

Financial incentives beat social norms

A field experiment on retirement information search

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DP 02/2018-015

**Financial Incentives Beat Social Norms:
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ABSTRACT

A lack of pension knowledge undermines adequate savings decisions. To understand what motivates individuals to inform themselves about their pension situation, we conducted a field experiment with 245,712 pension fund participants. We find that a small financial incentive is cost-effective and increases the rate by which individuals visit their personal pension website by 70%. Our experiment directly compares the effect of financial incentives to different social norms, which turn out to be ineffective in the pension domain. Financial incentives are effective regardless of gender, age and income, while nudges are ineffective for each subgroup.¹

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¹We thank *Bedrijfstakpensioenfonds voor de Detailhandel* for allowing us to run a field experiment and use their data for this study. We especially thank René Upperman, Bas de Lege and Jorinde Crum for their cooperation with us. We are grateful to George Loewenstein, John Beshears and participants at the Advances with Field Experiments Conference in Chicago in 2016 and at the Society for Experimental Finance Conference in Nice in 2017 as well as the colleagues in the Finance Department, Maastricht University for valuable feedback.

Under-saving for retirement is a major economic and societal challenge, which Benartzi and Thaler (2013) have termed a “retirement savings crisis”. More than half of the US population is at risk of inadequate funding to maintain their current lifestyle (Bernheim, Skinner, and Weinberg, 2001; Skinner, 2007; Benartzi and Thaler, 2007, 2013). Under-saving is also a problem in the Netherlands, where our study takes place. Every third Dutchman has a savings gap (de Bresser and Knoef, 2015). Even though individuals can fill this gap with additional private savings outside of their mandatory pension savings, only a tiny fraction does so². Before participants know whether they should save privately for retirement, they need to be aware of their potential savings gap. Pension awareness, however, is very low in the Netherlands (Prast and van Soest, 2014). It is therefore important to understand how to effectively communicate with pension fund participants. This is particularly true in the case of uncertain pensions, an environment in which individuals often avoid information (Karlsson, Loewenstein, and Seppi, 2009; Sicherman, Loewenstein, Seppi, and Utkus, 2016). Dutch pension funds pay \$ 397.54 million per year for their communication with participants (Azadi, 2012). This money is lost if participants do not read the communication and many individuals will be left with a pension savings gap.

In this paper, we investigate whether nudges or financial incentives are more effective in triggering people to look up information about their pension. Second, we examine the heterogeneous effect of nudges and financial incentives, which allows us to investigate whether pension communication should vary depending on participants’ gender, age and income (cf. Johnson, Shu, Dellaert, Fox, Goldstein, Häubl, Larrick, Payne, Peters, Schkade, Wansink, and Weber, 2012).

We conduct a highly powered field experiment with 245,712 participants of the pension fund that serves employees of the Dutch retail sector. The pension fund sent all these participants a letter with the goal that participants log in to their personal pension planner. Participants randomly received one out of six letters. The control group received a letter similar to the regular communication style of the pension fund. In addition, the fund sent out four social norm letters and one letter containing a financial incentive. Consistent with prior research, all treatment letters add one bold sentence to the control letter after the first paragraph (cf. Bott, Cappelen, Sørensen, and Tungodden, 2017; Bhargava and Manoli, 2015; Hallsworth, List, Metcalfe, and Vlaev, 2017).

A distinguishing feature of our experiment is that it is one of the few studies that directly

²13% of the participants studied privately save for retirement.

compares the cost-effectiveness of different types of nudges and financial incentives, as recommended by Benartzi, Beshears, Milkman, Sunstein, Thaler, Shankar, Tucker-Ray, Congdon, and Galing (2017).

The social norm letters are motivated by prior research that shows the power of social norms in triggering desired action in the domain of taxes, health, and energy consumption (Hallsworth et al., 2017; Burger and Shelton, 2011; Schultz, Nolan, Cialdini, Goldstein, and Griskevicius, 2007). Are social norms equally effective in the pension domain? And which type of social norms work best? As there is mixed evidence on the effectiveness of a goal focus or a focus on means (Freund and Hennecke, 2015), we test whether emphasizing retirement income or retirement savings is most effective. We also distinguish between social norms based on fear or on hope, by painting a positive or a negative picture of the retirement situation (Weinstein, 1980; Slovic, Finucane, Peters, and MacGregor, 2007). In our financial incentives treatment, it was announced that 100 people who log in will receive a voucher worth €25 (\$27.89). Financial incentives have been found to effectively change people’s behavior and decisions (Duflo and Saez, 2003; Gneezy, Meier, and Rey-Biel, 2011; Levitt, List, Neckermann, and Sadoff, 2016).

For this field experiment, we have access to a wealth of administrative data as well as data of the participants’ personal website behavior. Our dataset shows the time of logging in, how long a participant stayed on the website and the exact activity on the website (e.g. whether they clicked on the pension information and when). The data also contain information on gender, age, income, number of hours worked, postal code, and employer.

We find that social norms are ineffective in causing people to inform themselves about their pension. The login rate in all four different social norms treatments is either similar or even significantly lower than the one in the control group. In contrast, financial incentives increase the login rate by 70%, compared to the control group. People in the financial incentives group do not merely log in to cash in the incentive, but also look at information about their pension. A back-of-the-envelope calculation shows that the average costs per additional person logging in at the website via the financial incentive treatment is €0.33 (\$0.37). Importantly, social norms are ineffective for each subgroup, while financial incentives work best for all subgroups and have an even larger effect on women than men.

Our paper contributes to a current strand of experimental literature on financial decision-

making, see for example Haigh and List (2005); Nursimulu and Bossaerts (2014); Bossaerts (2009); Beshears, Choi, Laibson, Madrian, and Milkman (2015); Kirchler, Lindner, and Weitzel (2016); Asparouhova, Bossaerts, Roy, and Zame (2016); Riedl and Smeets (2017). In particular, our results complement prior work which shows that social norms are not always as effective as initial evidence suggested (Del Carpio, 2014; John, Sanders, and Wang, 2014; Blume and John, 2014; Bhargava and Manoli, 2015). For example, Beshears et al. (2015) show that peer effects deter people from saving for their pension if they feel that they cannot save as much as their peers. Our highly-powered study shows that social norms also do not work to stimulate pension fund participants to merely look up information about their personal situation, let alone take savings decisions. We also contribute to the literature on financial incentives. While Choi, Laibson, and Madrian (2011) find that financial incentives do not motivate employees to take up a pension plan, Duflo and Saez (2003) and Duflo, Gale, Liebman, Orszag, and Saez (2006) find that financial incentives increase take up of a pension plan, but also the likelihood to visit an information fair on retirement issues. Overall, our study shows that even a small financial incentive in the form of a lottery can be enough to substantially increase retirement information search.

The paper proceeds as follows. Section I provides background information on the Dutch pension system and the pension fund we study, as well as on the literature our treatments are based on. Section II describes the experimental design, while Section III describes our data. Section IV presents our empirical results. Section V discusses our findings. Lastly, Section VI concludes.

1. Background of the Study

1. The Dutch Retirement System

The Dutch pension system consists of three pillars. The first pillar is a pay-as-you-go state pension. The monthly sum is linked to the minimum wage in the Netherlands. The full amount is paid out to the individual if she has lived in the Netherlands for 40 years before the state retirement age. Otherwise, the amount is dependent on how many years the individual has stayed in the country. Singles receive 70% of the minimum wage, while each member of a couple receives 50%. If pensioners are still below a certain minimum of income and wealth, they can receive social benefits. The second pillar contains a funded occupational pension system. 90% of the plans are

(predominantly) Defined Benefit pension plans, while the remaining 10% are Defined Contribution or Collective Defined Contribution plans. The third pillar consists of private retirement savings accounts, which became increasingly important due to the recent financial crisis and the long period of low interest rates (Knoef, Been, Alessie, Caminada, Goudswaard, and Kalwij, 2016). By giving participants information on the first and second pillar pension, participants can decide upon their third pillar savings. The Dutch Central Bank, the regulator for pension funds, acknowledges the importance of pension communication, by making it mandatory for funds to communicate with their participants.

1. The Pension Fund for the Retail Sector

This study’s experiment was conducted with the participants of one of the ten largest Dutch pension funds, the pension fund for the retail sector. The pension fund has approximately €19.5 billion assets under management and 1,091,500 participants (retired, active, and passive). Approximately 266,000 participants are active, meaning they contribute to the pension fund on a monthly basis³. Table A.3 in Appendix 4 shows demographics both of the active pension fund participants and the general Dutch population. Women are relatively over-represented in the pension fund: 70% of the participants are female. Given the age constraints of active participants, 56% are between 20 and 40 years old. A quarter of the general Dutch population is in between that age range. As Dutch women on average tend to work part-time, the participants also earn less than the average working Dutch individual (€18,392 and €37,200, respectively). These characteristics of our sample are an advantage guiding pension policies because particularly low-educated women are at risk of poverty in old-age (OECD, 2014; EU, 2015).

2. Motivating Pension Fund Participants to Inform Themselves

Social norms are effective in many fields⁴: households consume less energy if they know that they consume more than their neighbors (Schultz et al., 2007; Nolan, Schultz, Cialdini, Goldstein, and Griskevicius, 2008), people use the stairs more often when they know that many people do so (Burger and Shelton, 2011), individuals file and pay their taxes more often when reminded that the

³Information on the pension fund’s assets under management and participant base as of June 12, 2017.

⁴For a review, see John et al. (2014)

majority does so (Fellner, Sausgruber, and Traxler, 2013; Bott et al., 2017; Hallsworth et al., 2017; Kettle, Hernandez, Ruda, and Sanders, 2016) and doctors reduce antibiotic prescriptions when they know they are in the top 20% (Hallsworth, Chadborn, Sallis, Sanders, Berry, Greaves, Clements, and Davies, 2016). The list continues as information on peers seems to influence menu selections at a restaurant, movie rating behavior in an online community, small charitable donations, music downloads, towel re-use in hotels, and stated intentions to vote (Cai, Chen, and Fang, 2009; Chen, Harper, Konstan, and Xin Li, 2010; Frey and Meier, 2004; Salganik, Dodds, and Watts, 2006; Goldstein, Cialdini, and Griskevicius, 2008; Gerber and Rogers, 2009). Nevertheless, peer engagement can also have negative effects. Kato-Lin, Abhishek, Downs, and Padman (2016) find that peer engagement decreases customer engagement in a food-tracking app. Providing information on peers has also had mixed results in the US pension context. Duflo and Saez (2002) find positive effects of peer information on participation and investment decision in a Tax Deferred Account plan. However, information about saving behavior of peers diminishes saving behavior in older strata of the population (Beshears et al., 2015). Beshears et al. (2015) have explained this by a discouragement effect: due to compounding, older people do not start saving as they are not able to achieve the same wealth levels as young people anymore. Similarly, Clark, Maki, and Morrill (2014) study the effect of giving simple information on a 401(k) plan. They find that younger employees do participate more often than the control group, while older employees do participate less. Given the predominantly positive empirical results on the effect of social norms on behavior, we hypothesize that the social norm treatments generally increase the login rate.

Hypothesis 1: *Social norms effectively encourage individuals to search for retirement information.*

We test four different types of social norms, consistent with the previous literature using social norms in other decision domains. First, we distinguish social norms focused on goals (retirement income) or means (retirement savings). Ülkümen and Cheema (2011) apply the construal level theory of Trope and Liberman (2010) to shed light on the question whether specific or abstract steps help savings behavior. They find that specific steps help consumers save more when the goal is abstract, while nonspecific steps help consumers more when the goal is specific. Freund and Hennecke (2015) have looked at several studies which analyze the effect of outcome or means focus on goal attainment. They state that it is unclear whether the focus on means or goals is better for

goal pursuit. When the means are unpleasant and demand effort (e.g. exercise), a goal focus seems more effective. When the goal is only achieved in the long-term, however, it seems that a means focus is more effective. Saving for retirement is both: the goal of a good income is only achieved in the long-term and unpleasant for present-biased individuals (Laibson, Repetto, Tobacman, Hall, Gale, and Akerlof, 1998). It is therefore an empirical question whether social norms based on goals or means are more effective to motivate individuals to look up their retirement information.

Our social norms treatments also distinguish between positive and negative social norms. The social norms literature often states its treatments in the positive form (“a majority of people behave well”), but psychologists have also researched the effect of fear appeals. A meta-analysis by Witte and Allen (2000) shows that the effect of strong fear appeals is moderated by efficacy. Strong fear appeals thus change behavior when self-efficacy is high, while reactance and inertia is prevalent with low self-efficacy and a fear appeal. Gutierrez and Hershey (2013) show that people with retirement anxiety process words related to those worries (e.g. poverty, loneliness) slower than individuals without retirement anxiety. Nevertheless, the treatment letters state that participants can act upon the information shown on the website. If this triggers an increased level of self-efficacy, the fear treatments could be more effective than the positive treatments.

Our financial incentive treatment consists of a lottery that gives participants the chance to win a voucher of €25. As Golman, Hagmann, and Loewenstein (2017) state, people might avoid information due to several reasons and a financial incentive could help to overcome this bottleneck. Financial incentives increased response rates in mail-based, interviewer-mediated and web surveys (e.g. Singer and Ye, 2013). Furthermore, they attract more charitable givers and boost the total amount raised (Morgan, 2000; Lange, List, and Price, 2007). Immediate financial incentives also increase test scores (Levitt et al., 2016), voter registration (John, MacDonald, and Sanders, 2015) as well as home-based health monitoring and school children’s healthy eating behavior (Sen, Sewell, Riley, Stearman, Bellamy, Hu, Tao, Zhu, Park, Loewenstein, Asch, and Volpp, 2014; Loewenstein, Price, and Volpp, 2016). Duflo and Saez (2003) find that providing university employees with a financial reward if they attend a benefits information fair increases fair attendance by a factor of five. In contrast, Gneezy and Rey-Biel (2014) show that very small contingent payments reduce the response rate, compared to no payments. Another “unintended” consequence of the financial incentive might be that participants log in and directly leave the website, without looking at their

personal pension information. In this case, the treatment would be effective in triggering people to visit the pension fund’s website, but would still fail to increase information search. Financial incentives then would undermine the intended effect. Other studies which describe unintended consequences of financial incentives are Frey and Oberholzer-Gee (1997), Gneezy and Rustichini (2000a,b), and Bowles (2008). Again, it is an empirical question whether financial incentives work to encourage individuals to look up their retirement information.

Hypothesis 2: *Financial incentives effectively encourage individuals to search for retirement information.*

2. Experimental Design

In December 2015, we sent out six different letter types to 245,712 active participants of the Dutch pension fund of the retail sector. All letters aim at motivating the pension fund participants to go to the website of the pension fund and log onto their page containing personalized retirement information. We measured who logged in to the website and when. Furthermore, the data show what the participants clicked on within their personal space and when they logged out. Participants were randomly allocated to the six treatments. A randomization check confirms successful randomization (see Appendix 3).

The core text of the five treatment letters is the text of the baseline letter. In every treatment letter, we added one sentence to the baseline text. With only one sentence varying between treatments, we can measure clean treatment effects as we do not differ other variables such as the length of the letter. Furthermore, studies such as Bott et al. (2017), Bhargava and Manoli (2015), and Hallsworth et al. (2017) have shown that adding one sentence is very effective. The added sentence were printed in bold in order to be more salient. The next paragraphs describe the messages in more detail. The (translated) wording of the letters can be found in Appendix 1.

Letter 1: The Baseline The baseline letter contains the text that all other letters display as well. It informs the pension fund participant about the pension fund’s new website and the personal pension environment of the participant, ‘MijnOmgeving’ (i.e. MyEnvironment in English). The tone is motivating, making explicit that it is crucial for retirement planning to know how much pension one has accrued so far.

Social Norm Treatment Letters Within the four social norm treatments, we use a 2x2 design. Two treatments focus on the goal of retirement savings, i.e. retirement income, while the other two focus on the means to achieve that income, i.e. saving. One of each pair then contains a negative message, while the other two contain a positive outlook (e.g. “enough income” vs “too little income”). As we do not want to deceive participants for ethical reasons, we based the social norm on information from the study of de Bresser and Knoef (2015). In order to increase the power of the social norm, we referred to “people in the Netherlands” in the treatment sentence. In tax trials, this has been proven to be more effective than just referring to majorities (Wenzel, 2004, 2005).

Letter 2: Income- Fear The second letter focuses on the goal of retirement savings: retirement income. It includes a fear appeal as it emphasizes that people might not have adequate retirement income. The added sentence reads: “**A large part of people in the Netherlands think that they will have a too low income to retain their current level of consumption in retirement. What about you?**” With this letter, we test whether a goal focus (Ülkümen and Cheema, 2011; Freund and Hennecke, 2015) and the fear appeal (Witte and Allen, 2000) motivates participants to log in and look at their personal pension information.

Letter 3: Income- Hope The third letter displays the goal focus and a positive description to focus on the positive, hopeful content: “**A large part of people in the Netherlands think that they will have enough income to retain their current level of consumption in retirement. What about you?**” This tests the hypothesis hinted at by Gutierrez and Hershey (2013), stating that a positive outlook is better than a negative wording in the pension domain.

Letter 4: Savings- Fear The fourth letter focuses on the means to achieve retirement income, i.e. saving for retirement. It also uses a fear appeal, as in the second letter: “**A large part of people in the Netherlands think they save too little to retain their current level of consumption in retirement. What about you?**”

Letter 5: Savings- Hope The fifth letter shows the means-focus with a positive description of the social norm: “**A large part of people in the Netherlands think they save enough to retain their current level of consumption in retirement. What about you?**”

Letter 6: The Financial Incentive The financial incentive letter adds one sentence written in bold to the baseline letter. The sentence added is the following: **Among all participants who log**

in, we are raffling 100 VVV gift vouchers worth €25. VVV gift vouchers are vouchers from the tourism association in the Netherlands. They are usable in over 24,000 Dutch shops. With this letter, we test whether a financial incentive can motivate participants to log in (Morgan, 2000; Lange et al., 2007; Singer and Ye, 2013; Levitt et al., 2016).

3. Data

Our final dataset stems from two data sources. In this section, we first describe the administrative data source. The second data source is obtained from the experiment, whose design is presented in Section 2.

1. Administrative Data

The administrative dataset is provided by TKP, the pension administrator. The data contain demographic statistics of 226,946 active pension fund participants in January 2016. A pension fund participant is active when she contributes to the pension fund on a monthly basis. Variables of interest are the following:

Administrative Variables *Gender.* Gender is a binary dummy which is 1 if the participant is male and 0 when female. We use gender as a control in our regressions, but also for our heterogeneity analysis to see whether male reactions to a treatment letter differ from female reactions.

Age. The variable displays the participants' age in January 2016. For the regressions, we categorize the participants into people younger than 30, between 29 and 40, between 39 and 50, between 49 and 60 as well as older than 60 year old. We use these categories to form dummies as control variables in Section 5. For the heterogeneity analysis, we build a dummy that indicates whether or not participants are older than the median age of 36 years.

Part-time factor. This is the factor that displays the ratio of contract hours of the participant to the hours of a full-time contract. For the regressions we use a categorization. We categorize participants who work full time (i.e. have a part-time factor of 1) as fulltimer, and participants work more than 0, but less than a full time employment as part timer. We drop all observations of participants who work 0 hours.

Partner. The variable is binary, with a 1 meaning that the participant has a partner registered in the administrative data of the pension fund, a 0 meaning that she does not. This variable is also used as a control variable in Section 5.

Gross Salary. This is the annual gross salary. The variable is winsorized in order to replace extreme values. For the heterogeneity analysis, we build a dummy indicating whether a participant is above the median income (value=1) or below (value=0).

Province dummies. With the postcode, we determine the province where the participant lives. We use the dummies in the regressions in order to check for regional effects.

2. Experimental Data

The experimental dataset is also provided by the pension administrator of the pension fund. It shows the participants' website behavior over the period December 2015 to January 2016. Variables of interest are the following:

Experimental Variables *Logged in at least once.* This variable is binary. A 0 means that the participant has never logged in between December 22, 2015 and January 22, 2016. A 1 means that the participant has logged in at least once in the same period. This is our first dependent variable.

Clicked on pension planner at least once. This variable is also binary, displaying whether the participant has clicked on the pension planner at least once during the observatory period. The pension planner shows the current salary as well as the pension that can be expected when the participant continues working until her retirement age. This is our second dependent variable, measuring whether participants actually look at their personal pension information.

4. Individual Characteristics and Website Behavior

This section describes the population of the pension fund's active participants as well as the participants who have logged in. Table A.1 in Appendix 2 shows summary statistics of the administrative data for both the whole population of participants of the retail sector pension fund as well as of the participants that log in at least once. Of the 245,721 participants who received a letter, 7,640 participants (i.e. 3.11%) have logged in at least once. Rather low login rates are usual for

studies that use letters to invite people to go on websites (see, for example Service, Hallsworth, Halpern, Algate, Gallagher, Nguyen, Ruda, Sanders, with Pelenur, Gyani, Harper, Reinhard, and Kirkman, 2014). In a study on information search of investors, Døskeland and Pedersen (2015) found that 0.81% of all participants clicked further to get more information. Comparably, 3.1% thus is a good response rate⁵. 2.23% of all participants have informed themselves by clicking on the pension planner of the website. This means that 71.6% of the people who visited the personal space of the website clicked on the pension planner. On average, participants spend 3.4 minutes on the pension planner. We assume that this is enough time to read and understand the information given properly. Compared to the average time a reader spends on a news article (i.e. 15 seconds), 3.4 minutes indicates that participants who click on the pension planner are also genuinely interested in looking at the information (Haile, 2014).

Comparing the demographics of the pension fund population with the demographics of the participants who log in, we find the following. 31.3% of all participants is male, while 36.4% of participants logging in are male. On average, the pension fund population is 37.86 years old. Individuals who have logged in are older, with an average age of 44.8 years. Participants who have logged on work more hours as their part time factor is 0.678, while the whole population has 0.662 of a full time employment. Consequentially, as they work more, participants who have logged on the website also earn more on an annual basis, on average (€20,580 vs €18,150). According to the administrative data of the pension fund, participants who have visited their personal space are more likely to have a partner than the overall population of the pension fund. These descriptives can be explained by the fact that older individuals are generally more interested in the topic of pension and retirement as it is a topic nearer to them (Alessie, Van Rooij, and Lusardi, 2011; Van Rooij, Lusardi, and Alessie, 2012). Furthermore, as males are more likely to be the financial decision-makers of the household, they might be more likely to look for financial information such as information on retirement income.

⁵Figure ?? in Appendix 8 shows the time series of number of logins over the year 2016. In summer, we can see a spike that is approximately as high as the number of logins triggered by our intervention.

5. Which Letter is Most Effective?

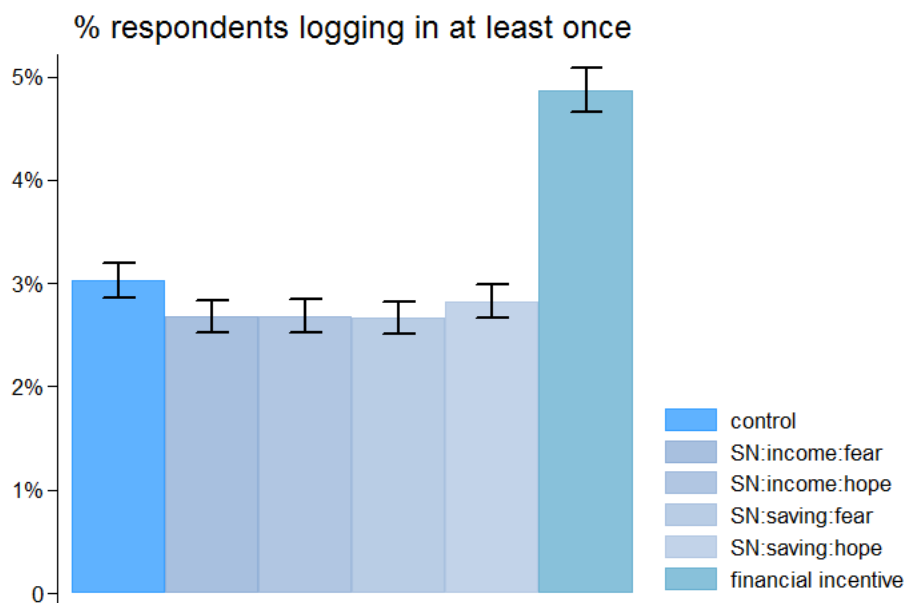
First, we analyze which letter is most effective in encouraging individuals to log in to their personal space of the pension fund’s website and who viewed their personal pension planner. In the next section, we look at heterogeneous treatment effects caused by age, gender, and income.

1. Univariate Tests

Figure 1 shows that the financial incentive letter is the most effective letter. While 3% of the control group logged in to the pension fund website, 5% of participants in the financial incentive treatment did. The four social norm treatments either resulted in a similar log in rate as the control letter, or a significantly lower rate, as is the case for the saving-fear letter.

Figure 1
The Log-In Rate per Letter

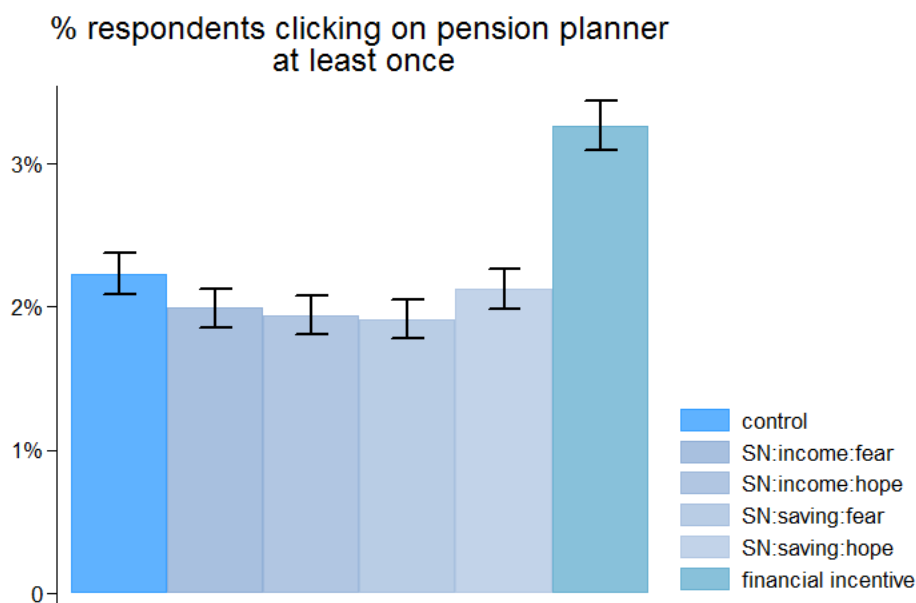
This figure shows the average log-in rate per letter, given by the height of the bars. The black ranges present the 95% confidence intervals. If the intervals overlap, the difference between the means is not statistically significant at a 5% level. Table A.4 in Appendix 5 shows the mean differences and p-values for the differences.



We now turn to the main variable of interest: do people inform themselves about their pensions? We measured this by the rate of participants clicking on the pension planner. Figure 2 gives an indication. As with the login rate, the financial incentive letter is most effective. More than 3% of participants receiving the financial incentive letter clicked on the pension planner. The baseline letter triggers more than 2% of people to look at their personal pension information. The saving-fear letter is again the least effective and all social norms letters do worse than the baseline letter.

Figure 2
The Pension Planner Click Rate per Letter

This figure shows the average click rate on the pension planner per letter, given by the height of the bars. The black ranges present the 95% confidence intervals. If the intervals overlap, the difference between the means is not statistically significant at a 5% level. Table A.5 in Appendix 5 shows the mean differences and p-values for the differences.



2. Multivariate Tests

In order to see effects based on demographics, we run probit regressions. The marginal effects are presented in column 1 of Table 1. As we have a highly-powered study, we are able to detect small economic effects as statistically significant. All our treatments are statistically significantly different from the baseline letter. Being in the financial incentive group increases the likelihood to

log in at least once by 1.58 percentage point. Given that the baseline rate is 3%, this is an increase by approximately 65%. As could be seen in Figure 1, the social norm letters do worse than the baseline letter: all marginal effects are negative. The effects are rather small as they range from -0.390 percentage points to -0.242 percentage points.

We now turn to the covariates in the probit regression. Men as well as older people are more likely to log in. Age has a U-shaped effect on the login rate. Individuals between 29 and 40 log in less than participants who are below 30 years old (i.e. the baseline). 39 to 50 year olds are as likely to log in than the below-30 year olds, whereas people older than 50 are more likely to log in. This is in line with expectations: individuals closer to retirement are also more likely to be interested in pensions. Salary has a positive effect on login behavior as well. Employees who work part time are also more likely to log in on the website than are fulltimers.

In order to correct for false positives due to multiple hypotheses testing, we use the approach described by List, Shaikh, and Xu (2016). Results can be seen in Table 2. Focusing on the multiplicity-adjusted p-values (columns 5 and 6), we see that the differences in means (termed DI in Table 2) between the individual treatment groups and the control group are statistically significant- except for the saving-hope treatment with outcome “pension planner” (see row 10, column 5 and 6). Overall, financial incentives increases the number of participants who log in by 70%. Given that €2,500 is used for the financial incentive and 7640 people log in, the average cost of a participant logging in is €0.33, which is \$0.37.

Column 2 of Table 1 shows the marginal effects of the probit regression we run. The directions of the marginal effects are the same as in column 1. The financial incentive letter increases information search by 0.915 percentage points. Given the baseline rate of 2%, this is nearly a 50% increase. The social norms letters have a negative effect on information search- the saving-hope letter, however, is not statistically significant from the baseline letter. Saving-fear has an effect of -0.323 percentage points, income-hope is slightly better with -0.317 and income-fear reduces the information search rate by -0.23 percentage points. Males are again more likely to look for information, as are participants below 30 or above 49 years old. Being a parttimer (the baseline category) has a positive effect on information search, as has annual salary. As with the login rate, Table 2 shows that all treatment letters except saving-fear have a significantly different effect than the baseline letter when controlling for multiple hypotheses testing.

Table 1
Effect of Receiving Different Letters: Regression Analysis.

This table shows marginal effects of probit regressions with dependent variables Login (binary variable, column 1) and Click-Through Rate to the pension planner (binary variable, column 2). Income-fear, Income-hope, Saving-fear, Saving-hope, and Financial Incentive indicate which letter a participant has received. The control letter is the baseline. Male indicates the gender of the participant, women are the baseline. 30-39 years, 40-49 years, 50-59 years, and 60-67 years are dummy variables indicating the age of the participant. Participants below 30 years old are the baseline category. Gross salary presents the winsorized annual gross salary. The coefficients have been multiplied by 1000. Parttimer indicated the participants who work less than a full-time position, but more than 0 hours a month. Fulltimers are the baseline category. In both regressions, we do control for province dummies. Robust standard errors are in parentheses.

VARIABLES	(1) Logged in at least once	(2) Check pension planner at least once
<i>Social Norm Treatments</i>		
Income-fear	-0.0032** (0.0013)	-0.0021* (0.0011)
Income-hope	-0.0037*** (0.0013)	-0.0030*** (0.0011)
Saving-fear	-0.0032** (0.0013)	-0.0030*** (0.0011)
Saving-hope	-0.0022* (0.0013)	-0.0010 (0.0011)
<i>Financial incentive</i>	0.0160*** (0.0012)	0.0093*** (0.0010)
Male	0.0075*** (0.0008)	0.0068*** (0.0007)
30-39 years	-0.0050*** (0.0012)	-0.0060*** (0.0010)
40-49 years	0.0013 (0.0011)	-0.0010 (0.0009)
50-59 years	0.0248*** (0.0010)	0.0150*** (0.0009)
60-67 years	0.0540*** (0.0014)	0.0376*** (0.0011)
Gross salary, wins.1%, divided by 1000	0.0004*** (0.0000)	0.0004*** (0.0000)
Parttimer	0.0071*** (0.0011)	0.0054*** (0.0009)
Observations	226,946	226,946
R-squared		
Province Dummies	YES	YES
Robust standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Table 2**Multiple Hypotheses Adjustments according to List et al. (2016)**

This table shows the multiple hypotheses adjustments according to the procedure proposed by List et al. (2016). The first column gives the two outcome variables. The second column presents the treatment group which is compared to the control group. The third column gives the differences in means. Columns 4-8 present the p-values given different procedures. Column 6 gives the strictest adjustment, more powerful than the Bonferroni and Holm tests in column 7 and 8.

Outcome	Letter	DI	p-values				
			Unadjusted		Multiplicity Adjusted		
			Remark3.1	Thm3.1	Remark3.7	Bonferroni	Holm
Login	SN:inc:fear	0.0035	0.0020***	0.0077***	0.0077***	0.0020***	0.0012***
Login	SN:inc:hope	0.0035	0.0047***	0.0147**	0.01467**	0.0467**	0.0187**
Login	SN:sav:fear	0.0036	0.0007***	0.0023***	0.0023***	0.0067***	0.0053***
Login	SN:sav:hope	0.0021	0.0723*	0.1037	0.1037	0.7233	0.1447
Login	Fin. inc.	0.0184	0.0003***	0.0003***	0.0003***	0.0033***	0.0033***
P. planner	SN:inc:fear	0.0024	0.0157**	0.0343**	0.0343**	0.1567	0.0470**
P. planner	SN:inc:hope	0.0029	0.0033***	0.0120**	0.0120**	0.0333**	0.0167**
P. planner	SN:sav:fear	0.0032	0.0020***	0.0083***	0.0083***	0.0200**	0.01400**
P. planner	SN:sav:hope	0.0010	0.3140	0.3140	0.3140	1.0000	0.3140
P. planner	Fin. inc.	0.0103	0.0003***	0.0003***	0.0003***	0.0003***	0.0030***

*** p<0.01, ** p<0.05, * p<0.1

6. Heterogeneity in Effectiveness

Potentially, the treatment effects can differ between subgroups. In order to answer the second research question (i.e. whether there are heterogeneous treatment effects), we first look at gender as a moderator, followed by age and income.

1. Gender

1. Univariate Tests

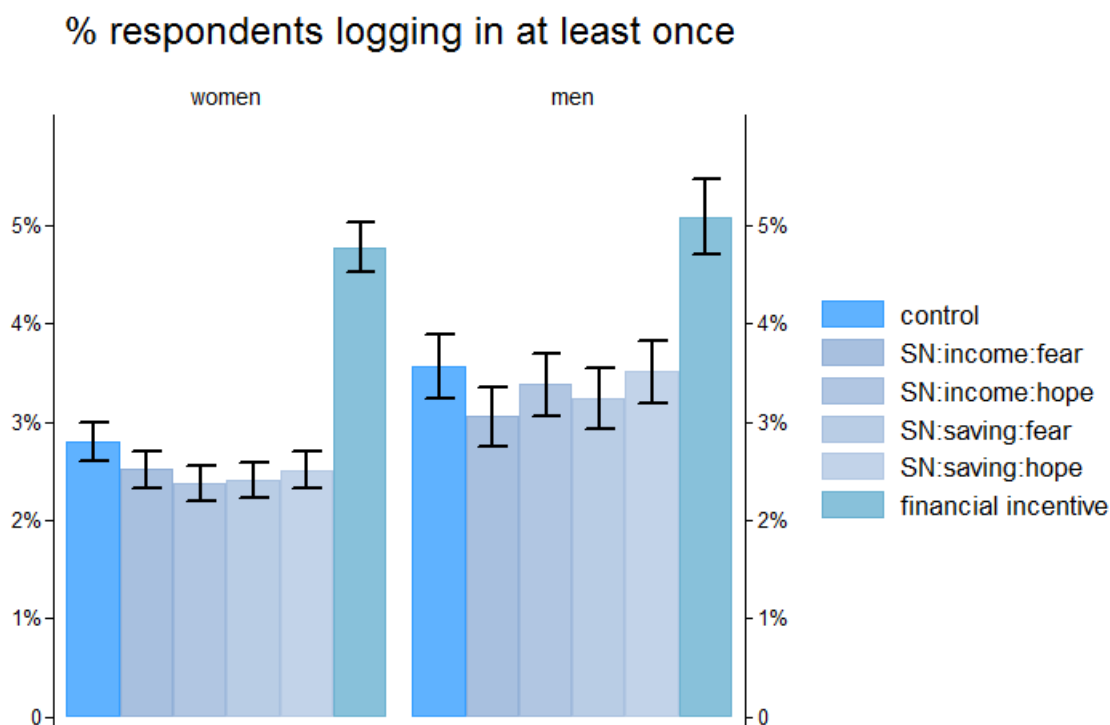
Figure 3 shows the effect of the different treatment groups for women and men separately. On average, women are less likely to log in. Interestingly, when one gives financial incentives, the login rates of women and men are the same. The top 2 effective letters are the same for women and men: the most effective treatment for both women and men is the financial incentive letter, while the baseline letter is the second most effective. Men seem to be comparatively less motivated by the negative statements as saving-fear and income-fear end up on ranks 5 and 6, respectively. For

women, conclusions are less straightforward as all social norm treatments are very close together.

Figure 4 presents the overall information search rate per gender group. As before, the first two

Figure 3
The Log-In Rate per Letter, Divided by Gender

This figure shows the average log-in rate per letter, given by the height of the bars. The sample is split by gender. The black ranges present the 95% confidence intervals. If the intervals overlap, the difference between the means is not statistically significant at a 5% level. Table A.6 in Appendix 5 shows the mean differences and p-values for the differences.



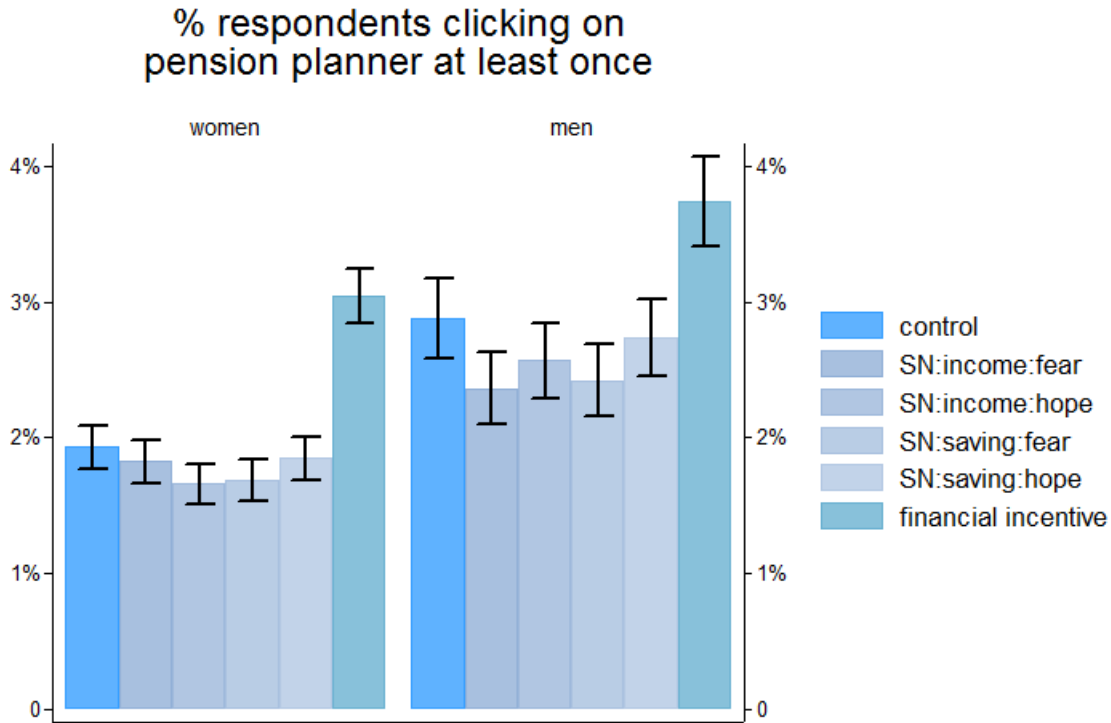
most effective treatments are the financial incentive letter and the baseline letter. Also for the information search measure, men are least motivated by the fear treatments, while no conclusions can be drawn for the female sample.

2. Multivariate Tests

In order to analyze heterogeneity, we add interactions between the gender dummy and the treatments. Column 2 of Table 3 shows the regression with the log-in rate as dependent variable. All interactions are statistically insignificant except for the interaction with the financial incentive

Figure 4
The Pension Planner Click Rate per Letter, Divided by Gender

This figure shows the average click rate on the pensionplanner per letter, given by the height of the bars. The sample is split by gender. The black ranges present the 95% confidence intervals. If the intervals overlap, the difference between the means is not statistically significant at a 5% level. Table A.7 in Appendix 5 shows the mean differences and p-values for the differences.



treatment. Men are thus less susceptible to the financial incentive treatment than women.

The multiple hypotheses testing according to List et al. (2016) is presented in Table A.12 in Appendix 6. The lottery treatment stays significantly different from the baseline letter for both men and women. For women, income-hope and saving-fear are also statistically significantly different from the baseline letter (see columns 6 and 7).

Column 4 of Table 3 repeats the findings of the heterogeneous effect of gender on the login rate, but this time for the click-rate on the pension planner as outcome variable. Men are less susceptible to the lottery letter than women. All other interactions are insignificant. Table A.12 confirms: when controlling for multiple hypotheses testing, the lottery letter is statistically significant for both men and women. For men, income-fear is also different from the baseline letter, while for women it is

the income-hope letter.

Table 3
Heterogeneous Effects Between Men and Women: Regression Analysis

This table shows the regressions with the dependent variables Login (binary variable, regressions 1 and 2) and Click-Through Rate to the pension planner (binary variable, regressions 3 and 4). Income-fear, Income-hope, Saving-fear, Saving-hope, and Financial Incentive indicate which letter a participant has received. The control letter is the baseline. The interactions between the male dummy and the treatment letters are indicated in rows 7-11. The covariates from Table 1 are controlled for in all regressions. Robust standard errors are in parentheses.

VARIABLES	(1) Logged in	(2) Logged in	(3) Pension planner	(4) Pension planner
<i>Social Norm Treatments</i>				
Income-fear	-0.0030** (0.0012)	-0.0022 (0.0014)	-0.0020** (0.0010)	-0.0009 (0.0012)
Income-hope	-0.0034*** (0.0012)	-0.0035** (0.0014)	-0.0028*** (0.0010)	-0.0024** (0.0012)
Saving-fear	-0.0031*** (0.0012)	-0.0030** (0.0014)	-0.0029*** (0.0010)	-0.0022* (0.0012)
Saving-hope	-0.0021* (0.0012)	-0.0024* (0.0014)	-0.0009 (0.0011)	-0.0005 (0.0012)
Financial incentive	0.0190*** (0.0014)	0.0209*** (0.0017)	0.0108*** (0.0012)	0.0118*** (0.0014)
Male* SN:inc:fear		-0.0025 (0.0027)		-0.0036 (0.0024)
Male* SN:inc:hope		0.0004 (0.0027)		-0.0012 (0.0024)
Male* SN:sav:fear		-0.0005 (0.0027)		-0.0021 (0.0024)
Male* SN:sav:hope		0.0010 (0.0028)		-0.0012 (0.0025)
Male* Fin.inc		-0.0061** (0.0031)		-0.0031 (0.0027)
Male	0.0078*** (0.0009)	0.0091*** (0.0020)	0.0073*** (0.0008)	0.0091*** (0.0018)
Constant	0.0020 (0.0019)	0.00159 (0.0019)	0.0005 (0.0016)	-0.0001 (0.0017)
Observations	226,946	226,946	226,946	226,946
R-squared	0.019	0.019	0.013	0.013
Other Covariates	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

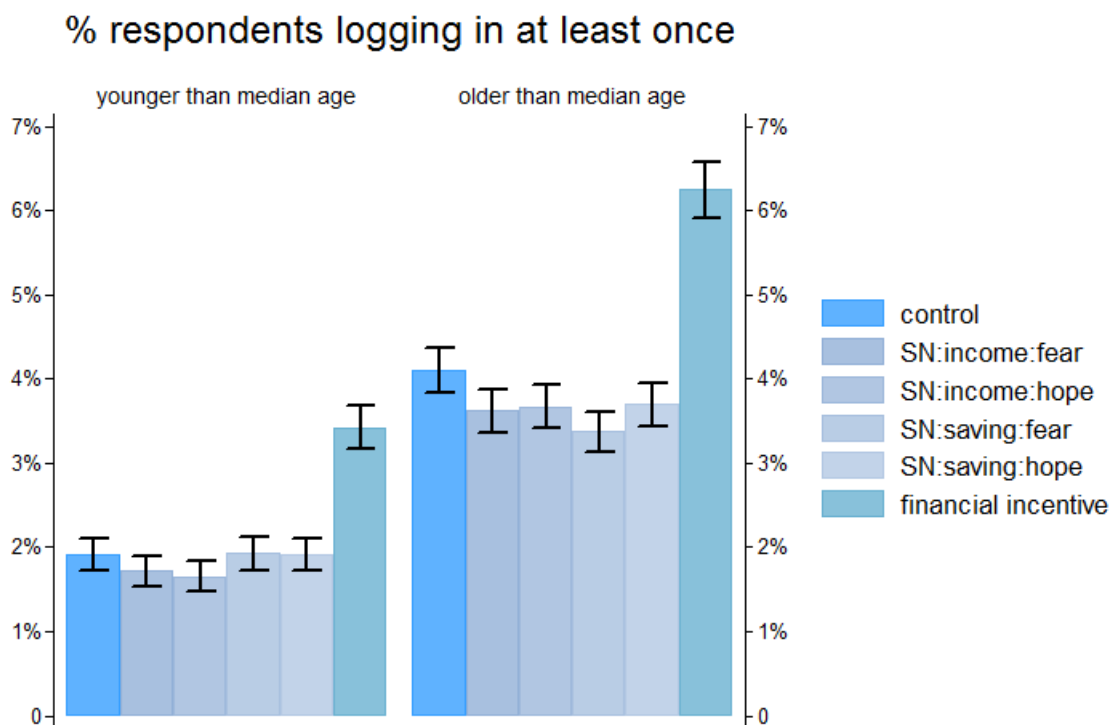
2. Age

1. Univariate Tests

Figure 5 splits the sample in participants above and below the median age of 36. On average, younger participants are less likely to log in. The financial incentive treatment motivates approximately as many young participants as does the least effective for the old, the saving-fear. As with the other figures, the social norm treatments are not differing much in outcomes among themselves. For the participants above the median age, the baseline letter might be significantly different from the saving-fear treatment.

Figure 5
The Log-In Rate per Letter, Divided by Median Age

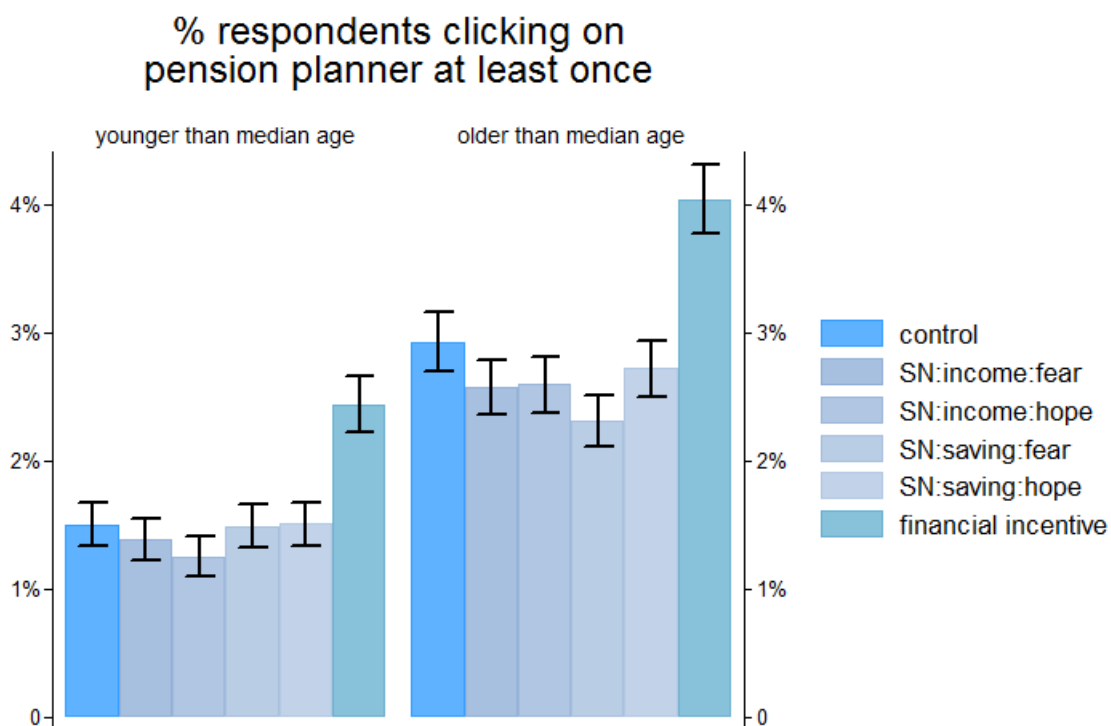
This figure shows the average log-in rate per letter, given by the height of the bars. The sample is divided by the median age of 36 years. The black ranges present the 95% confidence intervals. If the intervals overlap, the difference between the means is not statistically significant at a 5% level. Table A.8 in Appendix 5 shows the mean differences and p-values for the differences.



For the different age groups, the same conclusions as with the login rate can be drawn for the click rate on the pension planner: the financial incentive treatment is most effective for both age groups (see Figure 6). The baseline letter is the second most effective. For the young, the baseline letter is not significantly different from the social norm treatments. In the older sample, the baseline letter is significantly more motivating than the saving-fear letter.

Figure 6
The Pension Planner Click Rate per Letter, Divided by Median Age

This figure shows the average click rate on the pension planner per letter, given by the height of the bars. The sample is split by the median age of 36 years. The black ranges present the 95% confidence intervals. If the intervals overlap, the difference between the means is not statistically significant at a 5% level. Table A.9 in Appendix 5 shows the mean differences and p-values for the differences.



2. Multivariate Tests

To analyze the heterogeneous effects, we interact the median age dummy with the treatments. Table 4 shows the results of the regressions. Comparing regression 1 with regression 2, one can

see that the treatment dummies lose statistical significance. Income: fear and saving-hope are not statistically significant from 0. The saving-fear coefficient actually turns positive. The interactions between age and saving-fear and age and income-fear are highly statistically significant. The coefficients for the saving-fear, income-fear and saving-hope interactions are negative. The interaction with the financial incentive treatment is positive and significant at the 1%-level. The financial incentive dummy, however, loses its significance when the interactions are added. A participant who is older is thus more likely to react negatively to both fear treatments as well as both savings treatments and more likely to react to the financial incentive treatment.

According to Table A.13 in Appendix 6, the financial incentive and saving-negative remain significantly different from the baseline letter for the above-median age group (controlling for multiple hypotheses testing). For the group which is below median age, only the financial incentive treatment is significantly different from the baseline letter.

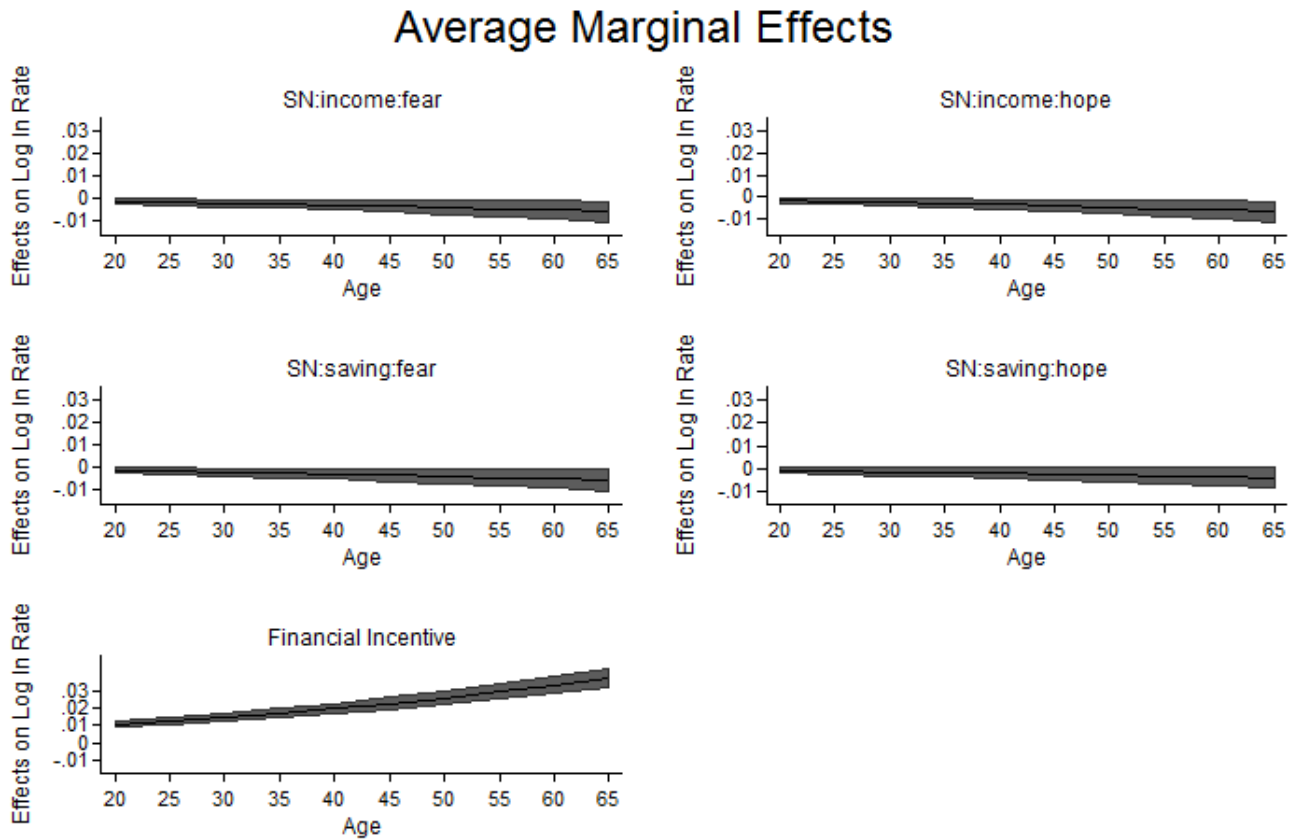
Figure 7 shows the average marginal effects of the different treatment letters over the whole age range. The older a participant gets, the more the social norm treatment effects decline. The opposite is true for the financial incentive treatment: the older the participant, the higher the average marginal effect.

According to column 4 of Table 4, the older participants are less likely to look at pension information if they have received the saving-fear letter. No other social norm interactions are significantly different from 0. Older participants are also more likely to react to the financial incentive. Table A.13, columns 6 and 7 show that the financial incentive letter is significantly different from the baseline letter for both young and older age groups (when controlling for multiple hypotheses testing). For people above the median age of 36, the saving-fear letter is also significantly different from the baseline letter.

Figure 9 in Appendix 7 shows a finer analysis of the average marginal effects given different age levels. The effects of the social norm treatments are decreasing with age. The average effect of the financial incentive, however, is higher on older participants.

Figure 7
Spotlight Analysis, by Age

This figure shows the average marginal effects of the treatment letters on the login rate, given different age levels. The lines present the average effects, while the areas show the 95%-confidence intervals.



3. Income

1. Univariate Tests

Figure 11 in Appendix 8 shows the log in rate per letter across two samples. The sample has been split by the median income of €15,622. Participants who own an income above the median income are slightly more likely to log in, in general. This is in line with what we have found before: wealthier, slightly older, male participants are more likely to log in. As with the main results, however, the financial incentive letter is the most effective treatment, while the social norm

Table 4**Heterogeneous Effects Between Younger and Older Participants: Regression Analysis**

This table shows regressions with the dependent variables Login (binary variable, regressions 1 and 2) and Click-Through Rate to the pension planner (binary variable, regressions 3 and 4). Income-fear, Income-hope, Saving-fear, Saving-hope, and Financial Incentive indicate which letter a participant has received. The control letter is the baseline. The interactions between the age and the treatment letters are indicated in rows 12-20. The covariates from Table 1 are controlled for in all regressions. Robust standard errors are in parentheses.

VARIABLES	(1) Logged In	(2) Logged In	(3) Pension planner	(4) Pension planner
<i>Social Norm Treatments</i>				
Income-fear	-0.0031** (0.0012)	0.0043 (0.0041)	-0.0021** (0.0010)	0.0029 (0.0035)
Income-hope	-0.0034*** (0.0012)	0.0025 (0.0040)	-0.0028*** (0.0010)	0.0003 (0.0035)
Saving-fear	-0.0032*** (0.0012)	0.0112*** (0.0041)	-0.0029*** (0.0010)	0.0074** (0.0035)
Saving-hope	-0.0020* (0.0012)	0.0058 (0.0041)	-0.0009 (0.0011)	0.0027 (0.0036)
<i>Financial incentive</i>	0.0191*** (0.0014)	0.0042 (0.0046)	0.0109*** (0.0012)	0.0035 (0.0040)
SN:inc:fear*Age		-0.0002* (0.0001)		-0.0001 (0.0001)
SN:inc:hope*Age		-0.0002 (0.0001)		-0.0000 (0.0001)
SN:sav:fear*Age		-0.0004*** (0.0001)		-0.0003*** (0.0001)
SN:sav:hope*Age		-0.0002* (0.0001)		-0.0000 (0.0001)
Fin.Inc.*Age		0.0004*** (0.0001)		0.0002* (0.0001)
Age	0.0012*** (0.0000)	0.0013*** (0.0001)	0.0008*** (0.0000)	0.0009*** (0.0001)
Constant	-0.0297*** (0.0021)	-0.0331*** (0.0033)	-0.0207*** (0.0019)	-0.0231*** (0.0029)
Observations	226,946	226,946	226,946	226,946
R-squared	0.012	0.012	0.008	0.008
Other Covariates	YES	YES	YES	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

treatments are doing less good than the control letter. The differences between the social norm letters and the control letter are not statistically significant for the above median income sample, while they might just be statistically significant for the below income sample.

Figure 12 in Appendix 8 shows the percentage of people who have looked at their personal pension information. The sample has been split in two, divided by the median income. As with Figure 11, the pattern between the two samples only differs slightly. The financial treatment letter is the most effective letter for both samples. The social norm treatments do worse than the control letter, the differences are statistically insignificant.

2. Multivariate Tests

In order to analyze the moderating effect of income, we add interactions between the gross salary variable and the treatments. Regression 2 of Table 5 shows that no interaction coefficient is statistically significant. This means that salary is not a moderating variable. As the gross salary-coefficient is positive and significant at the 1%-level, wealthier participants are more likely to log in, on average. Table A.14 in Appendix 6 shows the p-values corrected for multiple hypothesis testing. Across all subgroups, the effect of the financial incentive treatment is statistically significant. Figure 8 shows the average marginal effects, given different salary levels. The picture looks rather similar to Figure 7: with increasing income levels, the social norm treatments are hardly improving, rather decreasing in effect. The financial incentive treatment, however, seems to gain effect with the wealthier individuals.

Column 4 of Table 5 presents the findings of the regressions of interactions between treatments and salary on the click-rate on the pension planner. As with regression 2, no interaction coefficient is statistically significant. The salary coefficient on its own is positive and statistically significant. Table A.14 shows that the results hold when corrected for multiple hypothesis testing. Figure 10 in Appendix 7 presents the spotlight analysis for the click-through rate to the pension planner. As with the login rate, the effect of the social norm treatments stays constant or slightly decreases with income. The average marginal effect of the financial incentive treatment increases with income, however.

Figure 8
Spotlight Analysis of the Login Rate, by Salary

This figure shows the average marginal effects of the treatment letters on the login rate, given different salary levels. The lines present the average effects, while the areas show the 95%-confidence intervals.

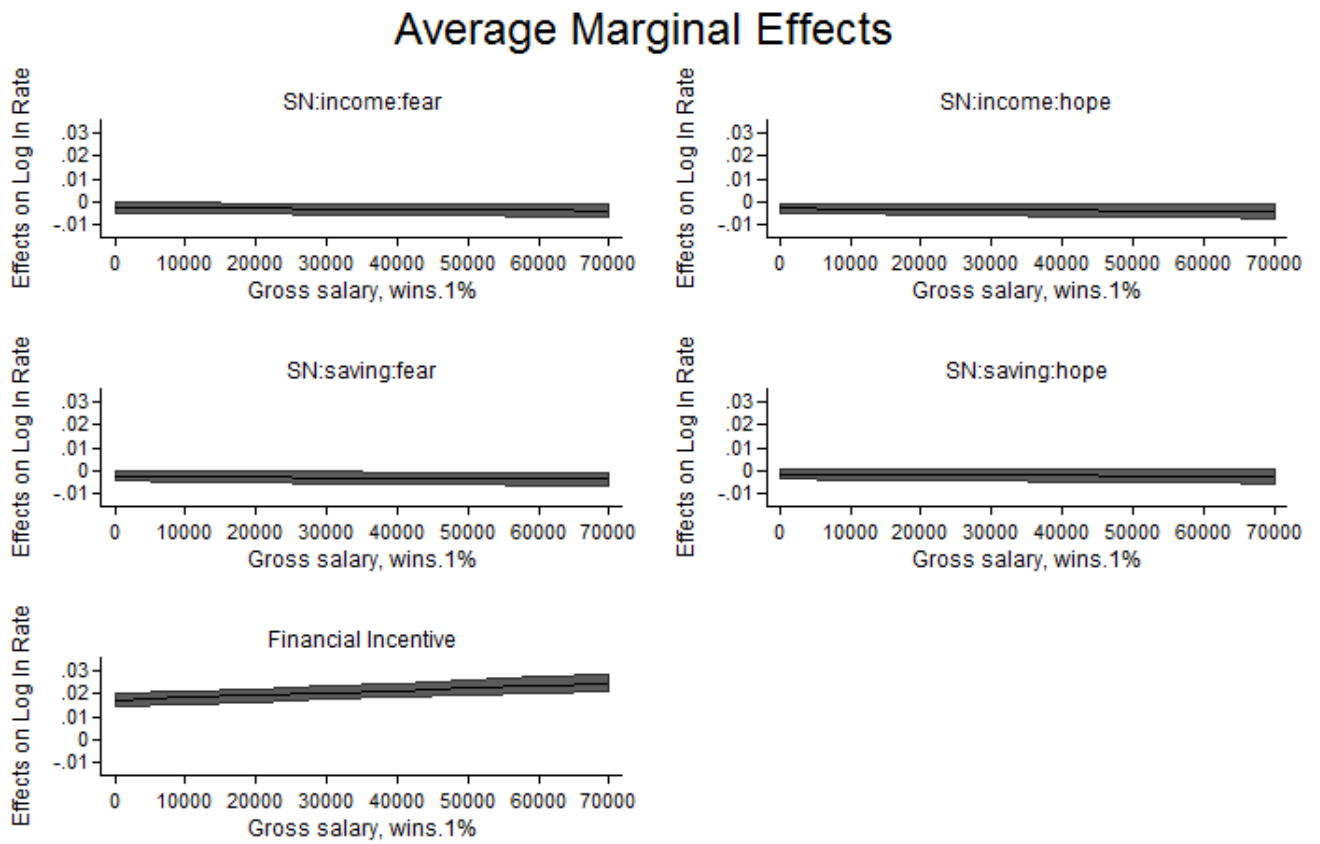


Table 5
Heterogeneous Effects Between Less-Wealthy and Wealthy Participants:
Regression Analysis

This table shows the regressions with the dependent variables Login (binary variable, regressions 1 and 2) and Click-Through Rate to the pension planner (binary variable, regressions 3 and 4). Income-fear, Income-hope, Saving-fear, Saving-hope, and Financial Incentive indicate which letter a participant has received. The control letter is the baseline. The interactions between gross salary and the treatment letters are indicated in rows 12-22. The covariates from Table 1 are controlled for in all regressions. Robust standard errors are in parentheses.

VARIABLES	(1) Logged In	(2) Logged In	(3) Pension planner	(4) Pension planner
<i>Social Norm Treatments</i>				
Income:fear	-0.0030** (0.0012)	-0.0012 (0.0022)	-0.0020** (0.0010)	0.0007 (0.0019)
Income-hope	-0.0034*** (0.0012)	-0.0036* (0.0021)	-0.0028*** (0.0010)	-0.0016 (0.0019)
Saving-fear	-0.0031*** (0.0012)	-0.0027 (0.0022)	-0.0029*** (0.0010)	-0.0019 (0.0019)
Saving-hope	-0.0021* (0.0012)	-0.0012 (0.0022)	-0.0009 (0.0011)	0.0006 (0.0019)
<i>Financial incentive</i>	0.0190*** (0.0014)	0.0178*** (0.0026)	0.0108*** (0.0012)	0.0088*** (0.0022)
Salary * SN:inc:fear divided by 1000		-0.0001 (0.0001)		-0.0001 (0.0001)
Salary * SN:inc:hope divided by 1000		0.0000 (0.0001)		-0.0001 (0.0001)
Salary * SN:sav:fear divided by 1000		-0.0000 (0.0001)		-0.0001 (0.0001)
Salary * SN:sav:hope divided by 1000		-0.0001 (0.0001)		-0.0001 (0.0001)
Salary * Fin.inc divided by 1000		0.0001 (0.0001)		0.0001 (0.0001)
Gross salary, wins.1% divided by 1000	0.0005*** (0.0000)	0.005*** (0.0001)	0.0005*** (0.0000)	0.0005*** (0.0001)
Constant	0.0020 (0.0019)	0.0017 (0.0022)	0.0005 (0.0016)	-0.0002 (0.0020)
Observations	226,946	226,946	226,946	226,946
R-squared	0.019	0.019	0.013	0.014
Other Covariates	YES	YES	YES	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

7. Conclusion

This paper examined how to improve the effectiveness of pension communication. It particularly sets out to motivate people to inform themselves about their pension. Being informed is the first step to good retirement planning. With correct information about their future pension, the participant can decide whether to save additionally or whether she is content with the level of retirement income. Secondly, pension communication is an important cost factor for pension funds.

In our experiment, we sent out six different letters. With data on website behavior, we measure which treatment is most effective in bringing pension fund participants to their personal site on the pension fund’s homepage and to search for information on their pension. We compare five different treatment letters to a baseline letter and find the following key results. First, financial incentives increase the login rate by 70%, compared to the control letter. Second, the social norms letters do worse than the control letter, for both overall login rate and the information search rate. Third, participants in the financial incentives group do not just login to the personal space to participate in the lottery. On average, 71% also search for information on their pension. Fourth, while men and older participants are on average more likely to log in and inform themselves, we find only small heterogeneity in effects. For males, females as well as participants above and below the median age, financial incentives are most effective. The control letter is the second most effective treatment overall. Women and older participants are more likely to log in and look at information when they receive the financial incentives letter. Older participants, however, are especially discouraged by the savings: fear treatment. Wealthier participants are slightly more likely to react to the financial incentives letter, but the effect is not statistically significant.

Our research shows that one can motivate pension fund participants to look at their personal retirement information with just a small amount of money (€0.33 per log-in). The information helps participants to plan ahead for retirement. If needed, this improves their financial situation if they save additionally.

8. Discussion

Social norms and peer effects have been shown to be effective in different policy areas (Frey and Meier, 2004; Salganik et al., 2006; Schultz et al., 2007; Nolan et al., 2008; Goldstein et al., 2008;

Burger and Shelton, 2011; Fellner et al., 2013; Bott et al., 2017; Hallsworth et al., 2016, 2017). So why do we find social norms to be either ineffective or even backfiring in the context of pensions? One explanation could be that people did not read the letters carefully so that one sentence was not enough to be treated. There are three arguments against that. First, the one sentence about the financial incentive did have a positive effect, which indicates that participants did notice the treatment sentences. Second, the social norms sentences do have a significant effect, but a negative one rather than the expected positive effect. For example, the income-hope treatment decreases the log in rate for all subgroups. Third, Bott et al. (2017), Bhargava and Manoli (2015), and Hallsworth et al. (2017) also only add one sentence in the usual text and do find desired effects.

A second explanation why our social norms treatments were ineffective could be that the particular social norms we used were suboptimal. In our social norms treatments we refer to “A large part of people in the Netherlands...”. An advantage of the type of social norm we used is that we could credibly make our statements in the context of the pension fund, without deceiving pension fund participants. We think it is crucial to communicate in an honest manner to foster trust in the pension fund. We choose this type of social norm because a large number of previous studies has successfully changed behavior this way (De Groot, Abrahamse, and Jones, 2013; Sanders and Smith, 2016; Hallsworth et al., 2017). For example, Hallsworth et al. (2017) use the phrasing “A great majority of the people in the UK...” to increase payment rates for overdue tax. Studies by Wenzel (2004, 2005) show that adding the country reference to the social norm in tax letters increases tax compliance. Based on the existing evidence, we therefore expected this type of social norm to be effective for triggering participants to look at their retirement information.

Clearly, the social norms did not work as intended in the retirement context, in contrast to the tax context. An important question for future research is whether other types of social norms do work effectively to change behavior in the context of retirement. Johnson et al. (2012) point out that more personalized nudges might increase the power of choice architecture. Social norms that refer to specific characteristics of pension fund participants could be more effective. One could think of social norms relating to the specific employer at which the individual is employed or the neighborhood in which she lives. Our findings that social norms are ineffective fit in a recent strand of literature with similar null results (see John et al., 2014, for an overview).

We also investigated spill-over effects. Employees in a branch could talk about the possibility

to receive a financial reward when logging in, thus leading to a higher number of logins across treatments and a washing down of the treatment effects. Three aspects speak against this. First, a spill-over effect would lead to measurement error, making our results conservative. Second, participants in the financial incentive group actually do have a disincentive to talk about the letter: if more people log in, the chance of receiving the VVV-voucher decreases. Third, we tested whether the fraction of participants in the financial incentive group does affect our results. In unreported regressions, the fraction of employees who work for the same employer and receive the financial incentive treatment has been added as a control. Neither does this affect the treatment effects nor is the coefficient of the fraction statistically significant. Spill-over effects therefore do not explain our main results.

Another question is whether the positive effect from the financial incentives treatment corresponds to new website visits that would not have otherwise occurred or whether participants forwarded their planned website visits into the treatment period instead of later in the year. In an unreported analysis we do not see that participants who received the financial incentive letter are less likely to log in during the year of 2016 than participants who have received any other letter. This shows that the financial incentive treatment really results in retirement information search that normally would have not have taken place in a later period of time.

Benartzi et al. (2017) recommend three ways for improving behavioral science’s power for policy-makers. First, Benartzi et al. (2017) recommend to compare the effect of different nudges on the same population. To our knowledge, this study is one of the first comparing the effect of different social norms as well as a financial incentive treatment on the same population. As we run the experiment outside of the governmental nudge units together with a Dutch pension fund, we further act upon Benartzi et al. (2017)’s recommendation of running experiments with partners other than governmental units. Second, they argue that “Tracking failures is as important for knowledge creation as tracking successes” (p.12). We do show null results as well as the negative effect of some of our nudges and do share our data. Third, we do report cost-effectiveness. We argue that the financial incentive costs €0.33 per login rate. As we sent out the letters with regular communication, the other interventions costs nothing in addition.

Lastly, our result might not be representative for the overall Dutch population as we only look at the employees of the pension fund of the Dutch retail sector. The sample contains relatively many

female participants and lots of participants with part-time jobs and, consequently, lower incomes. Low-income individuals might react more strongly to financial incentives (cf. John et al., 2015; Haisley, Volpp, Pellathy, and Loewenstein, 2012). Future research should further analyze whether richer individuals react equally strongly to the financial incentive. Surprisingly, within our sample, financial incentives are even more effective for participants with higher income, which suggests that the effects of financial incentives are not limited to low-income individuals. Our sample tilted towards female and low-income participants has also important advantages because particularly this group is at risk of being poor in old-age retirement (OECD, 2014; EU, 2015). Policy-makers thus have to find a way to reach this part of society. Our study is a first step in offering a solution, which can be extrapolated to activate investors, savers and debtors alike.

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A. Appendix

1. The Letters

The Baseline Letter

Dear participant,

Have you ever thought about your income for later? Your pension? The money which you will receive monthly from 67 onwards?

On www.pensioenfondsdetailhandel.nl you check- in less than a minute - what you will be able to spend soon.

This is how you do it:

- Go to “Mijn Omgeving” on pensioenfondsdetailhandel.nl;
- Log in with your personal ID number;
- Look at your personal pension accrual and pension scheme.

With this new insight you can decide whether you want to lay aside additional money or whether you want to keep on accruing your pension as you are used to.

Additionally, really handy, on “Mijn Omgeving” you see what it means for your pension if you change your job, start living together, get married or divorced... Topics you also find back in the Jij&Wij Magazine, the journal you receive with this letter.

May we ask you to quickly check your data?

Thanks in advance,

Best wishes,

Henk van der Kolk

President of the Pensioenfonds Detailhandel

The Income-Fear Letter

Dear participant,

Have you ever thought about your income for later? Your pension? The money which you will receive monthly from 67 onwards?

A large part of people in the Netherlands think that they will have a too low income to retain their current level of consumption in retirement. What about you?

On www.pensioenfondsdetailhandel.nl you check- in less than a minute - what you will be able to spend soon.

This is how you do it:

- Go to “Mijn Omgeving” on pensioenfondsdetailhandel.nl;
- Log in with your personal ID number;
- Look at your personal pension accrual and pension scheme.

With this new insight you can decide whether you want to lay aside additional money or whether you want to keep on accruing your pension as you are used to.

Additionally, really handy, on “Mijn Omgeving” you see what it means for your pension if you change your job, start living together, get married or divorced... Topics you also find back in the Jij&Wij Magazine, the journal you receive with this letter.

May we ask you to quickly check your data?

Thanks in advance,

Best wishes,

Henk van der Kolk

President of the Pensioenfondsdetailhandel

The Income-Hope Letter

Dear participant,

Have you ever thought about your income for later? Your pension? The money which you will receive monthly from 67 onwards?

A large part of people in the Netherlands think that they will have enough income to retain their current level of consumption in retirement. What about you?

On www.pensioenfondsdetailhandel.nl you check- in less than a minute - what you will be able to spend soon.

This is how you do it:

- Go to “Mijn Omgeving” on pensioenfondsdetailhandel.nl;
- Log in with your personal ID number;
- Look at your personal pension accrual and pension scheme.

With this new insight you can decide whether you want to lay aside additional money or whether you want to keep on accruing your pension as you are used to.

Additionally, really handy, on “Mijn Omgeving” you see what it means for your pension if you change your job, start living together, get married or divorced... Topics you also find back in the Jij&Wij Magazine, the journal you receive with this letter.

May we ask you to quickly check your data?

Thanks in advance,

Best wishes,

Henk van der Kolk

President of the Pensioenfondsdetailhandel

The Savings-Fear Letter

Dear participant,

Have you ever thought about your income for later? Your pension? The money which you will receive monthly from 67 onwards?

A large part of people in the Netherlands think they save too little to retain their current level of consumption in retirement. What about you?

On www.pensioenfondsdetailhandel.nl you check- in less than a minute - what you will be able to spend soon.

This is how you do it:

- Go to “Mijn Omgeving” on pensioenfondsdetailhandel.nl;
- Log in with your personal ID number;
- Look at your personal pension accrual and pension scheme.

With this new insight you can decide whether you want to lay aside additional money or whether you want to keep on accruing your pension as you are used to.

Additionally, really handy, on “Mijn Omgeving” you see what it means for your pension if you change your job, start living together, get married or divorced... Topics you also find back in the Jij&Wij Magazine, the journal you receive with this letter.

May we ask you to quickly check your data?

Thanks in advance,

Best wishes,

Henk van der Kolk

President of the Pensioenfondsdetailhandel

The Savings-Hope Letter

Dear participant,

Have you ever thought about your income for later? Your pension? The money which you will receive monthly from 67 onwards?

A large part of people in the Netherlands think that they will save enough to retain their current level of consumption in retirement. What about you?

On www.pensioenfondsdetailhandel.nl you check- in less than a minute - what you will be able to spend soon.

This is how you do it:

- Go to “Mijn Omgeving” on pensioenfondsdetailhandel.nl;
- Log in with your personal ID number;
- Look at your personal pension accrual and pension scheme.

With this new insight you can decide whether you want to lay aside additional money or whether you want to keep on accruing your pension as you are used to.

Additionally, really handy, on “Mijn Omgeving” you see what it means for your pension if you change your job, start living together, get married or divorced... Topics you also find back in the Jij&Wij Magazine, the journal you receive with this letter.

May we ask you to quickly check your data?

Thanks in advance,

Best wishes,

Henk van der Kolk

President of the Pensioenfonds Detailhandel

The Financial Incentive Letter

Dear participant,

Have you ever thought about your income for later? Your pension? The money which you will receive monthly from 67 onwards?

On www.pensioenfondsdetailhandel.nl you check- in less than a minute - what you will be able to spend soon.

Among all participants who log in, we are raffling 100 VVV gift vouchers worth €25.

This is how you do it:

- Go to “Mijn Omgeving” on pensioenfondsdetailhandel.nl;
- Log in with your personal ID number;
- Look at your personal pension accrual and pension scheme.

With this new insight you can decide whether you want to lay aside additional money or whether you want to keep on accruing your pension as you are used to.

Additionally, really handy, on “Mijn Omgeving” you see what it means for your pension if you change your job, start living together, get married or divorced... Topics you also find back in the Jij&Wij Magazine, the journal you receive with this letter.

May we ask you to quickly check your data?

Thanks in advance,

Best wishes,

Henk van der Kolk

President of the Pensioenfonds Detailhandel

2. Descriptive Statistics

Table A.1

Descriptive Statistics of Pension Fund's Population and Participants Who Have Logged In

This table shows descriptive statistics of both the sample of people who have logged in as well as all active participants of the pension fund. The number of observation differs between rows as we do not have information for everyone on income, the part-time factor and postcode. Except for the part-time factor, age and gross salary, all variables present rates. For example, 3.1% of the whole population has logged in at least once, while 2.2% have clicked on the pension planner. Of everyone who logged in (7,640 people), 71.6% have clicked on the pension planner. The province variables give information on how much % of the sample and population live in each province.

VARIABLES	N	Logged In		All Active Participants		
		Mean	St.Dev.	N	Mean	St.Dev.
Logged in at least once				226,946	0.0312	0.1740
Clicked on pensionplanner at least once	7,092	0.7268	0.4456	226,946	0.0227	0.1490
Time spent on pension planner, in minutes	5,155	3.4965	3.6084			
Man	7,092	0.3636	0.4811	226,946	0.3106	0.4627
Age, in years	7,092	44.0405	14.9323	226,946	37.4447	12.9761
Part-time factor	7,092	0.6831	0.2883	226,946	0.6708	0.2922
Partner	7,092	0.5111	0.4999	226,946	0.3940	0.4886
Gross salary, wins.1% , in €	7,092	20,743	15,124	226,946	18,358	12,994
PROVINCES						
Noord-Holland	7,092	0.1792	0.3836	226,946	0.1839	0.3874
Flevoland	7,092	0.0237	0.1521	226,946	0.0257	0.1582
Utrecht	7,092	0.0807	0.2723	226,946	0.0777	0.2677
Zuid-Holland	7,092	0.1834	0.3871	226,946	0.2040	0.4030
Gelderland	7,092	0.1213	0.3265	226,946	0.1166	0.3210
Noord-Brabant	7,092	0.1500	0.3571	226,946	0.1422	0.3493
Zeeland	7,092	0.0247	0.1551	226,946	0.0230	0.1499
Limburg	7,092	0.0740	0.2618	226,946	0.0681	0.2519
Overijssel	7,092	0.0688	0.2531	226,946	0.0671	0.2502
Drenthe	7,092	0.0343	0.1819	226,946	0.0292	0.1683
Friesland	7,092	0.0350	0.1837	226,946	0.0333	0.1795
Groningen	7,092	0.0250	0.1560	226,946	0.0291	0.1680

3. Summary Statistics per Treatment

Table A.2

Summary Statistics per Treatment

VARIABLES	Baseline (N=37,855)		Income: Fear (N=37,993)		Income: Hope (N=37,806)		Saving: Fear (N=37,748)		Saving: Hope (N=37,798)		Financial Incentive (N=37,806)	
	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.
Logged in at least once	0.0300	0.1705	0.0268	0.1615	0.0267	0.1611	0.0269	0.1618	0.0280	0.1650	0.0492	0.2162
Clicked on pensionplanner at least once	0.0223	0.1477	0.0201	0.1405	0.0196	0.1385	0.0195	0.1382	0.0215	0.1451	0.0333	0.1794
Male	0.3116	0.4631	0.3094	0.4623	0.3102	0.4626	0.3086	0.4619	0.3116	0.4632	0.3121	0.4634
Age	37.4166	12.9636	37.3363	12.9103	37.4482	12.9805	37.4971	12.9611	37.4607	13.0419	37.5099	12.9993
Part-time factor	0.6735	0.2916	0.6709	0.2919	0.6694	0.2922	0.6701	0.2932	0.6692	0.2919	0.6714	0.2922
Partner: admin data	0.3908	0.4879	0.3929	0.4884	0.3951	0.4889	0.3971	0.4893	0.3931	0.4884	0.3948	0.4888
Gross salary, wins.1%	18,433	13,021	18,343	12,951	18,331	12,975	18,340	13,031	18,320	13,018	18,379	12,971
Noord-Holland	0.1844	0.3878	0.1839	0.3874	0.1837	0.3872	0.1835	0.3871	0.1835	0.3871	0.1847	0.3880
Flevoland	0.0255	0.1575	0.0257	0.1583	0.0257	0.1583	0.0258	0.1586	0.0257	0.1584	0.0257	0.1582
Utrecht	0.0778	0.2678	0.0771	0.2668	0.0778	0.2679	0.0780	0.2682	0.0780	0.2681	0.0775	0.2674
Zuid-Holland	0.2041	0.4030	0.2045	0.4034	0.2044	0.4033	0.2035	0.4026	0.2039	0.4029	0.2035	0.4026
Gelderland	0.1162	0.3205	0.1172	0.3216	0.1167	0.3211	0.1167	0.3211	0.1166	0.3210	0.1164	0.3208
Noord-Brabant	0.1425	0.3495	0.1415	0.3486	0.1422	0.3492	0.1419	0.3489	0.1424	0.3494	0.1430	0.3501
Zeeland	0.0227	0.1491	0.0233	0.1507	0.0231	0.1503	0.0231	0.1502	0.0229	0.1496	0.0229	0.1496
Limburg	0.0681	0.2519	0.0684	0.2525	0.0678	0.2513	0.0682	0.2521	0.0679	0.2516	0.0682	0.2521
Overijssel	0.0670	0.2501	0.0671	0.2502	0.0669	0.2498	0.0673	0.2506	0.0671	0.2502	0.0670	0.2501
Drenthe	0.0292	0.1685	0.0292	0.1684	0.0292	0.1684	0.0294	0.1688	0.0290	0.1679	0.0289	0.1676
Friesland	0.0334	0.1798	0.0331	0.1789	0.0336	0.1802	0.0331	0.1789	0.0334	0.1797	0.0334	0.1796
Groningen	0.0291	0.1680	0.0289	0.1677	0.0288	0.1673	0.0295	0.1692	0.0295	0.1692	0.0287	0.1669

4. Comparison Between Pension Fund Participants and the Dutch Population

Table A.3

Comparison Between the Statistics of the Active Pension Fund Participants and the General Dutch Population

VARIABLES	Pension Fund Participants(BpFD) Mean	Dutch Population Mean
Male	0.3106	0.495
Age	37.4447	39
Younger than 20	0	0.2265
20 to 40	0.5727	0.2446
40 to 65	0.4203	0.3509
65 to 80	0.0069	0.1345
Older than 80	0	0.0435
Part-time factor	0.6708	
Real salary, wins.1%	18,150	37,200
PROVINCES		
Noord-Holland	0.1839	0.1640
Flevoland	0.0257	0.0238
Utrecht	0.0777	0.0750
Zuid-Holland	0.2040	0.2133
Gelderland	0.1166	0.1199
Noord-Brabant	0.1422	0.1472
Zeeland	0.0230	0.0225
Limburg	0.0684	0.0657
Overijssel	0.0665	0.0674
Drenthe	0.0290	0.0288
Friesland	0.0328	0.0381
Groningen	0.0291	0.0341

Source: For BpFD data: the administrative dataset provided by TKP. For the Dutch Population Mean: CBS.

5. Univariate Tests

Table A.4

Differences in Login Rate between Groups

This table shows the differences in login rates between the different groups. The Bonferroni-adjusted p-values are displayed in parentheses.

	Control	Social Norms			
		Income: Fear	Income: Hope	Savings: Fear	Savings: Hope
Social Norm Treatments:					
Income:Fear	-0.0032 (0.169)				
Income: Hope	-0.0033 (0.129)	-0.0001 (1.000)			
Savings: Fear	-0.0031 (0.216)	0.0001 (1.000)	0.0002 (1.000)		
Savings: Hope	-0.0020 (1.000)	0.0012 (1.000)	0.0014 (1.000)	0.0011 (1.000)	
<i>Financial incentive</i>	0.0192*** (0.000)	0.0224*** (0.000)	0.0225*** (0.000)	0.0223*** (0.0000)	0.0212*** (0.000)

*** p<0.01, ** p<0.05, * p<0.1

Table A.5

Differences in Click-Through Rates between Groups

This table shows the differences in click-through rates between the different groups. The Bonferroni-adjusted p-values are displayed in parentheses.

	Control	Social Norms			
		Income: Fear	Income: Hope	Savings: Fear	Savings: Hope
Social Norm Treatments:					
Income:Fear	-0.0022 (0.657)				
Income:Hope	-0.0028 (0.167)	-0.0006 (1.000)			
Savings:Fear	-0.0029 (0.127)	-0.0007 (1.000)	-0.0001 (1.000)		
Savings:Hope	-0.0008 (1.000)	0.0014 (1.000)	0.0019 (1.000)	0.0020 (0.900)	
<i>Financial incentive</i>	0.0110*** (0.000)	0.0131*** (0.000)	0.0137*** (0.000)	0.0138*** (0.000)	0.0118*** (0.000)

*** p<0.01, ** p<0.05, * p<0.1

Table A.6

Differences in Login Rate between Groups-Divided by Gender

This table shows the differences in login rates between the different groups. Panel A shows the differences for men, while Panel B shows the difference for women. The Bonferroni-adjusted p-values are displayed in parentheses.

	Panel A: Men				
	Control	Social Norms			
		Income: Fear	Income: Hope	Savings: Fear	Savings: Hope
Social Norm Treatments:					
Income:Fear	-0.0034 (0.979)				
Income: Hope	-0.0023 (1.000)	0.0022 (1.000)			
Savings: Fear	-0.0027 (1.000)	0.0018 (1.000)	-0.0005 (1.000)		
Savings: Hope	-0.0004 (1.000)	0.0041 (1.000)	0.0019 (1.000)	0.0024 (1.000)	
<i>Financial incentive</i>	0.0157*** (0.000)	0.0202*** (0.000)	0.0179*** (0.000)	0.0184*** (0.000)	0.160*** (0.000)

	Panel B: Women				
	Control	Social Norms			
		Income: Fear	Income: Hope	Savings: Fear	Savings: Hope
Social Norm Treatments:					
Income:Fear	-0.0026 (1.0)				
Income:Hope	-0.0038 (0.149)	-0.0011 (1.000)			
Savings: Fear	-0.0032 (0.417)	-0.0006 (1.000)	0.0006 (1.000)		
Savings: Hope	-0.0027 (1.000)	-0.0001 (1.000)	0.0011 (1.000)	0.0005 (1.000)	
<i>Financial incentive</i>	0.0208*** (0.000)	0.0234*** (0.000)	0.0246*** (0.000)	0.0240*** (0.000)	0.0235*** (0.000)

*** p<0.01, ** p<0.05, * p<0.1

Table A.7

Differences in Click-Through Rate between Groups-Divided by Gender

This table shows the differences in click-through rates between the different groups. Panel A shows the differences for men, while Panel B shows the difference for women. The Bonferroni-adjusted p-values are displayed in parentheses.

	Panel A: Men				
	Control	Social Norms			
		Income: Fear	Income: Hope	Savings: Fear	Savings: Hope
Social Norm Treatments:					
Income:Fear	-0.0044 (0.645)				
Income: Hope	-0.0030 (1.000)	0.0014 (1.000)			
Savings: Fear	-0.0038 (1.000)	0.0006 (1.000)	-0.0008 (1.000)		
Savings: Hope	-0.0010 (1.000)	0.0034 (1.000)	0.0020 (1.000)	0.0028 (1.000)	
<i>Financial incentive</i>	0.0093*** (0.000)	0.0137*** (0.000)	0.0123*** (0.000)	0.0131*** (0.000)	0.0103*** (0.000)
<hr/>					
	Panel B: Women				
	Control	Social Norms			
		Income: Fear	Income: Hope	Savings: Fear	Savings: Hope
Social Norm Treatments:					
Income:Fear	-0.0012 (1.000)				
Income:Hope	-0.0026 (0.501)	-0.0015 (1.000)			
Savings: Fear	-0.0024 (0.764)	-0.0012 (1.000)	0.0002 (1.000)		
hskip 2em Savings: Hope	-0.0007 (1.000)	0.0004 (1.000)	0.0012 (1.000)	0.0017 (1.000)	
<i>Financial incentive</i>	0.0117*** (0.000)	0.0129*** (0.000)	0.0143*** (0.000)	0.0141*** (0.000)	0.0124*** (0.000)

*** p<0.01, ** p<0.05, * p<0.1

Table A.8

Differences in Login Rate between Groups-Divided by Age

This table shows the differences in login rates between the different groups. Panel A shows the differences for participants younger than the median age, while Panel B shows the difference for participants older than the median age. The Bonferroni-adjusted p-values are displayed in parentheses.

	Panel A: Younger Than Median Age				
	Control	Social Norms			
		Income: Fear	Income: Hope	Savings: Fear	Savings: Hope
Social Norm Treatments:					
Income:Fear	-0.0022 (1.000)				
Income: Hope	-0.0027 (1.000)	-0.0005 (1.000)			
Savings: Fear	-0.0001 (1.000)	0.0021 (1.000)	0.026 (1.000)		
Savings: Hope	-0.0001 (1.000)	0.0020 (1.000)	0.0025 (1.000)	-0.0000 (1.000)	
<i>Financial incentive</i>	0.0154*** (0.000)	0.0176*** (0.000)	0.0181*** (0.000)	0.0155*** (0.000)	0.0156*** (0.000)
<hr/>					
	Panel B: Older Than Median Age				
	Control	Social Norms			
		Income: Fear	Income: Hope	Savings: Fear	Savings: Hope
Social Norm Treatments:					
Income:Fear	-0.0042 (0.580)				
Income:Hope	-0.0041 (0.656)	0.0001 (1.000)			
Savings: Fear	-0.0063** (0.030)	-0.0021 (1.000)	-0.0022 (1.000)		
hskip 2em Savings: Hope	-0.0039 (0.884)	0.0004 (1.000)	0.0003 (1.000)	0.0024 (1.000)	
<i>Financial incentive</i>	0.0228*** (0.000)	0.0270*** (0.000)	0.0269*** (0.000)	0.0291*** (0.000)	0.0266*** (0.000)

*** p<0.01, ** p<0.05, * p<0.1

Table A.9

Differences in Click-Through Rate between Groups-Divided by Age

This table shows the differences in click-through rates between the different groups. Panel A shows the differences for participants younger than the median age, while Panel B shows the difference for participants above the median age. The Bonferroni-adjusted p-values are displayed in parentheses.

	Panel A: Younger Than Median Age				
	Control	Social Norms			
		Income: Fear	Income: Hope	Savings: Fear	Savings: Hope
Social Norm Treatments:					
Income:Fear	-0.0022 (1.000)				
Income: Hope	-0.0027 (1.000)	-0.0005 (1.000)			
Savings: Fear	-0.0001 (1.000)	0.0021 (1.000)	0.0026 (1.000)		
Savings: Hope	-0.0001 (1.000)	0.0020 (1.000)	0.0025 (1.000)	-0.0000 (1.000)	
<i>Financial incentive</i>	0.0154*** (0.000)	0.0176*** (0.000)	0.0181*** (0.000)	0.0155*** (0.000)	0.0156*** (0.000)
<hr/>					
	Panel B: Older Than Median Age				
	Control	Social Norms			
		Income: Fear	Income: Hope	Savings: Fear	Savings: Hope
Social Norm Treatments:					
Income:Fear	-0.0031 (1.000)				
Income:Hope	-0.0031 (1.000)	0.0000 (1.000)			
Savings: Fear	-0.0056** (0.019)	-0.0025 (1.000)	-0.0025 (1.000)		
Savings: Hope	-0.0017 (1.000)	0.0014 (1.000)	0.0014 (1.000)	0.0039 (0.387)	
<i>Financial incentive</i>	0.0122*** (0.000)	0.0153*** (0.000)	0.0163*** (0.000)	0.0178*** (0.000)	0.0149*** (0.000)

*** p<0.01, ** p<0.05, * p<0.1

Table A.10

Differences in Login Rate between Groups-Divided by Income

This table shows the differences in login rates between the different groups. Panel A shows the differences for participants who earn less than the median income, while Panel B shows the difference for participants who earn more than the median income. The Bonferroni-adjusted p-values are displayed in parentheses.

	Panel A: Less Income Than Median Income				
	Control	Social Norms			
		Income: Fear	Income: Hope	Savings: Fear	Savings: Hope
Social Norm Treatments:					
Income:Fear	-0.0035 (0.670)				
Income: Hope	-0.0044 (0.162)	-0.0009 (1.000)			
Savings: Fear	-0.0037 (0.529)	-0.0002 (1.000)	0.0008 (1.000)		
Savings: Hope	-0.0024 (1.000)	0.0011 (1.000)	0.0020 (1.000)	0.0013 (1.000)	
<i>Financial incentive</i>	0.0200*** (0.000)	0.0235*** (0.000)	0.0244*** (0.000)	0.0236*** (0.000)	0.0224*** (0.000)
<hr/>					
	Panel B: More Income than Median Income				
	Control	Social Norms			
		Income: Fear	Income: Hope	Savings: Fear	Savings: Hope
Social Norm Treatments:					
Income:Fear	-0.0029 (1.000)				
Income:Hope	-0.0022 (1.000)	0.0007 (1.000)			
Savings: Fear	-0.0026 (1.000)	-0.0004 (1.000)	-0.0003 (1.000)		
hskip 2em Savings: Hope	-0.0015 (1.000)	0.0014 (1.000)	0.0007 (1.000)	0.0010 (1.000)	
<i>Financial incentive</i>	0.0184*** (0.000)	0.0213*** (0.000)	0.0206*** (0.000)	0.0210*** (0.000)	0.0199*** (0.000)

*** p<0.01, ** p<0.05, * p<0.1

Table A.11

Differences in Click-Through Rate between Groups-Divided by Income

This table shows the differences in login rates between the different groups. Panel A shows the differences for participants who earn less than the median income, while Panel B shows the difference for participants who earn more than the median income. The Bonferroni-adjusted p-values are displayed in parentheses.

	Panel A: Less Income Than Median Income				
	Control	Social Norms			
		Income: Fear	Income: Hope	Savings: Fear	Savings: Hope
Social Norm Treatments:					
Income:Fear	-0.0014 (1.000)				
Income: Hope	-0.0025 (1.000)	-0.0011 (1.000)			
Savings: Fear	-0.0031 (0.524)	-0.0017 (1.000)	-0.0006 (1.000)		
Savings: Hope	-0.0005 (1.000)	0.0009 (1.000)	0.0020 (1.000)	0.0026 (1.000)	
<i>Financial incentive</i>	0.0107*** (0.000)	0.0120*** (0.000)	0.0131*** (0.000)	0.0138*** (0.000)	0.0112*** (0.000)
<hr/>					
	Panel B: More Income Than Median Income				
	Control	Social Norms			
		Income: Fear	Income: Hope	Savings: Fear	Savings: Hope
Social Norm Treatments:					
Income:Fear	-0.0030 (0.917)				
Income:Hope	-0.0030 (0.883)	-0.0000 (1.000)			
Savings: Fear	-0.0026 (1.000)	0.0004 (1.000)	0.0004 (1.000)		
Savings: Hope	-0.0011 (1.000)	0.0018 (1.000)	0.0019 (1.000)	0.0015 (1.000)	
<i>Financial incentive</i>	0.0112*** (0.000)	0.0142*** (0.000)	0.0142*** (0.000)	0.0138*** (0.000)	0.0123*** (0.000)

*** p<0.01, ** p<0.05, * p<0.1

6. Multiple Hypotheses Testing

Table A.12

Multiple Hypotheses Testing: Splitting between Gender

This table shows the multiple hypotheses adjustments according to the procedure proposed by List et al. (2016). The first column shows the subgroup, in this case men or women. The second column gives the two outcome variables. The third column presents the treatment group which is compared to the control group. The fourth column gives the differences in means. Columns 5-9 present the p-values given different procedures.

Subgroup	Outcome	Letter	DI	p-values				
				Unadjusted	Multiplicity Adjusted			
				Remark3.1	Thm3.1	Remark3_7	Bonferroni	Holm
Men	login	SN:inc:fear	0.0050	0.0227**	0.1733	0.1733	0.4533	0.2720
Men	login	SN:inc:hope	0.0018	0.4200	0.8290	0.8290	1.0000	1.0000
Men	login	SN:sav:fear	0.0032	0.1620	0.5663	0.5663	1.0000	0.9720
Men	login	SN:sav:hope	0.0005	0.8310	0.8310	0.8310	1.0000	0.8310
Men	login	Fin.inc.	0.0153	0.0003***	0.0003***	0.0003***	0.0067***	0.0063***
Women	login	SN:inc:fear	0.0028	0.0423**	0.2153	0.2153	0.8467	0.3387
Women	login	SN:inc:hope	0.0042	0.0017***	0.0163**	0.0163**	0.0333**	0.0267**
Women	login	SN:sav:fear	0.0038	0.0040***	0.0397**	0.0397**	0.0800*	0.0600**
Women	login	SN:sav:hope	0.0038	0.0400**	0.2219	0.2210	0.8000	0.3600
Women	login	Fin.inc.	0.1980	0.0003***	0.0003***	0.0003***	0.0067***	0.0063***
Men	pension planner	SN:inc:fear	0.0052	0.0100**	0.0950*	0.0950*	0.2000	0.1400
Men	pension planner	SN:inc:hope	0.0031	0.1273	0.4957	0.4957	1.0000	0.8913
Men	pension planner	SN:sav:fear	0.0046	0.0237**	0.1673	0.1673	0.4733	0.2603
Men	pension planner	SN:sav:hope	0.0014	0.4980	0.6217	0.6217	1.0000	0.9960
Men	pension planner	Fin.inc.	0.0086	0.0003***	0.0003***	0.0003***	0.0067	0.0057***
Women	pension planner	SN:inc:fear	0.0011	0.3337	0.8030	0.8030	1.0000	1.0000
Women	pension planner	SN:inc:hope	0.0027	0.0143**	0.1273	0.1273	0.2867	0.18363
Women	pension planner	SN:sav:fear	0.0025	0.0250**	0.1643	0.1643	0.5000	0.2500
Women	pension planner	SN:sav:hope	0.0008	0.4580	0.7697	0.7697	1.0000	1.000
Women	pension planner	Fin.inc	0.0111	0.0003***	0.0003***	0.0003***	0.0067***	0.0060***

*** p<0.01, ** p<0.05, * p<0.1

Table A.13
Multiple Hypotheses Testing: Age.

This table shows the multiple hypotheses adjustments according to the procedure proposed by List et al. (2016). The first column shows the subgroup, whether participants are above or below the median age. The second column gives the two outcome variables. The third column presents the treatment group which is compared to the control group. The fourth column gives the differences in means. Columns 5-9 present the p-values given different procedures.

Subgroup	Outcome	Letter	DI	p-values				
				Unadjusted		Multiplicity Adjusted		
				Remark3_1	Thm3_1	Remark3_7	Bonferroni	Holm
Above median age	login	SN:inc:fear	0.0048	0.0107**	0.0903*	0.0903*	0.2133	0.1493
Above median age	login	SN:inc:hope	0.0044	0.0190**	0.1507	0.1507	0.3800	0.2470
Above median age	login	SN:sav:fear	0.0074	0.0003***	0.0003***	0.0003***	0.0067***	0.0053***
Above median age	login	SN:sav:hope	0.0041	0.0267**	0.1773	0.1773	0.5333	0.2933
Above median age	login	Fin.inc	0.0214	0.0003***	0.0003***	0.0003***	0.0067***	0.0050***
Below median age	login	SN:inc:fear	0.0021	0.1450	0.5143	0.5143	1.0000	0.749
Below median age	login	SN:inc:hope	0.0027	0.0470**	0.2233	0.2233	0.9400	0.3760
Below median age	login	SN:sav:fear	0.0001	0.9730	0.9703	0.9703	1.0000	0.9730
Below median age	login	SN:sav:hope	0.0001	0.9330	0.9990	0.9990	1.0000	1.0000
Below median age	login	Fin.inc.	0.0151	0.0003***	0.0003***	0.0003***	0.0067***	0.0067***
Above median age	pension planner	SN:inc:fear	0.0036	0.0227**	0.1660	0.1660	0.4533	0.2720
Above median age	pension planner	SN:inc:hope	0.0033	0.0337**	0.1990	0.1990	0.6733	0.3367
Above median age	pension planner	SN:sav:fear	0.0062	0.0003***	0.0003***	0.0003***	0.0067***	0.0057***
Above median age	pension planner	SN:sav:hope	0.0021	0.1807	0.5790	0.5790	1.0000	1.0000
Above median age	pension planner	Fin.inc.	0.0111	0.0003***	0.0003***	0.0003***	0.0067***	0.0060***
Below median age	pension planner	SN:inc:fear	0.0012	0.3587	0.7747	0.7747	1.0000	1.0000
Below median age	pension planner	SN:inc:hope	0.0025	0.0360**	0.1863	0.1863	0.7200	0.324
Below median age	pension planner	SN:sav:fear	0.0001	0.9270	1.0000	1.0000	1.0000	1.0000
Below median age	pension planner	SN:sav:hope	0.0001	0.9480	0.9963	0.9963	1.0000	1.000
Below median age	pension planner	Fin.inc.	.0094	0.0003***	0.0003***	0.0003***	0.0067***	0.006***

*** p<0.01, ** p<0.05, * p<0.1

Table A.14
Multiple Hypotheses Testing: Income.

This table shows the multiple hypotheses adjustments according to the procedure proposed by List et al. (2016). The first column shows the subgroup, in this case participants above or below the median income. The second column gives the two outcome variables. The third column presents the treatment group which is compared to the control group. The fourth column gives the differences in means. Columns 5-9 present the p-values given different procedures.

Subgroup	Outcome	Letter	DI	p-values				
				Unadjusted	Multiplicity Adjusted			
				Remark3_1	Thm3_1	Remark3_7	Bonferroni	Holm
Above median income	login	SN:inc:fear	0.0035	0.0313**	0.1850	0.1850	0.6267	0.2820
Above median income	login	SN:inc:hope	0.0026	0.1163	0.4263	0.4263	1.0000	0.6980
Above median income	login	SN:sav:fear	0.0036	0.0300**	0.1920	0.1920	0.6000	0.3000
Above median income	login	SN:sav:hope	0.0018	0.2747	0.6490	0.6490	1.0000	1.000
Above median income	login	Fin.inc.	0.0171	0.0003***	0.0003***	0.0003***	0.0067***	0.0060***
Below median income	login	SN:inc:fear	0.0034	0.0067***	0.0707*	0.0707*	0.1333	0.2693
Below median income	login	SN:inc:hope	0.0044	0.0067	0.0707*	0.0707*	0.1333	0.1067
Below median income	login	SN:sav:fear	0.0037	0.0290**	0.2023	0.2023	0.5800	0.3190
Below median income	login	SN:sav:hope	0.0024	0.1363	0.4203	0.4203	1.0000	0.6817
Below median income	login	Fin.inc.	0.0198	0.0003***	0.0003***	0.0003***	0.0067***	0.0063***
Above median income	pension planner	SN:inc:fear	0.0033	0.0193**	0.1757	0.1757	0.3867	0.2900
Above median income	pension planner	SN:inc:hope	0.0032	0.0273**	0.2030	0.2030	0.5467	0.3280
Above median income	pension planner	SN:sav:fear	0.0032	0.0260**	0.2120	0.2120	0.5200	0.3640
Above median income	pension planner	SN:sav:hope	0.0014	0.3187	0.6577	0.6577	1.0000	0.9560
Above median income	pension planner	Fin.inc.	0.0101	0.0033***	0.0003***	0.0003***	0.0067***	0.0057***
Below median income	pension planner	SN:inc:fear	0.0013	0.3390	0.5283	0.5283	1.0000	0.6780
Below median income	pension planner	SN:inc:hope	0.0025	0.0720*	0.3127	0.3127	1.000	0.5040
Below median income	pension planner	SN:sav:fear	0.0031	0.0260**	0.2020	0.2020	0.5200	0.338
Below median income	pension planner	SN:sav:hope	0.0005	0.7313	0.7313	0.7313	1.0000	0.7313
Below median income	pension planner	Fin.inc.	0.0106	0.0003***	0.0003***	0.0003***	0.0067***	0.0067***

*** p<0.01, ** p<0.05, * p<0.1

7. Further Spotlight Analyses

Figure 9
Spotlight Analysis of the Pension Planner Click Rate, by Age

This figure shows the average marginal effects of the treatment letters on the login rate, given different ages. The lines present the average effects, while the areas show the 95%-confidence intervals.

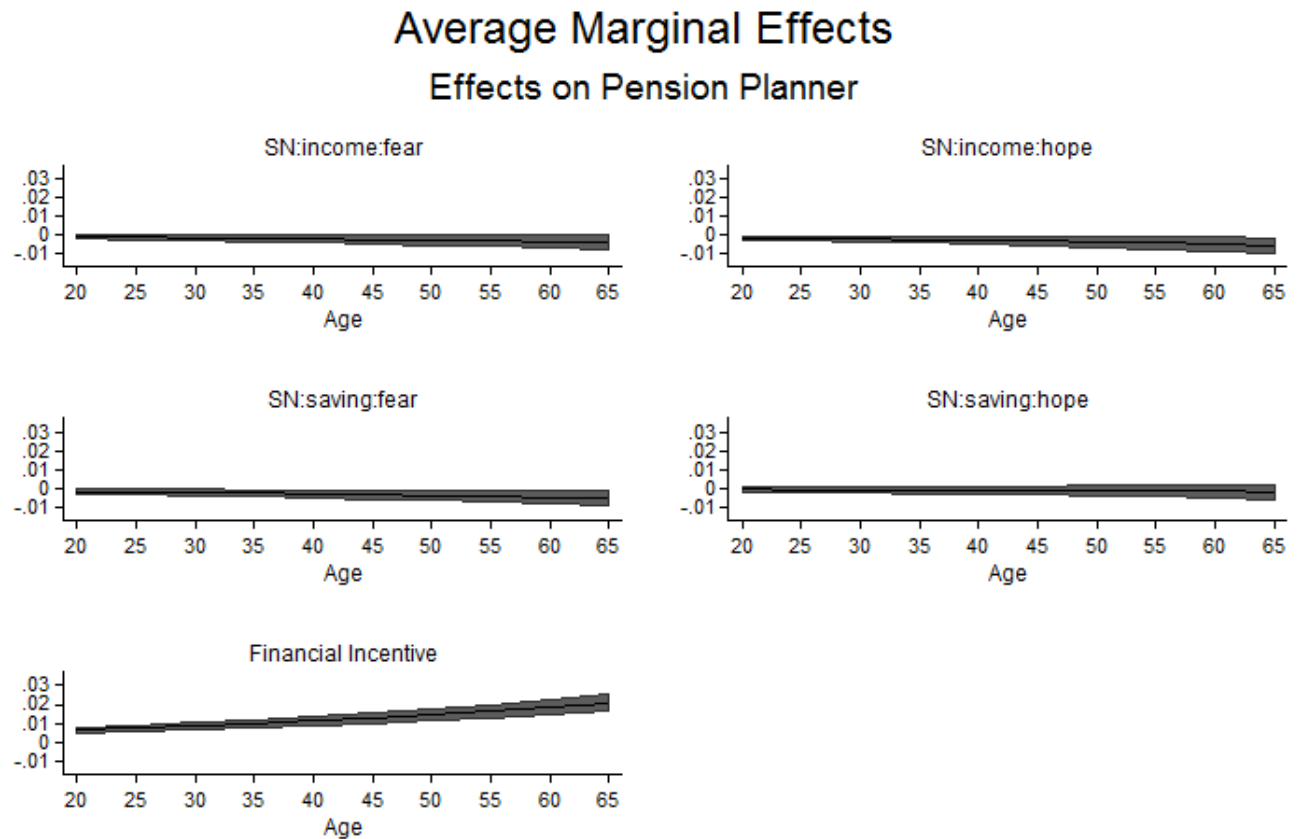
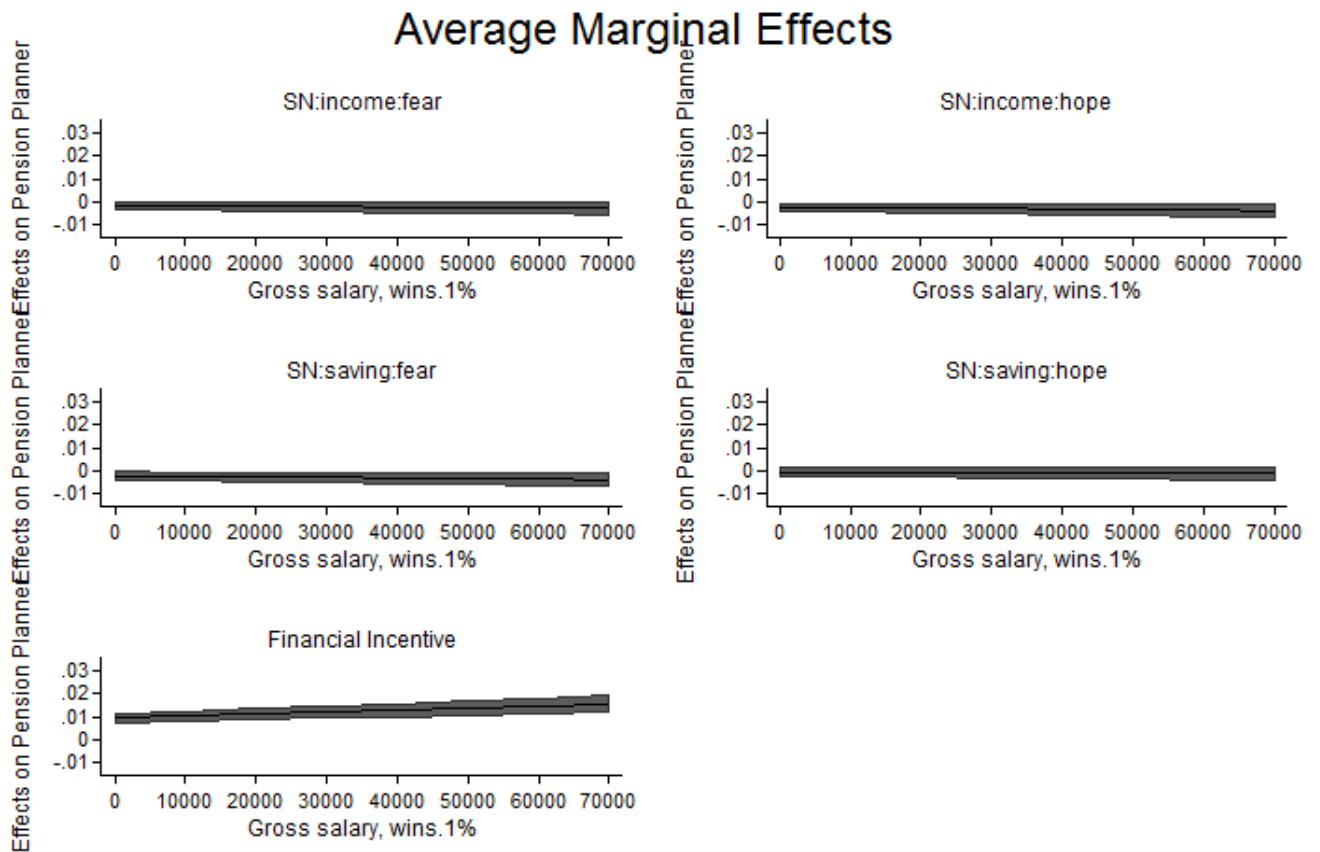


Figure 10
Spotlight Analysis of the Pension Planner Click Rate, by Salary

This figure shows the average marginal effects of the treatment letters on the click-through rate, given different salary levels. The lines present the average effects, while the areas show the 95%-confidence intervals.



8. Further Graphs

Figure 11

The Log-In Rate per Letter, Divided by Median Income

This figure shows the average log-in rate per letter, given by the height of the bars. The sample is divided by the median income of €15,622. The black ranges present the 95% confidence intervals. If the intervals overlap, the difference between the means is not statistically significant at a 5% level.

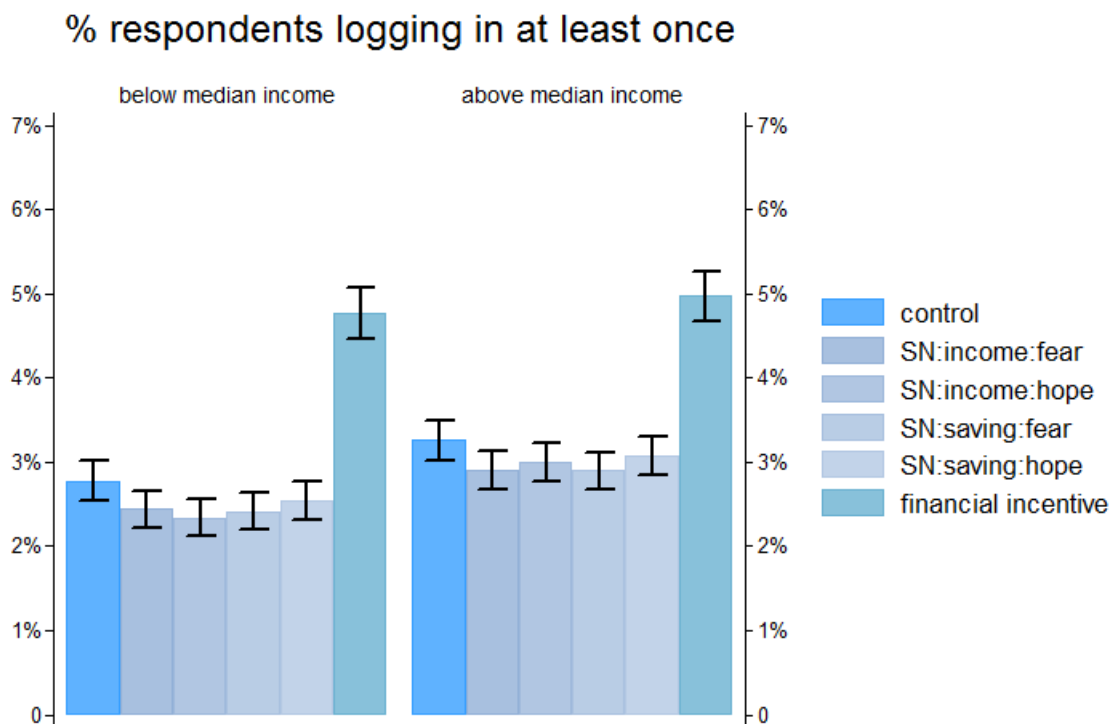


Figure 12

The Pension Planner Click Rate per Letter, Divided by Median Income

This figure shows the average click rate on the pensionplanner per letter, given by the height of the bars. The sample is split by the median income of €15,622. The black ranges present the 95% confidence intervals. If the intervals overlap, the difference between the means is not statistically significant at a 5% level.

