenrente bestehen bleibt.
Der Rentenabschlag beträgt für jeden Kalendermonat der vorzeitigen Inanspruchnahme einer Altersrente 0,3 %, er kann jedoch durch eine besondere Beitragszahlung zur Rentenversicherung ganz oder teilweise ausgeglichen werden.

Voraussetzung für die Inanspruchnahme einer Altersrente ist, dass die sonstigen persönlichen und versicherungsrechtlichen Voraussetzungen

C Besides pension benefits at full retirement age it is also possible to claim benefits earlier. This will permanently reduce pension benefits as well as a possible dependent's pension.

The reduction amounts to 0.3% per each month of early claiming.

# Tables

| | **Full Sample** | | **Sample Split by Treatment** | | |
|---|---|---|---|---|---|
| | | | *WTA* | *WTP* | |
| Variable | Mean | SD | Mean | Mean | Diff. |
| *Reservation Price* | | | | | |
| - Level 1 (65%) | 549.07 | 835.95 | 763.56 | 327.09 | 436.47*** |
| - Level 2 (110%) | 973.84 | 1,544.45 | 1,275.38 | 668.66 | 606.72*** |
| *Demographics* | | | | | |
| Age | 40.37 | 12.34 | 40.01 | 40.74 | -0.73 |
| Gender | 0.85 | 0.36 | 0.83 | 0.87 | -0.04** |
| Income (thousand) | 3.44 | 3.12 | 3.41 | 3.47 | -0.06 |
| Number of Children | 0.79 | 1.19 | 0.73 | 0.86 | -0.13*** |
| High School Degree | 0.92 | 0.27 | 0.92 | 0.92 | 0.00 |
| University Degree | 0.68 | 0.47 | 0.67 | 0.68 | -0.01 |
| Married | 0.47 | 0.50 | 0.46 | 0.49 | -0.03 |
| *Controls* | | | | | |
| Risk Aversion (1-7) | 3.87 | 1.47 | 3.93 | 3.80 | 0.13* |
| Loss Aversion (1-7) | 4.23 | 1.60 | 4.29 | 4.17 | 0.12* |
| Fin. Literacy Std. (0-4) | 3.51 | 0.71 | 3.49 | 3.55 | -0.06* |
| Fin. Literacy Extra (0-2) | 0.62 | 0.74 | 0.62 | 0.61 | 0.01 |
| Life Expectancy (Male) | 83.33 | 8.12 | 83.02 | 83.64 | -0.62 |
| Life Expectancy (Female) | 84.33 | 6.95 | 83.55 | 85.34 | -1.79** |
| Planed Ret. Age | 64.55 | 5.21 | 64.68 | 64.40 | 0.28 |
| Private Pension Insurance | 0.64 | 0.48 | 0.65 | 0.64 | 0.01 |

Table 1: **Online survey summary statistics.** Table 1 presents means and standard deviations (SD) for the full sample, as well as means for a sample split by the treatment dummy. In column "Diff." the difference between the means of the reservation price, demographic variables and control variables in the WTA and WTP treatment is presented. ***, **, and * indicate significance on the 1%, 5%, and 10% levels, respectively, for a two sided t-test.

| **Reservation Price (log)** | **Level 1** 65% | | **Level 2** 110% | |
|---|---|---|---|---|
| Variable | Coeff. | t-value | Coeff. | t-value |
| *Demographics* | | | | |
| Age | 0.004 | 0.86 | 0.005 | 1.05 |
| Gender | 0.131 | 1.15 | 0.196 | 1.61 |
| Market Price (log) | 0.512*** | 9.58 | 0.451*** | 7.87 |
| Number of Children | -0.077** | -2.02 | -0.032 | -0.80 |
| High School Degree | -0.054 | -0.33 | -0.151 | -0.87 |
| University Degree | 0.119** | 1.23 | 0.169* | 1.65 |
| Married | 0.274*** | 2.88 | 0.266*** | 2.63 |
| *Treatment* | | | | |
| WTA treatment | 1.423*** | 18.39 | 0.747*** | 9.11 |
| *Controls* | | | | |
| Risk Aversion | 0.044 | 1.29 | -0.011 | -0.32 |
| Loss Aversion | -0.038 | -1.21 | 0.013 | 0.41 |
| Financial Literacy Score | 0.033 | 0.92 | 0.029 | 0.75 |
| Life Expectancy | -0.006 | -1.15 | -0.008 | -1.62 |
| Planed Retirement Age | -0.064*** | -8.76 | -0.056*** | -7.16 |
| Owns Private Pension Insurance | 0.058 | 0.72 | 0.115 | 1.35 |
| Certainty of Social Security | 0.017 | 0.77 | 0.001 | 0.05 |
| Constant | 5.376*** | 7.19 | 5.957*** | 7.41 |
| Number of Obs. | 2123 | | 2093 | |
| Adj. $R^2$ | 0.2471 | | 0.1418 | |

Table 2: **Hypothesis 1a:** Results of OLS regressions with the logarithmized reservation price as the dependent variable. Level 1 and Level 2 columns present results for the treatment where the hypothetical pension value in the reservation price question amounts to 65% and 110% of participants' income, respectively. The WTA treatment dummy indicates whether participants where assigned to the WTA (=1) or WTP (=0) treatment. ***, **, and * indicate significance on the 1%, 5%, and 10% levels, respectively, for a two sided t-test.

| **Late Retirement** | **Level 1** 65% | | **Level 2** 110% | |
|---|---|---|---|---|
| Variable | Coeff. | z-value | Coeff. | z-value |
| *Demographics* | | | | |
| Age | 0.003 | 0.51 | -0.009* | -1.69 |
| Gender | 0.004 | 0.02 | -0.079 | -0.54 |
| Income (log) | 0.742*** | 8.94 | 0.597*** | 7.71 |
| Number of Children | -0.076 | -1.41 | -0.033 | -0.65 |
| High School Degree | -0.370 | -1.60 | -0.093 | -0.43 |
| University Degree | -0.242* | -1.80 | -0.325** | -2.53 |
| Married | 0.112 | 0.84 | -0.054 | -0.43 |
| *Treatment* | | | | |
| WTA treatment | -1.717*** | -15.08 | -0.908*** | -9.00 |
| *Controls* | | | | |
| Risk Aversion | -0.046 | -0.98 | -0.055 | -1.24 |
| Loss Aversion | 0.030 | 0.68 | 0.023 | 0.57 |
| Financial Literacy Score | 0.075 | 1.52 | 0.042 | 0.91 |
| Life Expectancy | 0.007 | 0.96 | 0.011* | 1.67 |
| Planed Retirement Age | 0.083*** | 7.08 | 0.070*** | 6.42 |
| Owns Private Pension Insurance | 0.249** | 2.25 | 0.134 | 1.28 |
| Certainty of Social Security | 0.030 | 0.98 | 0.023 | 0.80 |
| Constant | -9.867*** | -8.08 | -8.184*** | -7.19 |
| Number of Obs. | 2123 | | 2093 | |
| Correctly classified | 0.7373 | | 0.6946 | |
| Area under ROC Curve | 0.7698 | | 0.6865 | |

Table 3: **Hypothesis 1b:** Results of logistic regressions with an indicator variable for *late retirement* as the dependent variable. Level 1 and Level 2 columns present results for the treatment where the hypothetical pension value in the reservation price question amounts to 65% and 110% of participants' income, respectively. The WTA treatment dummy indicates whether participants where assigned to the WTA (=1) or WTP (=0) treatment group. ***, **, and * indicate significance on the 1%, 5%, and 10% levels, respectively, for a two sided t-test.

| | WTA (log) | | WTP (log) | |
|---|---|---|---|---|
| **Variable** | Coeff. | t-value | Coeff. | t-value |
| *Loss Aversion* | | | | |
| Loss Aversion (1-7) | 0.021 | 0.85 | -0.101*** | -3.44 |
| *Demographics* | | | | |
| Age | 0.001 | -0.31 | 0.011*** | 2.84 |
| Gender | 0.005 | 0.05 | 0.262** | 2.30 |
| Income (log) | 0.403*** | 9.45 | 0.603*** | 11.99 |
| Number of Children | -0.046 | -1.22 | -0.012 | -0.41 |
| High School Degree | 0.127 | 0.99 | -0.142 | -0.93 |
| University Degree | 0.102 | 1.36 | 0.396*** | 4.36 |
| Married | 0.159** | 2.01 | 0.286*** | 3.29 |
| *Controls* | | | | |
| Risk Aversion (1-7) | -0.010 | -0.34 | 0.073** | 2.28 |
| Financial Literacy Score (0-6) | 0.038 | 1.34 | -0.026 | -0.77 |
| Life Expectancy [years] | -0.001 | -0.22 | -0.010** | -2.54 |
| Planned Retirement Age [years] | -0.045*** | -7.52 | -0.013** | -1.97 |
| Owns Private Pension Insurance | 0.042 | 0.65 | 0.003 | 0.04 |
| Certainty of Social Security | 0.004 | 0.24 | -0.004 | -0.18 |
| Constant | 6.276*** | 9.90 | 3.007*** | 4.11 |
| Number of Obs. | 1046 | | 930 | |
| Adj. $R^2$ | 0.0834 | | 0.3153 | |

Table 4: **Hypothesis 2b:** Results of two OLS regressions with the logarithmized WTA and WTP as the dependent variables. ***, **, and * indicate significance on the 1%, 5%, and 10% levels, respectively, for a two sided t-test.

| **Summary Statistics** | **Full Sample** (1) | | **Used Sample** (2) | | **FAZ Sample** (3) | |
|---|---|---|---|---|---|---|
| **Variable** | Mean. | SD | Mean. | SD | Mean. | SD |
| *Demographics* | | | | | | |
| Age | 46.78 | 9.57 | 47.17 | 10.15 | 40.37 | 12.34 |
| Gender | 0.44 | 0.50 | 0.55 | 0.50 | 0.85 | 0.36 |
| Income (in thousand) | 2.44 | 1.64 | 2.82 | 1.54 | 3.44 | 3.12 |
| Number of Children | 0.71 | 0.96 | 0.65 | 0.92 | 0.79 | 1.19 |
| High School Degree | 0.22 | 0.42 | 0.31 | 0.47 | 0.92 | 0.27 |
| University Degree | 0.11 | 0.31 | 0.16 | 0.37 | 0.68 | 0.47 |
| Married | 0.58 | 0.49 | 0.67 | 0.47 | 0.47 | 0.50 |
| *Controls* | | | | | | |
| Financial Literacy (0-9) | 2.95 | 1.04 | 3.13 | 0.92 | - | - |
| Life Expectancy | 78.99 | 8.23 | 79.72 | 7.98 | 83.48 | 7.97 |
| Planned Ret. Age (years) | 65.26 | 3.11 | 64.97 | 3.56 | 64.54 | 5.21 |
| Private Pension Insurance | 0.40 | 0.49 | 0.48 | 0.50 | 0.64 | 0.48 |

Table 5: **Robustness - SAVE Summary Statistics**. This table presents summary statistics for the SAVE survey. Column (1) presents means and standard deviations (SD) for the full sample of participants in SAVE who are not retired. In column (2), the sample is restricted to participants who answered the WTA and/or WTP question. This sample is used in the analysis presented in Tables 6 and 7. To compare the characteristics of the SAVE sample with the FAZ sample, column (3) repeats the summary statistics of the FAZ sample.

**Reservation Price** [%]

| **Variable** | **Coeff.** | **t-value** |
|---|---|---|
| *Demographics* | | |
| Age | -0.004 | -0.60 |
| Gender | -0.271** | -2.19 |
| Income (log) | 0.008 | 0.06 |
| Number of Children | -0.031 | -0.45 |
| High School Degree | -0.185 | -1.18 |
| University Degree | -0.267 | -1.42 |
| Married | -0.130 | -0.86 |
| Treatment | | |
| WTA treatment | 1.160*** | 9.13 |
| Controls | | |
| Financial Literacy Score (0-9) | -0.042 | -0.66 |
| Life Expectancy | -0.013 | -1.63 |
| Planned Retirement Age (years) | -0.048*** | -2.67 |
| Owns Private Pension Insurance | -0.092 | -0.76 |
| Constant | 6.437*** | 4.29 |
| Avg. Number of Obs. | 240 | |
| Avg. Number of Clusters | 225 | |
| Avg. Adj. $R^2$ | 0.3489 | |

Table 6: **Robustness SAVE 2011: treatment effect on the logarithmized reservation price for early retirement.** This Table shows the results of OLS regressions with the logarithmized reservation price for early retirement as the dependent variable. The reservation price is measured in percentage of expected social security benefits per month. Data used for robustness are from the German SAVE panel, waves 2009 and 2011/2012. The WTA treatment dummy indicates whether participants answered a WTA (=1) or WTP (=0) question. ***, **, and * indicate significance on the 1%, 5%, and 10% levels, respectively, for a two sided t-test. The SAVE data are multiply imputed with five different implicates. All five implicates are used. Coefficients and standard errors are calculated according to Rubin (1987).

**Late Retirement**

| **Variable** | **Coeff.** | **z-value** |
|---|---|---|
| *Demographics* | | |
| Age | -0.019 | -1.02 |
| Gender | 0.646* | 1.82 |
| Income (log) | 0.385 | 0.81 |
| Number of Children | 0.037 | 0.20 |
| High School Degree | -0.170 | -0.37 |
| University Degree | 0.741 | 1.35 |
| Married | 0.128 | 0.30 |
| *Treatment* | | |
| WTA treatment | -2.300*** | -6.01 |
| *Controls* | | |
| Financial Literacy Score (0-9) | 0.030 | 0.17 |
| Life Expectancy | -0.001 | -0.03 |
| Planned Retirement Age (years) | 0.102* | 1.89 |
| Owns Private Pension Insurance | 0.574* | 1.73 |
| Constant | -9.141* | -1.81 |
| Avg. Number of Obs. | 240 | |
| Avg. Number of Clusters | 225 | |
| Avg. Correctly classified | 0.7114 | |
| Avg. Area under ROC Curve | 0.7905 | |

Table 7: **Robustness SAVE 2011: treatment effect on the probability for late retirement.** This Table shows results of logistic regressions with an indicator variable for late retirement as the dependent variable. Data used for robustness are from the German SAVE panel, waves 2009 and 2011/2012. The WTA treatment dummy indicates whether participants answered a WTA (=1) or WTP (=0) question. ***, **, and * indicate significance on the 1%, 5%, and 10% levels, respectively, for a two sided t-test. The SAVE data are multiply imputed with five different implicates. All five implicates are used. Coefficients and standard errors are calculated according to Rubin (1987).

| | **Proportion early retirement** | | **Difference** | |
|---|---|---|---|---|
| Scenario | WTA frame | WTP frame | WTA-WTP | z-value |
| Small difference | 55.5% | 39.0% | 16.5% | 2.91*** |
| Large difference | 29.7% | 19.5% | 10.2% | 2.05** |
| Average both decisions | 42.6% | 29.2% | 13.4% | 2.91*** |

Table 8: **Robustness Choice Task**: Proportions of people selecting early retirement in the WTA frame and WTP frame, respectively. Scenarios differ in terms of size of benefit reduction (small equals 14.4%, large 28.5%). Reported are z-values of a proportion test; ***, **, and * indicate significance on the 1%, 5%, and 10% levels, respectively.

| | | **Willingness to pay** | | |
|---|---|---|---|---|
| | | Baseline | +10% | +20% |
| | Average WTP | 234.00 | 217.50 | 326.00 |
| **Willingness to accept** | | | | |
| | Average WTA | | *WTA/WTP-ratios* | |
| Baseline | 593.64 | 2.54*** | 2.73*** | 1.82*** |
| −10% | 546.67 | 2.34*** | 2.51*** | 1.68*** |
| −20% | 553.00 | 2.36*** | 2.54*** | 1.70*** |

Table 9: **Robustness Income Effect**: This Table shows the average WTA and WTP for different levels of benefits. Baseline corresponds to 65% of net income, +10% and +20% are additions to this level, −10% and −20% are reductions. WTA/WTP-ratios are calculated for comparisons of different benefit levels (between subjects). ***, **, and * indicate significance on the 1%, 5%, and 10% levels, respectively, for a two sided t-test testing for $WTA/WTP = 1$.

# Figures

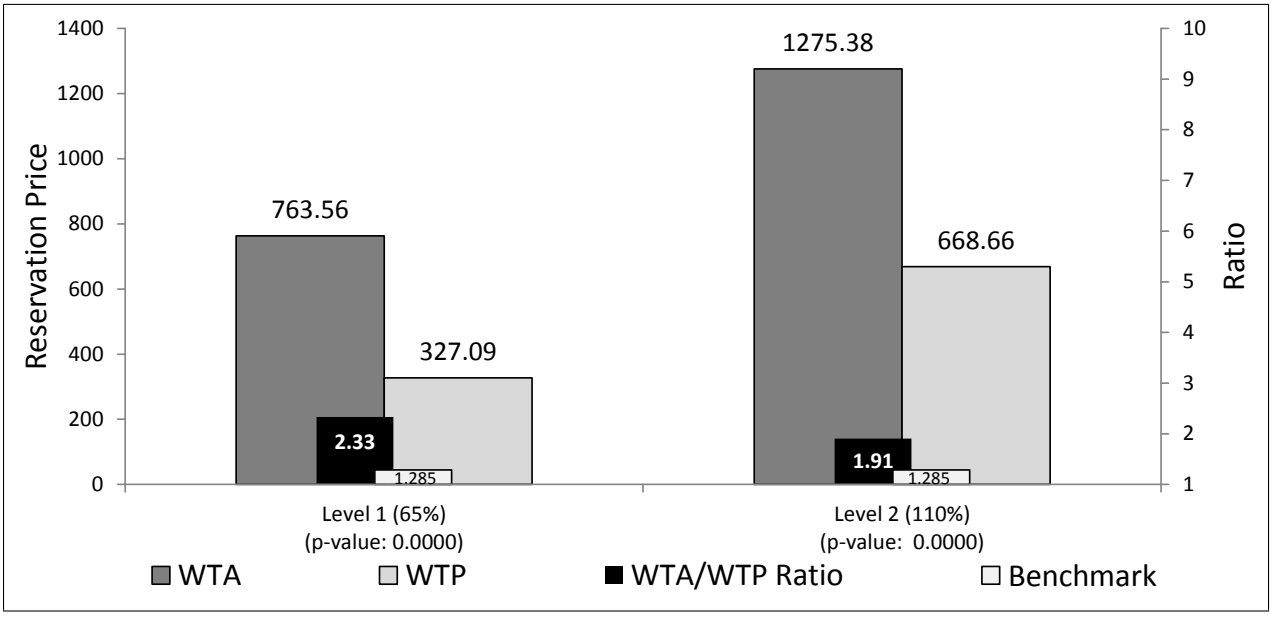



Figure 1: **WTA/WTP ratio and average reservation price for early retirement.** WTA/WTP ratio and average reservation price for early retirement depending on the treatment (WTA vs. WTP) and level (65% or 110%).

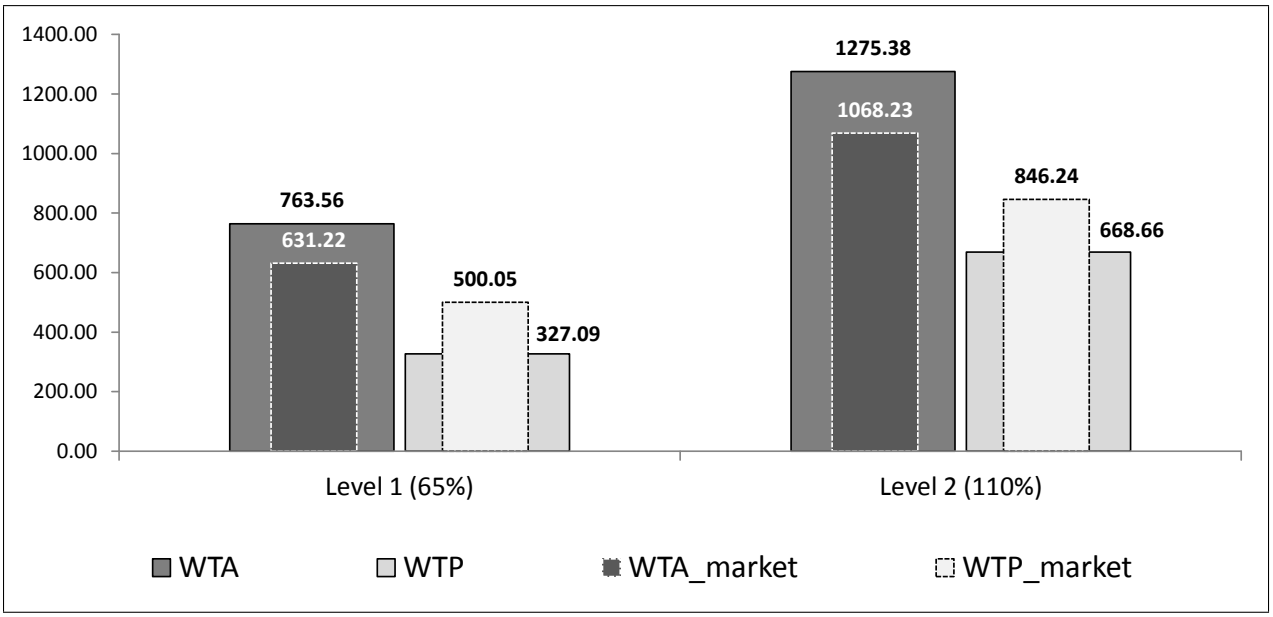



Figure 2: **Market price and average reservation price for early retirement.** Market price and average reservation price for early retirement depending on the treatment (WTA vs. WTP) and level (65% or 110%).

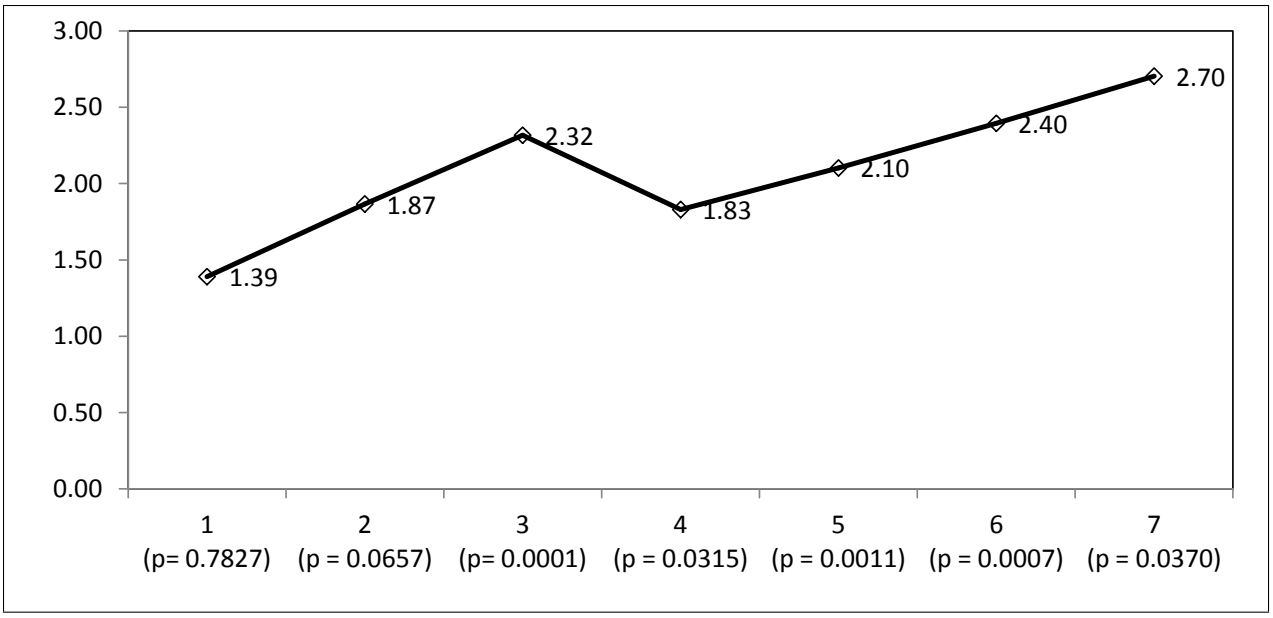



Figure 3: **Average WTA/WTP ratio by loss aversion.** This figure presents the average WTA/WTP ratio by loss aversion categories 1 - 7. In brackets, p-values of a Wald test with the null hypothesis of the WTA/WTP ratio being equal to 1.285 are presented.

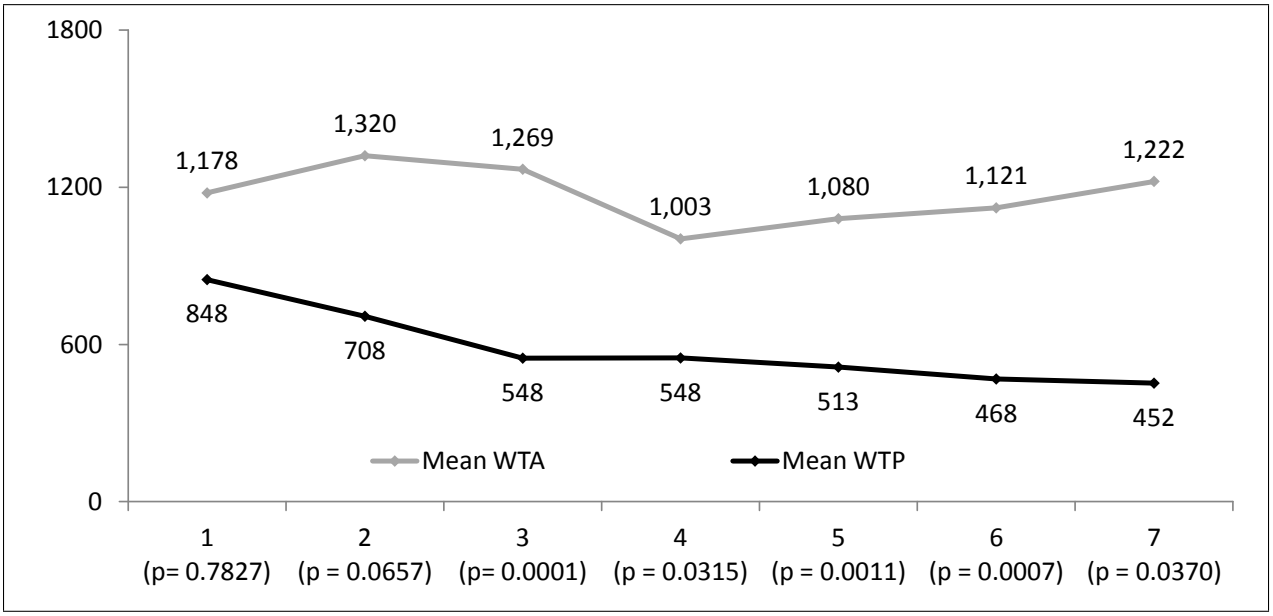



Figure 4: **Average WTA and WTP by loss aversion.** This figure presents the average WTA and average WTP by loss aversion categories 1 - 7. In brackets, p-values of a Wald test with the null hypothesis of the WTA/WTP ratio being equal to 1.285 are presented.

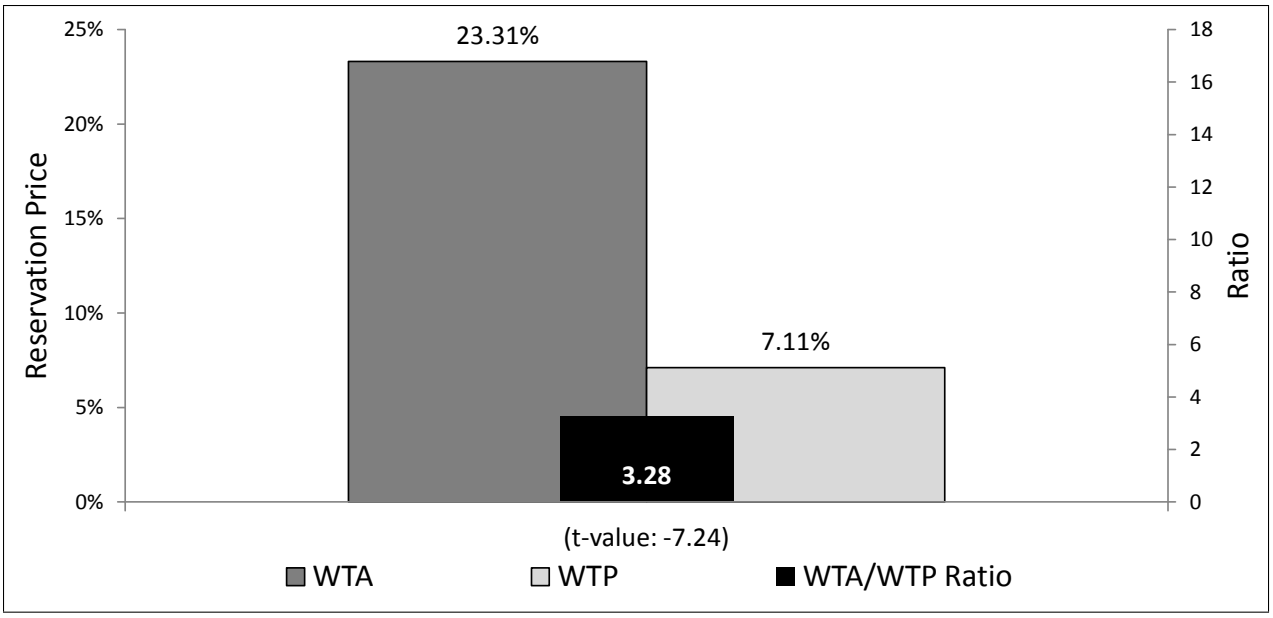



Figure 5: **Robustness SAVE: WTA/WTP ratio and average logarithmized reservation price for early retirement.** This figure presents the WTA/WTP ratio and average reservation price (in percentage of monthly social security benefits) for early retirement depending on the treatment (WTA vs. WTP). Data used for robustness are from the German SAVE panel, waves 2009 and 2011/2012.

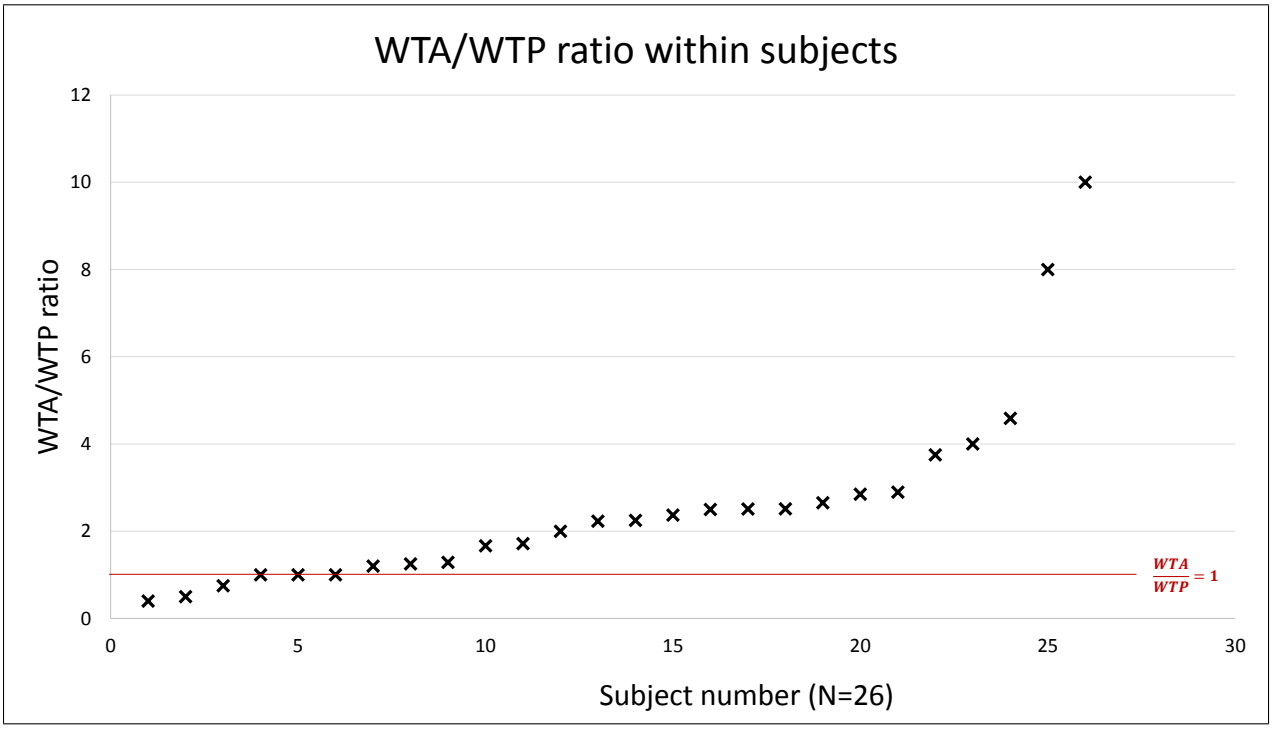



Figure 6: **Robustness income effect: WTA/WTP ratio of respondents in a within subjects design.** This figure presents the WTA/WTP ratio calculated from a within subject variation of decision frames. The second frame offers benefit levels calculated based on the individual response to the first frame. The horizontal line represents the rational benchmark at one.

# Online Appendix to

# "Framing and Retirement Age: The Gap between Willingness-to-Accept and Willingness-to-Pay"

**Abstract**

This Online Appendix contains materials to the experiments and an empirical appendix. Section A contains a translation of the main experiment. Section B shows the distribution of the main variables of interest. Section C reports additional empirical analyzes. Section D provides the financial literacy questions used in the SAVE survey. Finally, section E shows sample selection test for the SAVE survey.

# A Translation of the online experiment

## Dear participant,

On the following pages you will find a survey of [*University Name Removed for Double Blind Review Process*] in cooperation with FAZ.NET. We will ask you to answer a number of questions about retirement planing, financial literacy and personal preferences. All data is collected anonymously and will be treated confidentially. If you are interested, we will send you a detailed analysis of the results by email after the survey is completed.

**Thank you for your participantion!**

next

Page 1 of the online experiment.

We want to start our survey with a financial quiz. The following six questions are all related to the field of financial markets, good luck!

**1. Suppose you had EUR 100 in a savings account and the interest rate was 4% per year. After 10 years, how much do you think you would have in the account if you left the money to grow?**

- ■ More than EUR 140
- ☐ Exactly EUR 140
- ☐ Less than EUR 140
- ☐ Dont know/ dont want to answer

**2. Normally, which asset displays the highest fluctuations over time?**

- ☐ Savings accounts
- ☐ Bonds
- ■ Stocks
- ☐ Dont know/ dont want to answer

**3. Which of the following statements is correct?**

- ☐ Once one invests in a mutual fund, one cannot withdraw the money in the first year
- ■ Mutual funds can invest in several assets, for example invest in both stocks and bonds
- ☐ Mutual funds pay a guaranteed rate of return which depends on their past performance
- ☐ None of the above
- ☐ Dont know/ dont want to answer

**4. Consider a call-option with a stock as underlying. Please judge the following statement:** *"The price of the call-option should increase if the volatility of the underlying stock increase"*

- ■ The statement is true
- ☐ The statement is false
- ☐ The statement cant be judged with the information give
- ☐ Dont know/ dont want to answer

**5. If the interest rate falls, what should happen to bond prices?**

- ☐ Fall
- ■ Rise
- ☐ Stay the same
- ☐ Dont know/ dont want to answer

**6. What is measured by a stocks "beta"?**

- ☐ The stocks book to market value
- ☐ The stocks volatility
- ■ The sensitivity of the stock price to price changes of a benchmark index
- ☐ None of the above
- ☐ Dont know/ dont want to answer

next

Page 2 of the online experiment. The correct answers of the financial literacy questions are indicated by the filled black square.

**Thank you for answering the quiz.**

**Below we ask you to evaluate four statements. We are interested in your assessment, so this time there are no right or wrong answers:**

Please indicate on a scale of 1 - 7 how strongly you agree to each statement (1 = not at all, 7 = fully agree).

| | *not at all* | | | | | | *fully agree* |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| "I'm a risk averse Person" | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | *not at all* | | | | | | *fully agree* |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| "I'm afraid of losses" | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | *not at all* | | | | | | *fully agree* |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| "I'm an impatient person" | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | *not at all* | | | | | | *fully agree* |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| "I'm confident that the Government will fulfill its social security pension payment commitment" | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

next

Page 3 of the online experiment.

**For the second part of our survey, we need some personal information. Therefore, we ask you to answer the following questions:**

**1. Are you ···**
- ☐ Male
- ☐ Female
- ☐ I Dont want to answer

**2. What is your date of birth?**

Please Enter

**3. What is your highest level of education?**
- ☐ Unfinished high school
- ☐ High school
- ☐ Secondary School
- ☐ Bachelor's Degree
- ☐ Masters Degree
- ☐ PhD

**4. What is your marital status?**
- ☐ Married, live together
- ☐ Married, live seperate
- ☐ Unmarried, live together with partner
- ☐ Single
- ☐ Divorced
- ☐ Widowed

**5. Do you have children?**
- ☐ Yes, I have Please Enter children
- ☐ No

**6. Do you ave grandchildren?**
- ☐ Yes, I have Please Enter grandchildren
- ☐ No

**6. Are you retired?**
- ☐ Yes
- ☐ No

next

Page 4 of the online experiment.

**Below we ask you to answer some questions about your current job and your retirement plans**

For some questions in this questionnaire, we need information regarding your monthly net income (for example to calculate a corresponding pension).
Therefore, we ask you to make a statement about your net monthly income. If you prefer, you can also specify a range and later questions will refer to this range then.

**I want to give my net monthly income:**

After tax income: Please Enter (e.g. 1538)

**I want to specify a range for my monthly after tax income:**

- ☐ less than EUR 1,000.-
- ☐ EUR 1,000.- to EUR 2,000.-
- ☐ EUR 2,000.- to EUR 4,000.-
- ☐ EUR 4,000.- to EUR 6,000.-
- ☐ EUR 6,000.- to EUR 10,000.-
- ☐ more than EUR 10,000.-

**Will you receive a monthly pension from private pension insurance or do you receive this already.**

- ☐ Yes
- ☐ No

**At what age do you plan to retire?**

I plan to retire at age Please Enter

**If you think about it, how old are you expecting to get?**

Please Enter years

next

Page 5 of the online experiment. These questions were only asked if the participant indacted that he or she is nor retired yet (see Page 4).

**Please consider the following situation:**

Suppose you have the opportunity to retire at age 63. At this time you would receive a pension of EUR **y** *(e.g. EUR 1,000)* per month. Please imagine that you would be able to delay retirement by four years and retire at age 67. This would lead to an increase in monthly pension payments.

What would the minimum monthly increase have to be, so that you would be willing to delay retirement from age 63 to age 67?

The minimum monthly increase would have to be [Please Enter] EUR.

next

Page 6(a) of the online experiment. These questions were asked to participants assigned in the **WTA treatment**. The pension **y thereby amounts to 65% of participants income** indicated on page 5. If the participant indicated only a range, the midpoint of the range is used to calculate the hypothetical pension value **y**.

**Now please consider the following, slightly different situation:**

Suppose you have the opportunity to retire at age 63. At this time you would receive a pension of EUR **y** *(e.g. EUR 1,692)* per month. Please imagine that you would be able to delay retirement by four years and retire at age 67. This would lead to an increase in monthly pension payments.

What would the minimum monthly increase have to be, so that you would be willing to delay retirement from age 63 to age 67?

The minimum monthly increase would have to be [Please Enter] EUR.

next

Page 7(a) of the online experiment. These questions were asked to participants assigned in the **WTA treatment**. The pension **y now amounts to 110% of participants income** indicated on page 5. If the participant indicated only a range, the midpoint of the range is used to calculate the hypothetical pension value **y**.

**Please consider the following situation:**

Suppose you have the opportunity to retire at age 67. At this time you would receive a pension of EUR **y** *(e.g. EUR 1,000)* per month. Please imagine that you would be able to speed up retirement by four years and retire at age 63. This would lead to a decrease in monthly pension payments.

What maximum amount of monthly pension payments would you be willing to give up in order to be able to retire at age 63 instead of age 67?

I would be willing to give up an amount of EUR Please Enter per month.

next

Page 6(b) of the online experiment. These questions were asked to participants assigned in the **WTP treatment**. The pension **y thereby amounts to 65% of participants income** indicated on page 5. If the participant indicated only a range, the midpoint of the range is used to calculate the hypothetical pension value **y**.

**Now please consider the following, slightly different situation:**

Suppose you have the opportunity to retire at age 67. At this time you would receive a pension of EUR **y** *(e.g. EUR 1,692)* per month. Please imagine that you would be able to speed up retirement by four years and retire at age 63. This would lead to a decrease in monthly pension payments.

What maximum amount of monthly pension payments would you be willing to give up in order to be able to retire at age 63 instead of age 67?

I would be willing to give up an amount of EUR [Please Enter] per month.

next

Page 7(b) of the online experiment. These questions were asked to participants assigned in the **WTP treatment**. The pension **y now amounts to 110% of participants income** indicated on page 5. If the participant indicated only a range, the midpoint of the range is used to calculate the hypothetical pension value **y**.

# B Distributions of the WTA and WTP

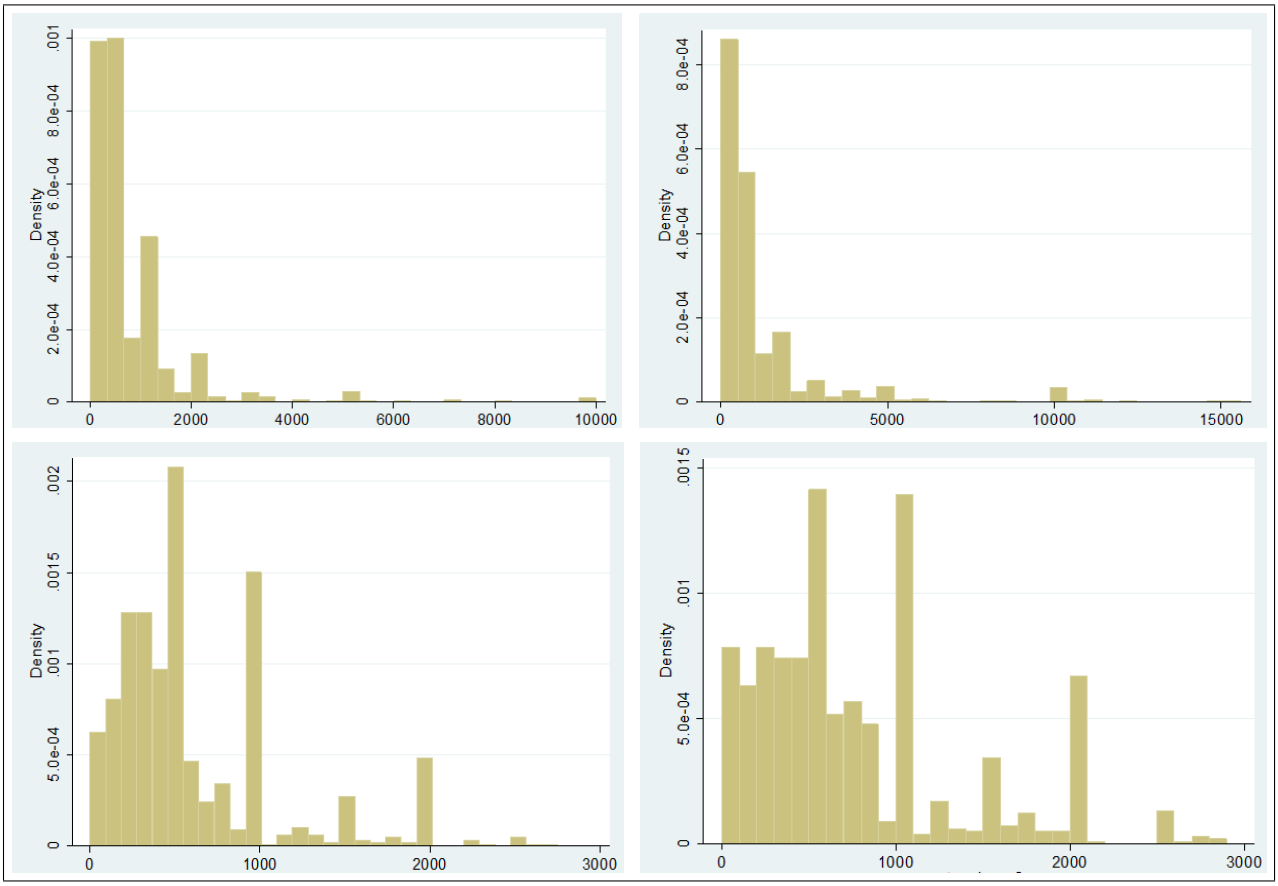



Figure 1: **Distribution of the WTA elicited in the main experiment.** On the upper left full results for level 1 and on the upper right full results for level 2. The panels below show WTA zoomed in for values $< 3000$ Euro, again separately for level 1 and level 2.

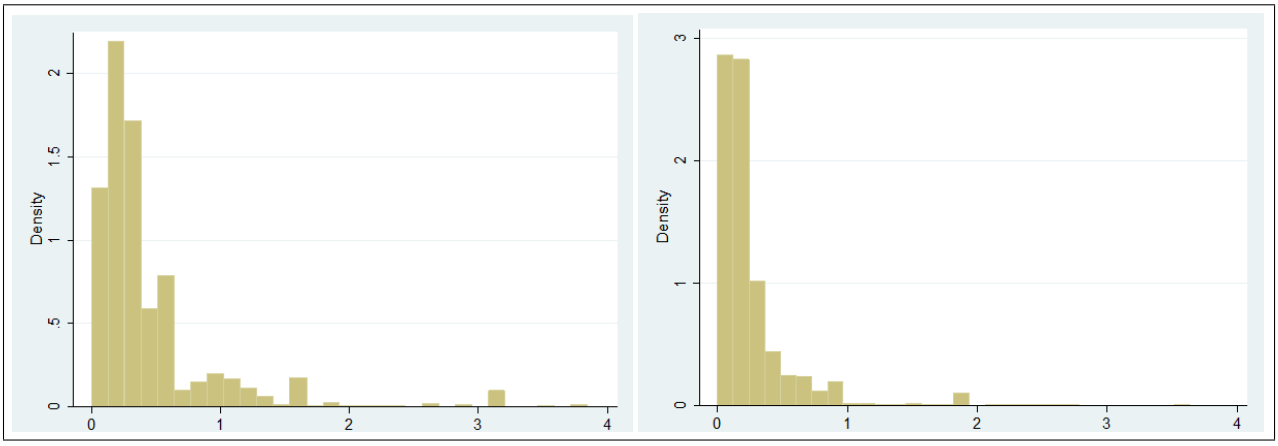



Figure 2: **Distribution of WTA divided by income.** On the left results for level 1 and on the right results for level 2 are shown.

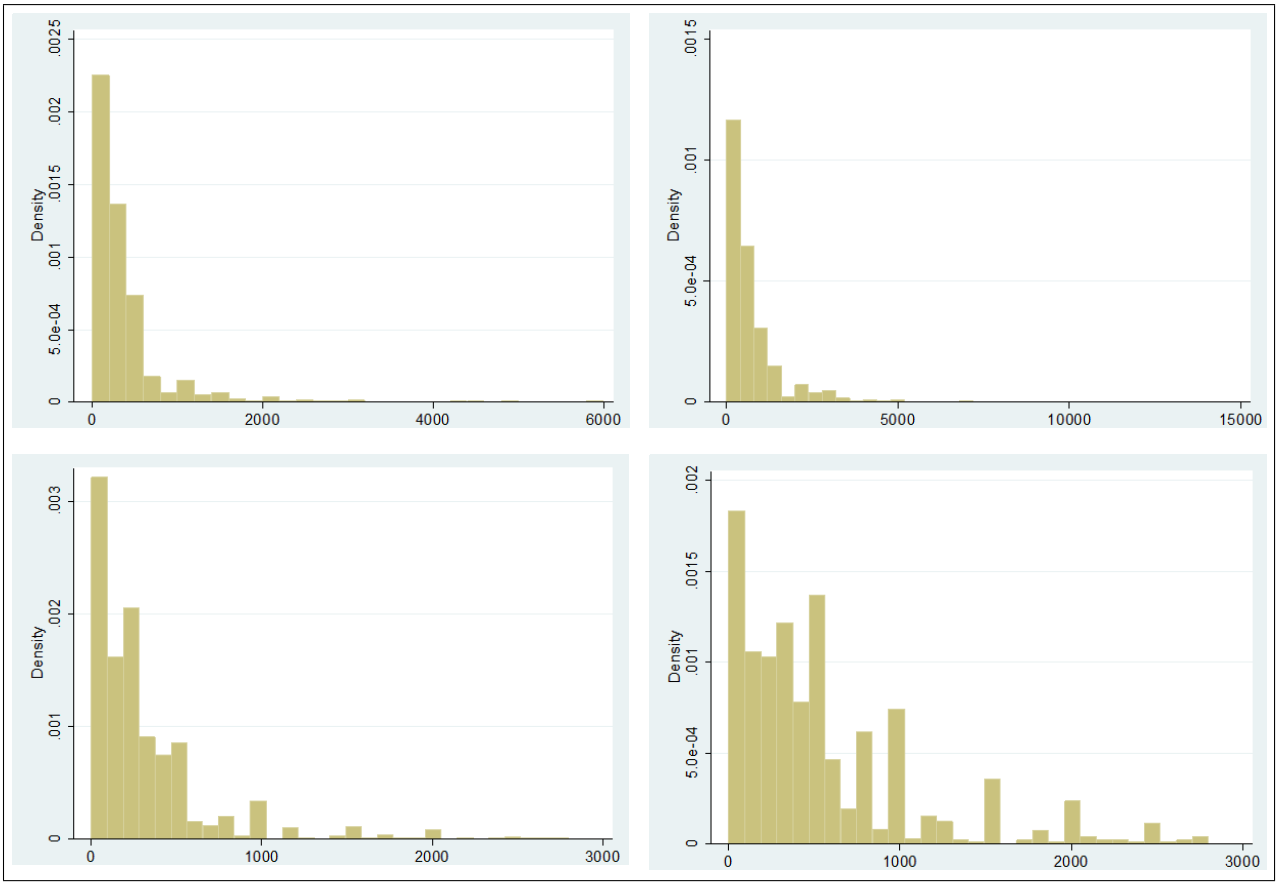



Figure 3: **Distribution of the WTP elicited in the main experiment.** On the upper left full results for level 1 and on the upper right full results for level 2. The panels below show WTP zoomed in for values $< 3000$ Euro, again separately for level 1 and level 2.

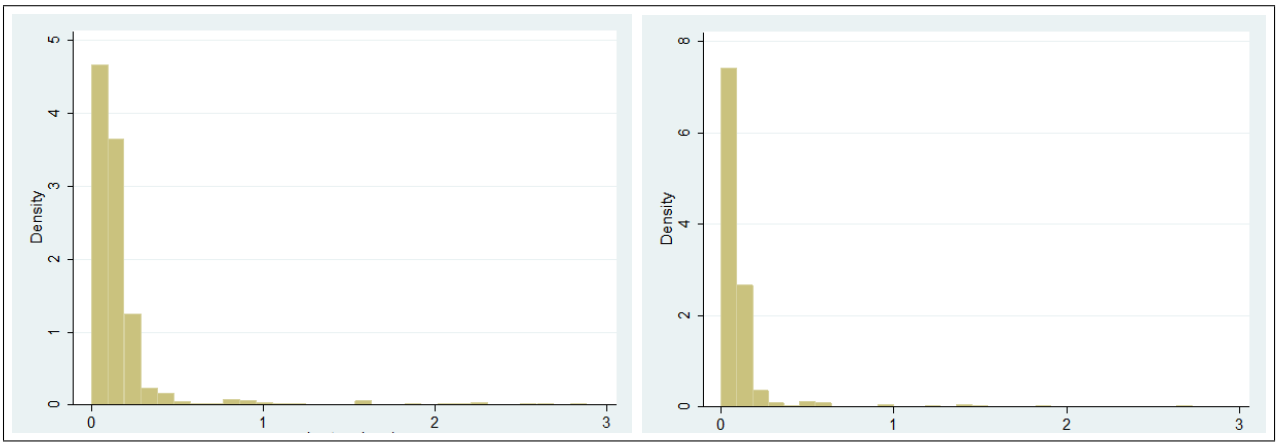



Figure 4: **Distribution of WTP divided by income.** On the left results for level 1 and on the right results for level 2 are shown.

# C Robustness: FAZ - Experiment

We conduct five tests, using the FAZ sample, to ensure the robustness of our results regarding Hypothesis 1a:

1. **Relative reservation price**. The relative reservation price is based on the social security benefits at age 63. To understand the relative measure, we go back to the example in section 4.1, where two participants with an income of EUR 1,000 are assigned to the two different treatments. Both participants are given a hypothetical pension value of EUR 650 per month (Level 1). Assume both participants have the same relative reservation price of +50% based on benefits at age 63. This would lead to a absolute reservation price of $650 \cdot 1.5 - 650 = 325$ in the WTA treatment and to $650 - 650 \cdot \frac{1}{1.5} = 217$ in the WTP treatment. A WTA/WTP ratio of $\frac{325}{217} = 1.5$ would be observed, even if relative reservation prices are equal. Therefore, the analysis is repeated with the relative price per participant as dependent variable.
2. **Inflated WTP**. We construct an inflated measure of the WTP for the second robustness test. In the previous analysis the fair WTA/WTP ratio in our experimental design is about 1.285. However, inflating the WTP by this factor is not sufficient. Figure 1 shows that the WTP increases more strongly than the hypothetical pension value. The WTP increases by +104.43%, whereas the hypothetical value only increases by $\frac{1.1}{0.65} - 1 = 69.23\%$. To account for this "overreaction," a inflated measure of the WTP is constructed as $WTP \cdot \frac{2.0443}{1.6923} \cdot 1.285 = WTP \cdot 1.552$.
3. **Reduced sample: WTP of zero**. Indicating a WTP of zero implies that someone would not even be willing to forgo one euro of monthly pension benefits to retire four years earlier. This could for example be due to a high job satisfaction or a really constrained budget. Another reason could be that participants did not want to answer the question and therefore, simply entered zero. However, since we did not force participants to indicate a reservation price (they could also leave the field blank), this explanation seems unlikely. In our sample, 175 (Level 1) and 92 (Level 2) participants indicated a WTP of zero. In contrast, only 27 (Level 1) and 47 (Level 2) participants indicated a WTA of zero. To analyze whether our results are driven by this difference, the analysis from section 5.2 is repeated without the participants that indicate a WTP of zero.
4. **Reduced sample: WTA > retirement income**. In an open-ended survey design, the WTA/WTP disparity could be driven by the fact that the WTA is not subject to a budget constraint. In our case, for example, the maximum amount of pension payments someone is willing to give up (WTP) can not exceed total the pension payments. That is, someone cannot give up more than he or she has. However, the WTA does not underlie that constraint as someone can easily demand an increase in pension payments that is higher than the total retirement income. To test whether the results are driven by participants who indicate a WTA greater than the hypothetical pension income, the analysis is repeated for a subsample that excludes these participants.
5. **Reduced sample: Participants close to retirement**. We also analyzed whether participants who are close to their planned retirement behave different from the rest of the sample. Possible reasons could be that this particular subsample is more informed about the social security system and the market price. They could also have already spent some time thinking about the retirement decision and therefore are less likely to be influenced by the treatment effect. Therefore the analysis is repeated with participants who have less than ten years to their planned retirement age.

Table 1 presents the results of all robustness tests regarding the FAZ sample. In the ten robustness regressions (5 tests x 2 levels), all demographic and control variables used in the main analysis (Table 2) are included. For a better overview, Table 1 presents only coefficients of the treatment dummy for the Level 1 and Level 2 questions, as well as the resulting WTA/WTP ratio. For comparison, the main result from Table 2 is also given in Table 1. In all regressions, the treatment dummy remains highly significant, but the magnitude of the treatment effect gets weaker. Thereby, especially the use of a relative reservation price (test #1) and the exclusion of participants who indicate a WTP of zero (test #3) weakens the results. The WTA/WTP ratio drops from 4.13 in the main analysis to 1.69 and 1.75 in the Level 1 regression, respectively. However, even if the effect gets weaker, the magnitude is still economically important, since the reservation price increases by more than 65% in all Level 1 robustness regressions. Therefore, we conclude that our results are neither driven by only a small fraction of participants nor by the way the reservation price is calculated.

| | Level 1 | | Level 2 | |
|---|---|---|---|---|
| | Coeff. | WTA/WTP | Coeff. | WTA/WTP |
| Main Result (Table 2) | 1.423*** | 4.13 | 0.747*** | 2.11 |
| *Robustness* | | | | |
| 1. Relative Reservation Price | 0.529*** | 1.69 | 0.492*** | 1.63 |
| 2. Infalted WTP | 1.055*** | 2.86 | 0.346*** | 1.40 |
| 3. Reduced Sample: WTP of Zero | 0.566*** | 1.75 | 0.225*** | 1.26 |
| 4 .Reduced Sample: WTA > Retirement Income | 1.178*** | 3.23 | 0.505*** | 1.65 |
| 5. Reduced Sample: Participants Close to Retirement | 1.046*** | 2.79 | 0.475** | 1.57 |

Table 1: **Robustness - FAZ sample**. This table presents results from five robustness tests and the main analysis. Coefficients of the treatment dummy and the corresponding WTA/WTP ratio are shown. The dependent variable in regressions 2 - 5. and the main analysis is the logarithm of participants' reservation price for early retirement. The effect of the treatment dummy and the resulting WTA/WTP ratio is calculated according to Halvorsen (1980) and Kennedy (1981). In regression 1, a relative reservation price is used as dependent variable. Level 1 and Level 2 columns refer to the Level 1 and Level 2 questions in the experiment, respectively. ***, **, and * indicate significance on the 1%, 5%, and 10%-level.

# D Financial literacy questions in the SAVE 2009 survey

1. Suppose you had EUR 100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?
   **(i) More than EUR 102**; (ii) Exactly EUR 102; (iii) Less than EUR 102; (iv) Do not know/Refusal.

2. Suppose you had EUR 100 in a savings account and the interest rate was 20% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?
   **(i) More than EUR 200**; (ii) Exactly EUR 200; (iii) Less than EUR 200; (iv) Do not know/Refusal.

3. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?
   (i) More than today; (ii) Exactly the same; **(iii) Less than today**; (iv) Do not know/Refusal.

4. Suppose that in the year 2012, your income has doubled and prices of all goods have doubled too. In 2012, how much will you be able to buy with your income?
   (i) More than today; **(ii) The same**; (iii) Less than today; (iv) Do not know/Refusal.

5. Normally, which asset described below displays the highest fluctuation over time?
   (i) Savings accounts; (ii) Bonds; **(iii) Stocks**; (iv) Do not know/Refusal.

6. Which of the following statements describes the main function of the stock market?
   (i) The stock market helps to predict stock earnings; (ii) The stock market results in an increase in the price of stocks; **(iii)The stock market brings people who want to buy stocks together with those who want to sell stocks**; (iv) None of the above; (v) Do not know/Refusal.

7. Buying a company stock usually provides a safer return than a stock mutual fund.
   (i) True; **(ii) False**; (iii) Do not know/Refusal.

8. Which of the following statements is correct?
   (i) Once one invests in a mutual fund, one cannot withdraw the money in the first year; **(ii) Mutual funds can invest in several assets, for example invest in both stocks and bonds**; (iii) Mutual funds pay a guaranteed rate of return, which depends on their past performance; (iv) None of the above; (v) Do not know/Refusal.

9. If the interest rate falls, what should happen to bond prices?
   **(i) Rise**; (ii) Fall; (iii) Stay the same; (iv) None of the above; (v) Do not know/Refusal.

# E SAVE Survey: sample selection test

| **Indicated percentage value** | | |
|---|---|---|
| **Variable** | **Coeff.** | **z-value** |
| *Demographics* | | |
| Age | 0.000 | -0.02 |
| Gender | 0.653*** | 3.73 |
| Income (log) | 0.278 | 1.54 |
| Number of Children | -0.224** | -2.30 |
| High School Degree | 0.298 | 1.29 |
| University Degree | 0.283 | 0.91 |
| Married | 0.134 | 0.67 |
| *Controls* | | |
| Life Expectancy | 0.030*** | 2.85 |
| Planned Retirement Age [years | -0.041 | -1.21 |
| Owns Private Pension Insurance | 0.138 | 0.80 |
| Constant | -3.283 | -1.20 |
| Avg. Number of Obs. | 899 | |
| Avg. Number of Clusters | 884 | |
| Avg. Correctly classified | 0.7333 | |
| Avg. Area under ROC Curve | 0.6593 | |

Table 2: **Robustness - SAVE: sample selection test,** . ***, ** and * indicate significance on the 1%, 5% and 10%-level. The SAVE data is multiply imputed with five different implicates. All five implicates are used. Coefficients and standard errors are calculated [Rubin(1987)].