Personalized Information as a Tool to Improve Pension Savings: Results from a Randomized Control Trial in Chile*

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Abstract

We randomly offer low- to middle-income workers in Chile personalized versus generalized information regarding their pension savings. We find that personalized information, overall, increased the probability that someone would made a voluntary contribution to their pension fund up to 8 months after the treatment and also increase the amount of voluntary savings in their pension fund. Once we divide individuals by their expected pension compared to their simulated one, we find that this effect is strongest for individuals who overestimated their pension at the time of the intervention while we see increased retirement rates and decrease mandatory contribution for individuals who had underestimated their pension. We find no evidence that savings outside of the official pension system were crowded out by our intervention. We even find some limited impact on formalization rates. This suggests that lack of understanding of the pension system can explain at least part of the low contribution rates in a defined contribution system.

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1 Introduction

Most developing countries are facing aging populations, which might lower their ability to provide acceptable living standards to the elderly. Most of these countries, furthermore, have opted to establish defined contribution pension systems instead of defined benefits ones, given their budgetary restrictions. However, defined contribution pension systems suffer from low contribution rates and low accumulation despite of its mandatory nature. Two general explanations have been provided to explain this low rate of contribution: lack of knowledge or inability to commit to savings plan. This paper focuses on the first one since it seems to be required that individuals have the right information set before we verify whether they have commitment problems. Specifically, we randomly provided *personalized information in a very concrete and simple fashion* to around 1,000 low- to middle-income individuals in Chile explaining how they could improve their expected pension. At the same time, a control group of the same size received generic information regarding how to increase their pension savings, crucially this message used no personalized information. We evaluate the impact of this information provision on pension savings using administrative data from the Chile's Superintendence of Pension (afterwards, SdP, from its Spanish name) complemented with self-reported survey data.

Providing simple information may be relevant in the context of a defined contribution system since that type of system requires an understanding of financial concepts by the population, because the actions taken while being active in the labor market directly translate into pension replacement rates once retired. While a defined benefits system usually requires individuals to know their last x years of wage earnings to calculate their pensions, defined contribution systems rely on individuals understanding complex financial concepts such as compound interest, market fluctuations and timing of investments. In that context, generic advice such as "save today for a better retirement tomorrow" may not be fully understood by participants and thus lead to limited responses, even more when choosing a course of action requires a working knowledge of returns, contributions, and their connection to pensions at retirement.

The intervention consists of a field experiment (randomized control trial) where eight self-service modules were installed, equipped with a pension simulation software (Berstein, Fuentes and Villatoro, 2013), in locations with a high flow of low-income individuals, namely governmental offices where social payments and services targeted to their needs are delivered. In Chile, those services have been agglomerated into government offices called "Chile Atiende", of which there are 153 locations across the country, receiving on average 37,000 visits per year, and we chose eight offices with a large number of visits to install the self-service modules. The intervention considers a single treatment (receiving personalized versus generic information) and the allocation into treatment and control groups was made according to the last digit of their national ID number,

splitting the sample into two equally sized groups.[1]

The treated individuals receive a personalized estimate of their expected pension under different scenarios: increasing the number of months per year with a contribution to the system, increasing voluntary savings, and delaying retirement by one year.[2] Such estimates are calculated using administrative data that is matched using the national ID number. At the time of the simulation, the individual is faced with his/her actual situation in terms of the level in his/her saving account, density of contributions, income level, fund type, etc.[3] In order to make sure that our intervention does not simply increase the salience of pension savings or produces a "nudge" to individuals to talk about their pension savings, the control group is also reminded that savings for retirement is important. The control group receives *general* information and recommendations on how to improve their future pensions, including the benefits of augmenting the number of contributions per year, augmenting voluntary savings and postponing retirement age, but without any reference to their individual situation. Thus, we see that the treatment consists only in offering personalized versus generalized information, and does not focus on nudging or inducing a different behavioral response. The interest on personalized information regarding one's pension also comes from a practical point of view, as personalized messages are used around the world as many plan providers offer this type of information but its impact has not yet been tested formally, particularly in the context of a mandatory system like Chile's pensions.

By focusing on personalized information linking courses of action with simply explained outcomes, our intervention aims at helping individuals to recognize the link between their contributions today and the level of pension they will obtain at the moment of retirement and through that, modify their savings behavior. The main hypothesis is that the pension simulator can effectively provide information which will improve poor individuals' understanding of the role that their contributions today have on their pension levels in the future. We further hypothesize that this additional information can help individuals raise their self-funded pension by increasing formalization of their employment (through which one starts contributing to the system), through delaying retirement age (for those close to retirement age) or by making additional voluntary contributions to their pension fund (beyond the mandatory minimum).

To test these hypotheses, this project uses data from three different sources: administrative data obtained from the SdP, a baseline survey conducted before the simulation exercise (for the treatment group) or information provision (for the control group), and a follow-up survey designed to understand the process leading to possible behavior changes. The administrative data

[1] While national ID numbers are given by birth or immigration date and thus are not random, the last digit, preceding the "verification" character is not correlated with age, gender or any determining characteristic of the individual. The ID numbers consist of a seven to eight digit number followed by the verification character (xx.xxx.xxx-y), we use the last digit before the hyphen for the randomization.

[2] Users could then request simulations with different parameters if they wished to do so.

[3] We only simulated the self-funded pension. For low-income individuals, the pension system also includes a subsidy that was not included in the calculations.

contains information about demographic characteristics, mandatory and voluntary savings, labor status (as reflected in monthly contributions) and variables related to the fund management of individuals affiliated to the system. On the other hand, the baseline survey covers topics associated with labor status and income to complement administrative data (specially for non affiliates), while it also gathers information about expected pensions and financial knowledge. Finally, the follow-up survey is conducted a bit less than one year after exposure to the self-service modules and covers topics related to their understanding of the pension system, decisions in terms of savings patterns, confidence in the system, and characteristics of the self-attention module. The intervention took place between August 2014 and February 2015 and 2,604 individuals participated, 92.8% of which were affiliated to the system by the time the intervention was conducted. Administrative data is available up to 8 months after treatment and the follow-up survey was conducted between October and December 2015.

Using the administrative data, we find evidence that voluntary savings (both amounts and probability of contributing) significantly increased on average for the treatment group compared to the control group. The estimated impact represents an increase of about 10-15 percent in terms of the voluntary savings made by participants. This is driven by an increase of 1 percentage point in the number of individuals making a voluntary contribution. While small, this corresponds to an increase of more than 33 percent in the number of individuals making these types of contributions. We also observe an increase in the probability of retiring among those in the treatment group. The increased voluntary savings are strongest for women, younger individuals and those with higher salaries. Retirement increases are largest for close-to-retirement-age participants.

We complement these results by using data collected through a phone survey. Although our response rate is somewhat low, we find no indication in the data that the effect we documented in the administrative data was undone by savings outside the pension system. If anything, savings outside the system also appear to have increased among those treated with personalized information. We also find evidence that treatment individuals entered into more formal labor market arrangements (since their responses show they are more likely to have mandatory health insurance) and that the treatment group had more knowledge about the pension system and a more positive view of the firms that participate in the market than the control group (although this last effect is not statistically significant).

More interestingly in terms of heterogeneity, during the baseline, we elicited individuals expected pension levels and can thus differentiate the impact of the information provision by the type of "news" the individuals received from the simulation. Our increase in voluntary savings is mostly concentrated in individuals who had previously overestimated their expected pension. On the other hand, for individuals who had underestimated how much the system would provide them, we see a decrease in mandatory contributions. These results emphasize the role of information, versus "nudging" as the likely channel of action in our context.

Chile is an interesting setting to study this question since Chile was one of the first developing countries to implement a defined contribution pension system in 1981. The system requires all formal employees (and self-employed workers since 2014) to contribute 10 percent of their monthly taxable income to a pension fund administrator of their choice. The first generation of individuals who started working in the labor force under the new system is now nearing retirement age and there is a lot of public criticism made about the level of pension they will be able to obtain for their retirement.

Chilean affiliates display little financial knowledge, and in particular scarce knowledge and understanding of the pension system in which they participate. The 2009 Social Protection Survey (EPS), for instance, indicates that 82% of Chilean affiliates do not know how their pension will be calculated. Moreover, almost half of those who claim to know about this subject give an incorrect description. Additionally, almost 60% of affiliates have no knowledge of either the existence of different types of pension funds nor can they explain the differences among these funds.[4] It should be noted that the lack of financial knowledge is not unique to Chile. Indeed, Lusardi and Mitchell (2005) and Lusardi and Mitchell (2008) find evidence of low levels of financial knowledge for the U.S., especially among women, low-income individuals, minorities and immigrants. These authors conclude that the degree of financial knowledge is highly correlated with the lack of skills to plan for retirement and portfolio choice. Another important factor that influences affiliates' decisions is the existence of inertia and myopic behavior.[5] Also, Barr and Diamond (2008) argue that individuals tend to seek short-term gratification, which translates, for instance in opting for early retirement even though this reduces the amount of pensions.

Decisions of participating into the system more actively (through delaying retirement age, formalization of employment or increasing voluntary savings) are crucial and may be difficult to understand for those with limited financial literacy. In this context, it has been shown that information plays a critical role in increasing participation into new pension plans (Duflo and Saez, 2002), delaying retirement age (Mastrobuoni, 2011; Miranda Pinto, 2012) and effectively responding to incentives to increase pension savings (Duflo, Gale, Liebman, Orszag and Saez, 2005; Mastrobuoni, 2011). Additionally, to be exposed to an educational event impacts members' savings expectations and their specific retirement goals (Clark, d'Ambrosio, McDermed and Sawant, 2006), influencing them to take decisions to improve their future pension.

While we are one of the first paper randomly assigning personalized versus general information in the context of a pension system, many other works have looked at the role of information on savings. Goldberg (2014) reviews a set of existing studies and argues that there is very limited effect of interest rates or financial literacy on savings rate. In particular, 2 studies in Indonesia,

[4]For more details on the results from the Social Protection Survey see the evidence showed in Berstein, Fuentes and Torrealba (2010).

[5]Inertia in individuals' investment decisions in pension plans has been documented by Madrian and Shea (2001), Agnew, Balduzzi and Sunden (2003) and Mitchell, Mottola, Utkus and Yamaguchi (2006).

Cole, Sampson and Zia (2011) and Carpena, Cole, Shapiro and Zia (2011) both show no impact of interventions which increased financial literacy on savings (see also (Kast, Meier and Pomeranz, 2012) for experimental evidence about the effect of interest rates in (micro)savings in Chile). It may be that generic information is simply unlikely to change behavior.

One of the main hypotthesis in this paper is that information about pension savings may alter labor supply decisions, in particular the formalization of employment. This is because the pension deduction may be seen as a pure tax by employees, thus reluctant to enter the formal labor force. However, once they are shown the benefits in terms of pension value these contributions may generate, they may be more likely to enter into formal contracts, despite these additional deductions. This has been emphasized previously, for example, Kumler, Verhoogen and Frías (2013) show that in Mexico, a pension reform that put more weight on past wages did increase the amount of wage payment officially declared by employers.

The rest of the paper is organized as follows. The next section details the context of the pension system in Chile. Section 3 documents the experimental design, the empirical methodology and the data. The following presents the results and the last one concludes.

2 Pensions Savings in Chile

To better understand the setting in which we undertook our experiment, this section describes the main elements of the Chilean pension system. Moreover, we also present the main elements of the pension simulator that the SdP currently offers on its web page. The information showed to participants in our experiment is based on a simplified version of the SdP simulator. The main features of this simplified simulator are also explained.

2.1 Legal and administrative background

In 1981, Chile was the first country in the world to privatize its pension system, moving from a traditional state-managed Pay-as-You-Go (PAYG) scheme to a privately managed defined contributions system with individual accounts. Reforms have been introduced over the years, including a major reform in 2008 (Law #20.255), which introduced a solidarity or basic pillar, providing protection for lower income groups.

The SdP, as a public agency, is in charge of supervising and regulating Pension Fund Administrators, the public solidarity pillar and the old PAYG system that will eventually disappear.

Currently, the pension system is organized around a scheme of three basic pillars: (i) a poverty-prevention pillar, (ii) a contributory pillar of mandatory nature and (iii) a voluntary savings pillar. The combination of these components seeks to guarantee individuals the possibility of maintain-

ing a standard of living similar across their active life and retirement stages and to eliminate the incidence of poverty among the elderly and disabled.

The first pillar, the solidarity pillar, is aimed at preventing poverty. This pillar consists of a non-contributory pension called the Basic Solidarity Pension (Pensión Básica Solidaria, or PBS), and a complement to the contributory pension called the Solidarity Pension Payment (Aporte Previsional Solidario, or APS). The PBS and APS are mean-tested benefits, targeted to the poorest 60% of the population.

The mandatory contribution pillar is a single nation-wide scheme of financial capitalization in individual accounts managed by single-purpose private companies called Pension Fund Administrators (AFPs for their name in Spanish). This is a defined contribution scheme; in other words, the contribution rate is determined and the benefits are calculated using actuarial formulas, according to the balance each individual has accumulated at retirement. Since its introduction, this pillar has required a monthly contribution rate of 10% of taxable income.[6] The coverage provided by the system, measured as the proportion of members to working-age population is around 79%.

The employees' individual accounts formed with mandatory contributions can only be managed by an AFP (Pension Fund Manager of Administradora de Fondos de Pensiones). Assets under management reached USD 150, 324 million at the end of 2015 (69.1% of GDP). In return for their portofolio management services, AFPs charge a percentage of the monthly income by affiliates.[7] As part of the 2008 reform, new affiliates are assigned to the lowest charging AFP (this AFP is determined through an auction process that takes place every two years). However, after two years, affiliates can choose from one of the six AFPs currently in the market.

For each AFP, there is a fund choice among five funds, which are differentiated mainly by the proportion of their portfolio invested in equities and fixed income securities. Fund A has the highest exposure to equities, with an 80% limit to invest in these securities. Fund B follows, with a 60% limit; Fund C has a 40% ceiling; while funds D and E have limits of 20% and 5%, respectively. For those affiliates not choosing voluntarily the destination fund for their savings, the regulation considers a default option consistent with the individual's life-cycle, i.e. the investment allocation becomes more conservative with age with shifts in portfolios smoothed over a 5 year period.

In terms of investment regulation, quantitative investment regulations apply to pension fund managers. This includes the existence of an investment policy for each fund, authorization for the investment of a significant part of pension funds abroad and the valuation of their assets at market prices using a transparent methodology.

[6] For the purpose of pension (and health insurance contributions) the income is capped by the *tope imponible*. As of 2016, this cap is set at a monthly (annual) wage of approximately USD 2,792 (USD 33,500). Moreover, the cap is adjusted every year, according to the real annual growth in average wages.

[7] Currently, these fees range between 0.47% and 1.54% of monthly wages. This is thus a fee defined in terms of the flow of contributions and there currently aren't additional charges on management of the stock of savings.

Finally, the voluntary pillar is the last of the three fundamental pillars of the system. Workers may choose from a broad variety of capital market institutions and financial instruments to manage the funds corresponding to their voluntary contributions and agreed deposits. In order to complement the mandatory savings made through the AFP system, there are tax incentives to encourage people to make voluntary contributions through various financial instruments: voluntary pension savings accounts managed by the AFPs themselves, mutual funds, life insurance products with savings, etc. The scheme is designed so that savings that use these products are tax-exempt during all years in which deposits are made. The yields generated by these savings are also tax-exempt, but the pensions financed with these resources are considered as income for income-tax calculation purposes. Individuals may withdraw their voluntary savings before retirement, but they must pay the corresponding taxes and a surcharge for early withdrawal.

2.2 Pension savings and knowledge in Chile

Given the complexity of the Chilean pension system just described, one may wonder about Chilean individuals' financial literacy. Survey evidence about retirement planning and financial literacy in Chile shows that a large fraction of the population has low levels of financial literacy and that most of the population is not planning for retirement. For instance, results from the Social Protection Survey indicate that 82% of Chilean affiliates do not know how their pension will be calculated. Moreover, almost half of those who claim to know about this subject give an incorrect description. Additionally, almost 60% of affiliates have no knowledge of either the existence of different types of pension funds nor can they explain the differences among these funds.[8]

The 2009 Social Protection Survey (EPS) included a financial literacy module with questions comparable to the ones analyzed in other countries (Lusardi, Michaud and Mitchell, 2011). Based on this data, Moure (2016) shows that, relative to respondents from developed countries, Chileans show lower levels of financial literacy. Less than half of respondents answer correctly a simple questions about compound interest and risk, while less than 20% answer correctly a question about inflation. Moreover, the correct response rates are positively related to educational attainment and negatively related to age, and are lower for female and lower income respondents (see Hastings and Mitchell, 2010). According to this data, Chileans also show poor financial planning practices, less than 10% of the EPS sample take active planning actions, and within different subgroups of the population only individuals with post-graduate education have a planning prevalence higher than just 30%.

[8] For more details on the results from the Social Protection Survey see the evidence showed in Berstein et al. (2010).

2.3 Predicting pensions

2.3.1 The online simulator

Given this low level of pension knowledge, SdP has had a strategy of improving pension knowledge among the population. In order to provide better risk-related information to affiliates, the SdP built a pension simulator. Since September 2012, this simulator is available on the SdP website: http://www.spensiones.cl/apps/simuladorPensiones/. However, this simulator is complex to used and the number of individuals who have accessed it is limited. We know summarizes the simulators' main elements[9] since a simplified version of it was employed in our experiment.

The SdP simulator is based on a model that uses a representative affiliates' characteristics: age; gender; level and density of contributions; level of income prior to retirement; age of retirement; investment strategy; and beneficiaries' number and characteristics. This model is described in detail in Berstein et al. (2013). With information about the current balances in mandatory and voluntary pension savings, the model constructs a consolidated balance. This sum grows during all the affiliate's active life; this is, from actual age until the age of retirement. There are two sources of growth: one is the monthly contribution made by users, which comes from their mandatory and voluntary savings and is affected by their density of contributions. The second one is the return earned by their existent pension savings.

The model assumes that funds returns evolve stochastically over time according a random walk, where the possibility of the occurrence of crisis is considered by means of a jump diffusion process.[10] Table 1 shows the real returns and standard deviations for each of the five types of funds and the annuities' implicit rate. These values are obtained after simulating 40 years of monthly returns.

The simulator feeds from current and projected information about affiliates. Several variables are filled with administrative records: current age; gender; current balance in the mandatory personal pension account; monthly gross income; historic average density of contributions; value of recognition bonds (these bonds are held by affiliates who made contributions in the old defined benefit Chilean Pension System); and current type of fund. The users may also input this information manually.

In the online version of the simulator, users are asked about their desired monthly pension upon retirement, as well as the current balance on any other type of voluntary pension-saving vehicles. Afterward, users are asked about their preferences regarding age of retirement (under current Chilean legislation, the legal age of retirement is 65 years for males and 60 for females). Users can choose to simulate delaying or anticipating this age.

[9] This description of the Simulator is based on Antolin and Fuentes (2012)

[10] The details of the stochastic process are discussed in Berstein et al. (2013).

The next step is the definition of an investment strategy in order to specify the types of funds (A through E) in which the user plans to keep his savings until retirement. The simulator allows users to design their own investment strategy or they can also select a predefined strategy. Moreover, by selecting the advanced edition option, users can select up to two funds in which to invest their accounts.

In order to forecast future mandatory contributions a series of assumptions are made. Firstly, for the one-year contribution forecast, the simulator uses the current taxable income ceiling.[11] For the next years' forecasts, the Simulator assumes that this ceiling increases 1.75% each year[12]. Secondly, the gaps in contributions are assumed to be uniformly distributed. This is, if the user expects to work 6 months a year, the contribution density is set equal to 0.5 (50%). This factor is applied to the contributions made every month for the entire forecasting horizon. Regarding the values of future voluntary pension savings, the simulator assumes that these savings are invested in the same type of funds as the mandatory account. Moreover, voluntary pension savings has a monthly ceiling of UF 50. This is the current voluntary savings ceiling that is considered to give affiliates tax incentives. Finally, the simulator assumes that the future density of contributions affects the amount of voluntary savings when these savings are expressed as a percentage of the user's monthly income, but the density has no effect when future voluntary savings are expressed in pesos or UF.

The last input required is information regarding expected beneficiaries at the age of retirement. This is necessary because, under Chilean legislation, the pension to be received by the beneficiary depends on the existence and age of spouse, children entitled to pensions, and any other individual with legal rights to receive a survivor pension (this include, for instance, children older than 24 with some degree of disability). The Simulator allows for an important degree of flexibility in terms of the number and type of beneficiaries that are considered.

Using all these inputs, the simulator produces a forecast which corresponds to net pension values. In order to reach these values, the Simulator uses all the inputs provided by users to estimate 2,000 gross pensions.[13] A 7% health contribution is then deducted from the gross pension. The resulting value is assumed to be the only income source for users. Therefore, the currently valid income tax rates are used to obtain the net pension values.

Figure 1 shows the results given by the Simulator. The output consists of: expected pension at the age of retirement, pension payment for the 5th percentile (called "pessimistic scenario pension"), pension payment for the 95th percentile (called "optimistic scenario pension"), and the probability of having a pension payment that is equal or greater than the desired pension spec-

[11] This income ceiling was equal to UF 67.4 during 2012 and 70.3 UF for 2013. The UF is an inflation-linked unit of account approximately equal to USD 48.

[12] The ceiling is increased every year according to the previous year change in real wages for the Chilean economy.

[13] The mortality tables used to estimate pensions are the currently valid tables (RV - 2009 H and RV - 2009 M), which are available at http://www.spensiones.cl/files/normativa/circulares/CAFP1679.pdf.

ified by the user. Also, users are showed the same set of results that would be obtained if they postpone the retirement age by three years.

2.3.2 The Experiments' (Simplified) Simulator

The pension simulator developed for the experiment is a simplified version of the SdP pension simulator. It uses administrative records, as well as information given by participants, to project pension-savings growth and the expected value of pension. The figures estimated are given in current Chilean pesos, they are after-tax pensions that correspond to annuities.

In order to estimate expected pensions, the following simplifying assumptions are made:

1. **Investment strategy**: It is assumed that the user will follow the default investment strategy. This is, pension savings are reassigned from Fund B to Fund D as the user ages. The same investment strategy is applied to the mandatory and voluntary pension saving accounts.

2. **Pension fund returns**: Regarding the returns earned by pension savings, the methodology used replicates the one employed by the SdP pension simulator. This is, stochastic returns are estimated. A total of 2,000 monthly series of returns are built for each type of funds and for the implicit interest rates of annuities. The average annualized real returns for each fund are: 6.04% (Fund A); 5.2% (Fund B); 4.71% (Fund C); 4.35% (Fund D); 3.71% (Fund E). The average annuity rate is 3.58%. With these returns and annuity rates, a total of 2,000 pensions are calculated. The simulator reports the average pension to users.

3. **Beneficiaries**: For male users, the simulator assumes the existence of a two-years-younger spouse and that there are no children. For female users, the no-children assumption is maintained and a two-years-older spouse is considered.

4. **Density of contributions**: The simulator assumes that the future value of this variable will equal the observed density at the time of use.

5. **Taxable income by age group**: This variable is estimated using the current users' taxable income and the number of years that the affiliate is in each age group. Table 2 shows the annual growth rates for each group. These were estimated using administrative records for members of the pension system.

6. **Taxable income ceiling**: The cap for monthly taxable income is set at UF 72.3 (CLP 1,863,677 or USD 3,170). Thereafter, the ceiling is increased at an annual rate of 1.75%.

7. **Mortality**: The RV-2009 H and RV-2009 M mortality tables are used to estimate pensions.

8. **Retirement age**: For users that are at least two years younger that the legal retirement age (65 years for males and 60 years for females), the simulator assumes that users retire at said

moment. For users that are older, the simulator assumes that retirement takes place in two more years or at age 70, whichever is lower.

3 Methodology

Having described how the simulator was programmed, we now described the experiment we implemented as well as the empirical methodology and data we will use to analyse its impact.

3.1 Randomized Control Trial

The intervention consisted in installing self-service modules, equipped with the pension simulation software described above in locations with a high flow of low- to middle-income but working individuals. We decided to install these modules in the locations where social payments and services targeted to their needs are delivered. In Chile, those services have been agglomerated into offices of a government office called "Chile Atiende", of which there are 153 locations across the country, receiving on average 37,000 visits per year. Most of the proceedings, inquiries or consultations performed in these offices are related to pensions (26%), information on procedures and benefits (23%), certificates (11%) and buying state-run FONASA "bonos" with which to pay medical care by a doctor (8%). A quarter of visitors aim only to make general questions or to obtain information about some specific topic.

We chose to partner with this government office because the demographics of their population appeared to match that of our target population. According to the information they provided us for visits in 2013, most users are women (67%), 27% are under 40 years old, 27% between 40 and 55 years old, 24% between 56 and 65 years old and 22% with ages above 65 years old. With regard to educational level, 48% of them have primary education or incomplete secondary education, 33% completed secondary education and only 19% have complete or incomplete tertiary education.

The module was identified as a module from the SdP in order to increase its credibility. As individuals approached the module, they were asked to place their national ID card under a scanner and their index finger on a fingerprint reader. This was required for us to be able to obtain their data from the database of SdP (if they had ever affiliated to the system). They would then be asked to consent. At that point, not only the SdP appeared as participating in the project but also the university of the researchers and J-PAL. If they consented, they would be asked to answer a short survey of about 10 minutes, regarding their education, labor force participation, pension knowledge, etc. For individuals not affiliated to the pension system, we would also ask them about their income since we are unable to obtain this information from the SdP database. Finally, we would conclude by asking a question regarding the value of the pension they expected to obtain when they would retire. This was asked to both control and treatment groups.

Once the survey was completed, treatment individuals were led to the simulator while control participants were offered 3 simple tips to increase their pension. They were reminded that by increasing the number of times one contributes during the year, by making voluntary contributions and by delaying retirement age, one can increase their pension saving. Figure 2 shows the exact screen the control group would face. The participant had the option of obtaining a printed version of this reminder if they chose to do so. They can also have it sent to them by email.

On the other hand, treatment individuals were given an estimate of their current pension based on the simulator and the exact impact that each of the three measures mentioned to the control group would have on one's pension. Figure 3 shows the screen that would appear to a given individual. That individual was anticipated to receive a pension of 130,795 Chilean pesos or about US$250 per month at the exchange rate of that year. While low, this is about twice as large as the guaranteed pension offered by the government. This woman, in the past, has only contributed to the pension fund 5 months per year. The simulator shows her that by increasing the frequency of her contributions to all months of the year, she would more than double her pension. It also shows her that saving 1% of her monthly income would increase her pension by about 15%. Finally, delaying her retirement age by 1 year would increase her pension by a bit less than 10%. All these estimates are provided for each person using her own data as available in the system. They are also expressed in terms of monetary value which may be simpler for individuals to grasp than percentages. Once at that point, the person can obtain a printed or email version of the estimates. She can also go back and alter the parameters of the simulation to see the impact of other alternatives. For example, they could try to increase the amount of the voluntary savings, alter the retirement age by more than what the system suggested or increase only partially the density of mandatory contributions. The system records those simulations for any individual who chose to do that.

At first, we implemented our modules as self-serving kiosks in 8 locations of "Chile Atiende" in the metropolitan region of Santiago and its rural surroundings. The locations were selected based on the demographics of the visitors they would received, the flow of visits they had, a representativeness of rural/urban areas and geographic proximity. We ran the experiment like this for 2 months. However, the flow of individuals completing the process was very small. In particular, most individuals were stopping at the point where the national ID card and the fingerprint reader were required. Observational data suggested that this step was complicated for many users who would get frustrated by the process. We thus altered our implementation and randomly assigned to locations and days a module "assistant" who both encouraged participation and helped the person navigate the module. The assistants were undergraduate students who were given a basic training on the pension system. The presence of these assistants substantially raised the take-up of the module. Since the assistant was such a success, we have more than 93 percent of our sample having completed the experiment with an assistant. This means that our experiment

should thus be thought of including the interaction with the assistant. However, the interaction with the assistant was the same whether the individual is a control or a treatment individual. We thus continue to highlight the fact that our experiment really contrasts the role of personalized versus generic information.

3.2 Data

The data in this paper comes from 3 separate sources. First, individuals answered a short survey when they first access the module. This survey included questions about current labor supply, education and position within the household. For individuals who were not registered in the pension system, we also included questions regarding their gender, their age and their labor earnings since we could not rely on the information provided by the SdP regarding these variables. We also requested information regarding the importance of the pension system for their retirement financing and the amount of savings they had outside the pension system. We then measured their financial knowledge using the 3 typical questions in this literature (see Hill, 2014; Lusardi et al., 2011; van Rooij, Lusardi and Alessie, 2011): present value, compound interest and inflation. We also tested their knowledge of the pension system in Chile. Finally, we also elicited their expected and desired pension levels.

The second source of data we obtained for this project comes directly from the administrative database of the SdP. This database is constructed from the information that each AFP provides to the SdP about its members. Information regarding their age and gender is available, among the few demographics the database records. However, the database offers a rich set of information regarding the formal labor market participation of individuals (since all formal employed workers are required to contribute to the pension fund system), their pension savings, whether they work as employed or self-employed and whether they have retired. Finally, the database also records some information regarding the involvement of the individual in their investment decisions: whether they have asked or changed their password required to access their AFP's website, whether they have changed their savings of funds and whether they have changed AFPs.

We then complemented this data using a phone survey conducted around 10 months after the use of the module. Phone calls were made at the number the individuals reported as their contact information in the module as well as the phone numbers they had on file in the administrative data of the SdP. In this relatively short phone survey, we focus on variables that are invisible to us in administrative data. We measure informal labor force participation, savings outside the pension system and knowledge, intentions and perceptions regarding that system.

We first present some baseline information regarding the participants in our experiment. First and foremost, our strategy of simplifying the simulator and bringing it to a location where low-income individuals are more prevalent helped the population of our experiment be relatively close

demographically to that of all affiliates to the pension fund system. While only 30 percent of those who used the simulator in its complex version online were women, roughly 52 percent of participants were women, much closer to the 47 percent of affiliates they represent. Our participants also have almost the same age distribution as those of all affiliates while those visiting the online simulator were much older.

As can be seen in Table 3, in terms of socioeconomic characteristics, most have a high school diploma and almost a third has a post-secondary education. About 12 percent have completed a university degree and a similar fraction is a high-school dropout. Two-thirds of participants are the head of the household, 79 percent are currently working and 88 percent are in the labor force. They earn on average a wage of about CLP$460,000 per month, which is almost twice the full-time minimum wage in Chile. Thus, our participants are not very poor but more representative of low- to medium-income workers in the region of Santiago. Once more, however, this is much lower than online participants.

Almost all (93 percent) of our participants are affiliated to a pension fund. Most of them consider the pension system as an important source of revenue for their retirement. On average, individuals expect to receive about half of their current wage as pension levels and wished they could receive a bit more than their actual wage as pension. On average, they contribute to the mandatory system only around 8 months per year, they have around a bit more than 9 million chilean pesos in their pension savings account and less than 3 million as part of their private savings.

We then turn to their financial knowledge. Less than half can properly answer a multiple question regarding how pensions are calculated and less than half correctly answered that 10 to 12 percent of one's income is contributed to the AFP (since each pension fund manager sets its own service fee on top of the mandatory savings of 10 percent). The participants on average answer about half of our financial literacy quiz properly but they overestimate their capacity since they give themselves a score of 4.7 out of 7.

Finally, we note that the average pension we simulated for these individuals is on average *larger* than the one the individuals themselves predicted. Figure 4 suggests that while individuals do make mistakes in how they estimate their pension, there is no sense that they systematically over- or under-estimate their pension since the distribution is almost centered at 0. The average error is relatively small compared to the amount of the pension. The average absolute value of the error, however, is relatively large, amounting to about 66 percent of the predicted pension. This suggests that while there is no strong bias in the direction of the mistake, some individuals do have a very incorrect view of what their future pension is likely to be. We will exploit this heterogeneity later on in our results.

Overall, Table 3 suggests that our randomization worked relatively well. Few baseline characteristics are statistically different between the two groups. We will verify whether our results are

robust to the introduction of baseline characteristics as controls.

3.3 Empirical methodology

Randomized allocation to the treatment allows us to directly compare treated and control individuals. Therefore, we use a simple approach as specified in the following equation:

$$Y_{i,t} = \alpha + \beta T + \gamma Y_{i,(t-1)} + \delta X_{i,(t-1)} \mu_t + \epsilon \tag{1}$$

where $Y_{i,t}$ is the outcome for individual i in period t, T represents the treatment status, $Y_{i,(t-1)}$ is the outcome in the same month but one year before the treatment and μ_t represents exposition date fixed effects. $X_{i,(t-1)}$ represents baseline characteristics that we will include in some specifications as robustness checks. Namely, we control for gender, age (linear), log of baseline wage, whether the individual is the head of the household, whether the individual was working in the baseline as well as dummies for educational attainment.

We currently have 8 months of administrative data for all participants in the experiment. Thus, our analysis will focus on changes made either in that full period or by each month.

Non-response in the baseline is very infrequent and only individuals who consented were randomly allocated to receive personalized or generic information so non-consent is irrelevant in the administrative data.

Attrition is not a problem in the administrative data since we can capture the universe of participants and know that if they do not appear in the database, this is because they have not contributed during a given month. Furthermore, we can perfectly measure the entry and exit of individuals in the database for reasons such as death, retirement or affiliation.

Attrition in our survey is much more severe. Quite a few respondents provided phone numbers that were incorrect or that had been disconnected by the time we tried reaching them 10 months later. This implied that we only managed to find about 40 percent of the individuals who were part of the initial survey.

Overall, however, there is no evidence that attrition is different depending on whether individuals received the personalized or generic information. This supports our claim that our problem with reaching participants was not linked with an unwillingness to answer but rather a problem that the numbers provided were not correctly entered or with too much rotation to be used 10 months later. We also find limited indication that attrition made our treatment and control group no longer balanced on observables. Still the probability of answering the phone survey is higher for some individuals, as shown in Table 4. Those who answered our surveys are more likely to be older, be head of households, working and having contributed more to the pension fund than those who did not answer.

4 Results

4.1 Aggregate results

We first estimate the overall impact that the experiment had on changes within the pension system. For that, we first document, in Table 5, the impact of being randomly assigned to treatment on the behavior of individuals over the 8 months following their visit to the module. The first column suggest that there is no change in the probability of being an affiliate of the pension fund system over those 8 months. However, we must remember that only 7 percent of our original sample was not affiliated, implying that there was little room for us to impact this variable.

The subsequent columns measure the impact of our intervention on savings within the pension fund. We measure the frequency and the amount of voluntary contributions made over the 8 months following the intervention in the next two columns. We find that the number of voluntary contributions made over 8 months increased by 0.08. While small, this is very large compared to the baseline value of about 0.26. The value of the contributions are also increased by about 23 percent. This suggests that receiving personalized versus generic information increased both the likelihood and the amounts individuals saved voluntarily to their pension account.

The next two columns measure the change in mandatory contributions. We find that our treatment reduced the number of times an individual made mandatory contribution to the pension fund, although not significantly. The amount saved is not changed at all. This is surprising since we hypothesized that, if anything, we would see an increase in that variable since individuals would be more likely to formalize their employment once they received the personalized information. Column (6) helps us understand the reason behind this as it regresses the probability that an individual has retired from the system in the 8 months after the visit to the module and finds that those who received personalized information were also more likely to retire, although this is only significant once we include controls. The probability raises by 1 percentage point, when the mean in the control group is only 1 percent.

Finally, we test whether individuals took some active management decisions of their pension funds in columns (7) through (9). Specifically, we measure whether the individual changed mutual fund within a given AFP, whether the individual changed AFP and whether the individual changed his password. We see no impact on any of these variables suggesting that the impact we measure did not necessarily come hand-in-hand with more involvement by the participant.

Panel A and B are very similar, suggesting that the inclusion of controls do not alter our conclusions, which is to be expected given the balance in the randomization.

We thus observe that voluntary contributions, in both frequency and amounts, increased in response to personalized information. Nevertheless, voluntary contributions are, on average, less than 10 percent of mandatory contributions into the pension fund. The relative magnitudes of

voluntary and mandatory contributions, thus, make total savings basically unaffected by our experiment. We seem to simply not have sufficient statistical power to obtain a significant impact on such a "stable" variable.

We have also tried to understand whether the impact is due to individuals making only one or multiple contributions to their voluntary savings. Figure 5 shows that we see a decrease of about 2 percent in the number of individuals making no contribution during the eight month period and that this is shifted to a variety of frequency of payments. The largest increase, however, is observed in individuals making monthly payments, which raises from about 2 percent in the control group to almost 3 percent in the treatment. However, the graph makes it clear that we did not simply increase the likelihood of a few individuals starting an automatic savings plan but rather that we also saw increases in sporadic contributions. We also find very limited evidence that individuals replaced their mandatory contributions with voluntary ones since less than 0.1 percent of the sample ever contributed to the voluntary fund within 8 months without having contributed to the mandatory one as well.

We then turn to evaluate whether the results we obtain on voluntary and mandatory contributions as well as retirement are short-lived by looking separately at the impact of the treatment for each month following the visit to the module. We present each outcome in a separate panel in Table 6. We here present only the version without controls but the results are very similar when adding controls. Panel A and B suggest that our previous results regarding increase in voluntary contribution is not driven by an immediate reaction to the module information. Coefficients suggest a fairly constant response across months up to 2 quarters after the experiment. Panel C and D continue to show negative but non-significative effects of the personalized information. Thus, our previous conclusion is not driven by the fact that the effect dies out as we move away from the provision of the information. Finally, Panel E suggests that the probability that a participant retires in any given month is relatively stable over the 8 month period although loses significance as we move along over time.

The richness of our administrative data has one drawback which is that it can only measure savings within the pension system. Since our experiment could very well have generated a shift from savings outside the pension system to savings inside of it, we then turn to our self-reported measures of savings from our survey. Table 7 shows various outcomes related to savings. We find that receiving personalized information regarding the pension system did increase, but not significantly so, the probability of having other savings for retirement. It did significantly increase the savings outside the system by about 80 percent. It also shows a positive but not significant impact on the probability of reporting that the pension system is relatively not important for individual's retirement. We also asked individuals to report their expected income source after retirement and found no impact of the personalized information in that regard. We also see no impact on how individuals report they plan to complement their savings after retirement. Overall, we find no ev-

idence that the result we documented in the administrative data is likely to represent a relocation of the same savings into a different investment vehicle.

Thus, we find strong evidence that offering personalized (versus generic) information increased pension savings, at least for the part of savings that can be altered most easily. We now turn to evaluating whether other outcomes have been altered by the intervention. We first look at labor market formalization to then move to knowledge and perceptions through our survey.

Table 8 first presents various measures of labor market participation and formalization. All variables, except the last one, come from our survey measure as the administrative data measures formal labor force participation through mandatory contribution, which we have already explored previously. Given that our sample size is much smaller for the survey, this implies that we have a much diminished capacity to find a significant effect. Despite that, we seek to see whether individuals formalized their employment relationship in response to the treatment. As found previously in the administrative data, we find no evidence that individuals are working more when receiving personalized information. We also find no significant response in the probability of working for a contract or being an employee versus self-employed, as reported by respondents. However, individuals may be unwilling to reveal to us that they are working without a formal contract. Furthermore, some types of contracts are exempt from contributions to the pension fund system. To try to tease this information, we asked individuals whether they had any health insurance since health insurance contributions are made when pension fund contributions are also made. We find a significant impact on the likelihood that a participant declares having any health insurance and this is particularly strong for the publicly-funded insurance (FONASA). This suggests that, at least in the sample of survey respondents, we find evidence of higher formalization when measured through health insurance coverage. Finally, our administrative data allows us to verify the previous result on self-employment since it includes a measure of whether individuals are contributing "independently" to the pension fund, rather than through their employer. We find again no evidence that self-employment likelihood was altered by our experiment.

We try to argue that the reason our experiment had the above impact is because it provided individuals with personalized rather than generic information. We now verify that this is the likely channel by looking at the impact the "treatment" had on knowledge and perceptions of individuals, as shown in Table 9. The first outcome of that table suggests that individuals who received the personalized information treatment were 8 percentage point more likely to remember having interacted with the module. This is a large fraction since the control average is 82 percent. We also find that the individuals were much more likely to identify their interaction with the module as involving alternatives to increase pension than general information or not remembering. Finally, they valued the information they received substantially more than those who received generic information.

We then turn to the knowledge displayed by individuals in the sample. Receiving person-

alized information appear to increase one's own perceived knowledge about the pension system. However,the performance of the respondents in the 4 questions we included to measure that knowledge, namely how pensions are calculated, the percentage discounted for pension, the role of voluntary savings and the retirement age for men and women, is positive but only significant for the latter. Individuals who received personalized information are also more likely to report having acquired information on the pension system but not significantly so.

When measuring intended behavior, we find that receiving personalized information decreased the likelihood that someone would think of affiliating to the system but increased their intention to make voluntary savings and informing themselves more about the system. Actual behavioral change in the survey data, however, is all not significant, maybe because of the loss of power we suffer from the lower sample size. Finally, while the measured impact of the experiment on the valuation of the system is positive for the 3 outcomes we present, all coefficients are not statistically significantly different from zero.

4.2 Heterogeneity of responses

Having shown that personalized information appear to have had a significant average impact on savings behavior within and outside the system, we now turn to exploring the heterogeneity in response. We first decompose the results by typical socioeconomic characteristics (gender, age and education) in Table 10. Results are shown without controls (except for the main effect of the interaction) but results are extremely similar with controls. The first panel shows that both genders responded to the personal information by increasing the frequency and amount of voluntary contribution, women did so more strongly and are the only ones to show an effect that is statistically significantly different from zero. Men, on the other hand, appear to be the ones reducing, albeit not significantly so, their mandatory contributions. Retirement probabilities are increased similarly for both genders.

The next panel turns to a division by age. We classify participants in 3 different groups: those more than 5 years away from retirement based on the official retirement age, those within 5 years of that age and those above the retirement age. Note that since, in Chile, retirement ages differ by gender, this implies that each group has younger women than men. Also, given that we have age in the baseline only, we include men who were 64 years old and women who were 59 years old as passed the retirement age since they will cross that threshold at some point during the duration of our data. The results suggest that only the youngest group saw a significant increases in its voluntary contribution in response to personalized information. This is not surprising since this is the age group in which voluntary contribution can be the most relevant in terms of its impact on future pension. Individuals passed the official retirement age, on the other hand, are the only group that responded to personalized information by decreasing their mandatory contributions. It

is, by far, the group for which it is the easiest to do so since, once retired, mandatory contribution is no longer "mandatory" even in the case where they continue working. Finally, personalized information appears to have induced some retirements of individuals who were just about to become age-eligible for retirement. In the bottom panel, we split our sample by levels of education and find limited patterns in this case. This suggests that personalized information did not impact individuals with more or less education. The conclusions from this table are upheld when splitting the sample by month.

More importantly, if we think that the impact of our treatment is exactly that the information is personalized, we should anticipate that individuals received different types of "shocks" depending on their previous views about their pension levels. This is what we turn next where we focus in the heterogeneity based on the difference between the expected pension and the estimated pension. Consequently, we define the error as:

$$Error = \frac{Simulated\ \ Pension - Expected\ \ Pension}{Expected\ \ Pension} \tag{2}$$

We can observe in Figure 4 that there is heterogeneity in this measure. Thus, we split the sample into three groups, those whose simulation was 25 percent below their expected pension, those where that simulation was 25 percent above the expected pension and those whose simulation came within $\pm$ 25 percent of their expected pension.[14] Thereafter, individuals are sorted into the groups according to whether they overestimated, underestimated or correctly anticipated their pensions.

Table 11 shows that the increase we documented on average in voluntary savings is most significant and also larger in magnitudes amongst those who either were correctly estimating their pension and those who had significantly overestimated how much savings they had in the system. This is consistent with our hypothesis that provided personalized information made individuals who received worse news increase their contribution. In the next two columns, we show that the overall non-significant decrease in mandatory savings we documented previously was concentrated amongst those who received a good news from the pension simulator compared to those with similar expectations who simply received generic information. However, the type of news we gave individuals also may have some unexpected impacts. Column (5) details that some individuals who had overestimated their pension substantially decided to retire after receiving the personalized information, most probably out of disappointment over how little they could do to alter their pension at that point. When we look at this in more details, we find that this behavior is concentrated amongst those who had overestimated their pension but still had above median simulated pension. Once we look at the result separately by month, we find that the difference in voluntary and mandatory contributions between the types of groups is strongest in the initial

[14] Results are qualitatively robust to alternative definitions and groupings.

months and then is reduced as time goes by. On the other hand, the impact on retirement appears only after the sixth month, suggesting that individuals may try to reach savings goals and then later get discouraged.

While not shown, we also explored these same types of heterogeneity in our survey data. The results show that while recall of information provided is not related to the difference between one's expected and simulated pension, the self-reported plans and decisions are. Individuals who overestimated their pension were the ones who claimed to have considered most increasing voluntary savings and changing the frequency of their mandatory payments in response to personalized information. Individuals who had most underestimated their pension were, on the other hand, the one to give the best evaluation to the AFPs in response to receiving personalized information. We finally find that the only group where savings outside the system increased was the one who had underestimated their pension.

We finish our analysis by splitting our sample by financial literacy and by knowledge of the pension system. The idea here is that personalized information may be particularly important for individuals with the lowest degree of knowledge in terms of the pension system. However, in order to take some of the decisions studied here, one may also be able to understand the system better. We thus present, in Table 12, the heterogeneity of the impact by our measure of financial literacy, in Panel A, and by our measure of knowledge of the pension system, in the bottom panel. High financial literacy here implies having answered more than 50 percent of our questions adequately while the opposite is true for "low" financial literacy individuals. The first panel suggests that individuals with high and low financial literacy responded similarly in terms of their voluntary contributions. While the effect is slightly stronger for those with low levels of literacy, the difference is not at all significant. There is no significant effect on either group for the other outcomes. In the following panel, we divide our participants by their level of knowledge of the pension system. Individuals who answered correctly none one of our baseline questions correctly are classified as "low", those who answered one are classified as "medium" and those who answered both questions properly are classified as "high". Based on that classification, we find that individuals with low and high pension system knowledge are the ones who responded most strongly in terms of voluntary contributions. The impact of personalized information for those in the medium category is not significantly different from 0. For the mandatory contributions, however, a more monotone pattern arises suggesting that only those with high levels of pension system knowledge responded to personalized information by increasing their mandatory contribution. These individuals also show the lowest response in terms of retirement. This may be because these decisions require a deeper understanding of the way the system operates compared to voluntary savings plans that are relatively easier to implement. Overall, the results suggest that our difference between those who underestimated, overestimated and correctly estimated their pension is not a reflection that each of these groups has a degree of financial sophistication but

instead that voluntary savings appear to have been increased by many individuals, regardless of their financial literacy or pension system knowledge.

5 Conclusions

A defined contribution system requires much more understanding of financial concepts than a defined benefit one. Consequently, the availability of easily accessible information is crucial for the proper functioning of the system. In this paper, we show that individuals in a well-established system with more than 40 years of existence still have difficulty estimating how much their pension is and that providing personalized information regarding their pension can have substantial impact on their savings and retirement behavior.

We argue that the impact of our experiment is mostly, if not entirely, due to the personalization of information and not to other behavioral responses generated by our set-up. This is because we made the personalized information as similar as possible to the generic one in terms of presentation. We reminded both groups of the importance of savings and of the typical mechanisms that can be employed to increase their pension savings. Furthermore, the size and importance of the impact of personalized information differed significantly depending on the type of "news" that the personalized information provided users and less so on other socio-economic characteristics. We thus see this paper as a demonstration that information, without nudge, may be useful in helping individuals making financial decisions, in particular when confronted with a complex system where the time horizon is particularly long. This is different from most intervention implemented in short-term savings systems but the personalization of the information appears to be key.

However, our experiment also shows that personalizing information may lead some individuals to reduce their savings behavior. Whether this is something that should be encouraged depends on how rational we believe individuals to be. It does, however, point out to the need of trying to still reinforce savings motives even when individuals receive a "good news".

Furthermore, our paper is silent about whether that nudges or commitment devices could not be added on to this set-up. We leave it to further research to explore the complementarity or substitutability between providing personalized information and offering commitment mechanisms to implement some of the decisions suggested by the personalized simulator.

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Figure 1. Example of SdP Simulator Output

Source: Berstein et al. (2013).

Figure 2. Example of information provided to the control group

Figure 3. Example of information provided to the treatment group

Figure 4. Distribution of difference between predicted pension and expected pension

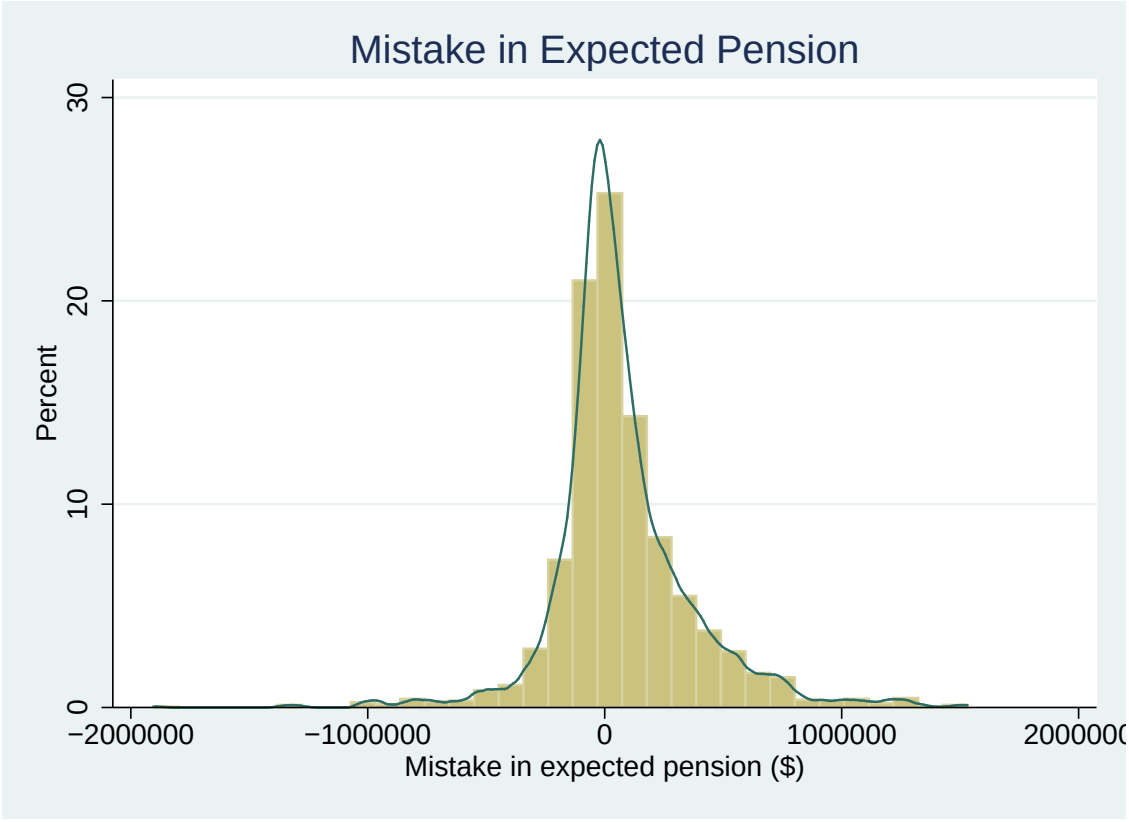

Figure 5. Distribution of number of monthly contributions in the control and treatment groups

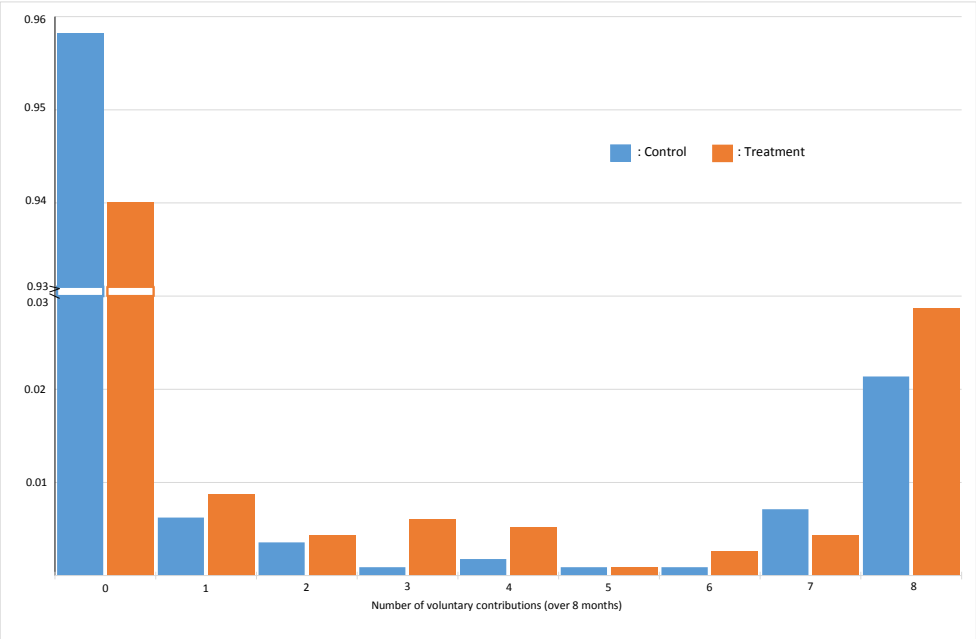

Table 1. Simulated Real Returns (Annual %)

	Fund A	Fund B	Fund C	Fund D	Fund E	Annuities
Average Return	6.04	5.20	4.71	4.35	3.71	3.59
Standard Deviation	11.91	9.00	6.38	3.90	3.10	1.32

*Source: Berstein et al. (2013)

Table 2. Taxable Income Growh Rate (Annual %)

Age Group (Years)	Males	Females
18 - 35	4.58	3.30
36 -55 (50*)	2.27	2.37
Over 56 (51*)	2.19	2.01

*Source: Authors' estimations. Values in parentheses correspond to the age of females.

Table 3. Balance

	N	Mean		Difference
		Control	Treatment	T-C
Descriptive:				
Female	2,603	0.505	0.529	0.026
				(0.020)
Age	2,602	39.638	38.257	-1.295***
				(0.496)
Primary school	2,604	0.153	0.164	0.009
				(0.014)
High school	2,604	0.336	0.319	-0.017
				(0.018)
Some post-secondary	2,604	0.333	0.352	0.018
				(0.019)
Head of household	2,604	0.705	0.679	-0.023
				(0.018)
Working	2,604	0.787	0.792	0.006
				(0.016)
In labor force	2,604	0.890	0.877	-0.012
				(0.013)
Wage (avg. $last 6 months)	2,604	436,953	474,762	41,163**
				(16,187)
Savings:				
Affiliated	2,604	0.927	0.929	0.003
				(0.010)
Desired pension ($)	2,583	505,036	567,012	49,275
				(57,537)
Expected pension ($)	2,583	249,927	290,008	32,411
				(32,607)
AFP important for retirement	2,416	0.864	0.888	0.023*
				(0.013)
Months contributed	2,496	8.180	8.448	0.301
				(0.187)
Balance mandatory account (UF)	2,602	375.733	425.768	54.146*
				(27.651)
Bono (UF)	2,604	15.988	18.864	3.005
				(4.625)
Savings ($000's) outside system	1,640	2,879.817	2,377.511	-531.182
				(919.376)
Knowledge:				
Ease with system (1-7)	2,475	4.770	4.718	-0.054
				(0.070)
Knows how are pensions calculated	2,604	0.446	0.446	0.002
				(0.019)
Knows % of wage discounted	2,604	0.434	0.427	-0.006
				(0.019)
Financial knowledge score (1-3)	2,604	1.573	1.573	0.003
				(0.036)
Simulation:				
Simulated pension	2,558	283,529	307,864	25,350*
				(13,793)
Mistake in expected pension	2,358	58,430	42,888	-5,997
				(36,728)
Mistake (absolute value)	2,358	204,008	244,387	30,950
				(35,767)

Robust standard errors in parenthesis.
*** p<0.01, **p<0.05, *p<0.1

Table 4. Attrition

	Baseline		Baseline & Follow-up		Difference
	N	Mean	N	Mean	Follow-up - Baseline
Descriptive:					
Female	1,831	0.524	772	0.501	-0.012
					0.022
Age	1,830	37.748	772	41.781	3.762***
					0.545
Primary school	1,831	0.147	773	0.185	0.039**
					0.016
High school	1,831	0.329	773	0.323	-0.003
					0.020
Some post-secondary	1,831	0.356	773	0.312	-0.043**
					0.020
Head of household	1,831	0.677	773	0.727	0.056***
					0.020
Working	1,831	0.778	773	0.816	0.041**
					0.017
In labor force	1,831	0.878	773	0.897	0.023*
					0.013
Wage (avg. $last 6 months)	1,831	447,212	773	476,583	24,738
					17,975
Savings:					
Affiliated	1,831	0.924	773	0.937	0.019*
					0.011
Desired pension ($)	1,811	547,465	772	509,468	-61,285
					69,214
Expected pension ($)	1,811	273,680	772	261,443	-27,713
					39,812
AFP important for retirement	1,692	0.853	724	0.930	0.067***
					0.013
Months contributed	1,755	8.127	741	8.777	0.747***
					0.200
Balance mandatory account (UF)	1,830	373.618	772	465.458	77.356**
					31.712
Bono (UF)	1,831	17.197	773	17.987	-0.520
					4.985
Savings ($000's) outside system	1,239	2,414.425	401	3,296.875	493.474
					863.670
Knowledge:					
Ease with system (1-7)	1,747	4.741	728	4.753	0.019
					0.079
Knows how are pensions calculated	1,831	0.455	773	0.423	-0.007
					0.021
Knows % of wage discounted	1,831	0.432	773	0.427	-0.004
					0.021
Financial knowledge score (1-3)	1,831	1.563	773	1.596	0.018
					0.040
Simulation:					
Simulated pension	1,798	289,498	760	309,849	16,720
					14,776
Mistake in expected pension	1,648	42,296	710	70,335	35,747
					41,558
Mistake (absolute value)	1,648	233,481	710	201,969	-42,143
					40,470

Robust standard errors in parenthesis.
*** p<0.01, **p<0.05, *p<0.1

Table 5. Impact of Personalized Information on behavior within the pension system

	(1) Affiliated	(2) N. of Voluntary Cont.	(3) Voluntary Savings (logs)	(4) N. of Mandatory Cont.	(5) Mandatory Savings (logs)	(6) Retired	(7) N. of Changes in Funds	(8) Ever Changed AFP	(9) Active Password
				Panel A: Without Controls					
Personalized Info.	-0.001	0.080**	0.232***	-0.065	0.003	0.007	0.004	-0.008	0.010
	(0.004)	(0.038)	(0.074)	(0.101)	(0.164)	(0.005)	(0.014)	(0.008)	(0.017)
R^2	0.827	0.591	0.547	0.501	0.490	0.006	0.336	0.015	0.095
				Panel B: With Controls					
Personalized Info.	-0.002	0.079**	0.230***	-0.122	-0.073	0.010**	0.005	-0.008	0.011
	(0.004)	(0.038)	(0.074)	(0.097)	(0.156)	(0.005)	(0.014)	(0.008)	(0.017)
R^2	0.831	0.594	0.551	0.549	0.539	0.061	0.344	0.027	0.108
Control Mean	0.933	0.254	14691.315	5.065	310330.024	0.011	0.055	0.042	0.237

Robust standard errors in parentheses. Sample size is N=2270 for each outcome *** p<0.01 ** p<0.05 * p<0.1

Table 6. Impact of Personalized Information on pension savings, by month

	(1) 1 Month	(2) 2 Months	(3) 3 Months	(4) 4 Months	(5) 5 Months	(6) 6 Months	(7) 7 Months	(8) 8 Months
				Panel A: Contributed Voluntary				
Pers. Info.	0.012**	0.010*	0.011**	0.011**	0.013**	0.009*	0.012**	0.014**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
R^2	0.554	0.495	0.469	0.487	0.465	0.473	0.418	0.401
Control Mean	0.032	0.033	0.030	0.030	0.029	0.033	0.030	0.030
				Panel B: Log of Voluntary Contributions				
Pers. Info.	0.127**	0.107**	0.115**	0.126**	0.141***	0.104*	0.138**	0.166***
	(0.053)	(0.054)	(0.053)	(0.053)	(0.054)	(0.055)	(0.056)	(0.063)
R^2	0.534	0.485	0.462	0.468	0.466	0.475	0.417	0.385
Control Mean	5344	1332	1110	1103	1147	2043	1085	1163
				Panel C: Contributed Mandatory				
Pers. Info.	-0.015	-0.026*	-0.026*	-0.023	-0.020	-0.031**	-0.016	-0.020
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.016)	(0.016)	(0.018)
R^2	0.397	0.377	0.376	0.355	0.349	0.343	0.324	0.283
Control Mean	0.656	0.657	0.649	0.639	0.639	0.639	0.625	0.600
				Panel D: Log of Mandatory Contributions				
Pers. Info.	-0.145	-0.228	-0.256	-0.234	-0.193	-0.306*	-0.193	-0.244
	(0.153)	(0.156)	(0.158)	(0.161)	(0.162)	(0.164)	(0.167)	(0.187)
R^2	0.425	0.403	0.404	0.386	0.377	0.371	0.352	0.313
Control Mean	37284	37653	38100	38387	37729	38194	38458	38615
				Panel E: Retired				
Pers. Info.	0.007**	0.006**	0.006*	0.010**	0.010**	0.011**	0.012**	0.010**
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)
R^2	0.030	0.032	0.034	0.043	0.047	0.055	0.060	0.061
Control Mean	0.002	0.004	0.005	0.006	0.007	0.009	0.009	0.011

Robust standard errors in parentheses. Sample size is N=2588 for each outcome *** p<0.01 ** p<0.05 * p<0.1

Table 7. Impact of Personalized Information on Savings outside the pension system

Variables	N	Control Mean	Impact of pers. info.
Has other savings for retirement	752	0.198	0.046
			(0.030)
Savings outside the system (log)	754	1.126	0.901***
			(0.324)
System's pension important (1-2)	723	0.728	0.019
			(0.032)
Expected income source after retirement:			
Pension and government transfers	752	0.093	-0.008
			(0.021)
Pension and complementary sources	752	0.773	0.047
			(0.030)
Not clear	752	0.133	-0.032
			(0.024)
How to complement savings after retirement:			
Other savings	654	0.141	-0.021
			(0.027)
Keep working	654	0.731	0.020
			(0.034)
Family help	654	0.055	0.017
			(0.019)
Real estate	654	0.174	-0.023
			(0.028)
Other	654	0.015	0.004
			(0.011)

Robust standard errors in parenthesis. *** p<0.01, **p<0.05, *p<0.1

Table 8. Impact of Personalized Information on Labor market participation and formalization

Variables	N	Control Mean	Impact of pers. info.
Working	760	0.824	0.005
			(0.023)
Working with contract	753	0.657	-0.022
			(0.030)
Employed	760	0.621	-0.001
			(0.031)
Income from main occupation	701	484,567	-3,710
			(29,881)
Additional income	717	43,515	11,397
			(9,796)
Health insurance (public or private)	756	0.864	0.054**
			(0.021)
Public health insurance	756	0.667	0.033
			(0.031)
Private health insurance	756	0.197	0.021
			(0.026)

Robust standard errors in parenthesis. *** p<0.01, **p<0.05, *p<0.1

Table 9. Impact of personalized information on knowledge and perceptions

Variables	N	Control Mean	Impact of pers. info.
Recall:			
Module recall	772	0.824	0.086***
			(0.025)
About Information Received:			
Pensions, wages, etc (general)	761	0.168	-0.052**
			(0.026)
How to increase pension	761	0.092	0.036
			(0.023)
Module with alternatives to inc. pension	761	0.108	0.285***
			(0.030)
Does not remember	761	0.632	-0.269***
			(0.035)
Valuation of info received (1-7)	379	5.504	0.478***
			(0.145)
Knowledge:			
Pensions system knowledge (1-7)	767	4.005	0.251**
			(0.112)
Informed about system (last 10 months)	767	0.300	0.036
			(0.032)
Knows how are pensions calculated	765	0.066	0.004
			(0.018)
Knows % discounted by AFP	745	0.118	0.028
			(0.023)
Understands voluntary savings (APV)	745	0.614	0.061*
			(0.034)
Knows retirement age	745	0.753	0.074***
			(0.028)
Behavior:			
During the last year, have you considered:			
Affiliating to AFP	766	0.042	-0.019
			(0.012)
Initializing/increasing voluntary savings	766	0.389	0.084**
			(0.036)
Changing contributions frequency	766	0.157	0.028
			(0.027)
Changing expected retirement age	766	0.266	-0.051*
			(0.031)
Informing more about the system	766	0.601	0.067*
			(0.035)
AFP's valuation:			
AFP qualification (1-7)	736	3.172	0.175
			(0.132)
Pension is an adequate retribution (0-1)	709	0.131	0.065*
			(0.036)
Trust in the system (1-7)	746	2.854	0.186
			(0.130)

Robust standard errors in parenthesis. *** p<0.01, **p<0.05, *p<0.1

Table 10. Impact of Personalized Information on behavior within the pension system, by demographics

	(1) N. of Voluntary Cont.	(2) Voluntary Savings (logs)	(3) N. of Mandatory Cont.	(4) Mandatory Savings (logs)	(5) Retired
			Panel A: By Gender		
Pers. Info.*Male	0.035	0.103	-0.209	-0.247	0.008
	(0.053)	(0.109)	(0.142)	(0.227)	(0.006)
Pers. Info.*Female	0.122**	0.356***	-0.035	0.099	0.012
	(0.052)	(0.099)	(0.133)	(0.216)	(0.007)
R^2	0.595	0.551	0.549	0.540	0.061
			Panel B: By Age		
Pers. Info.*> 5 yrs	0.074*	0.189**	-0.042	0.033	0.001
from Retirement Age	(0.039)	(0.073)	(0.110)	(0.178)	(0.001)
Pers. Info.*< 5 yrs	0.130	0.530	0.241	0.672	0.001
from Retirement Age	(0.179)	(0.414)	(0.295)	(0.459)	(0.001)
Pers. Info.*Passed	0.133	0.577	-1.006***	-1.570**	0.150*
Retirement Age	(0.204)	(0.423)	(0.380)	(0.662)	(0.085)
R^2	0.592	0.548	0.551	0.543	0.285
			Panel C: By Educational Level		
Pers. Info.*<HSD	0.096	0.055	-0.503**	-0.481	0.031*
	(0.077)	(0.113)	(0.243)	(0.374)	(0.018)
Pers. Info.*HSD	-0.014	0.123	-0.140	-0.104	0.001
	(0.063)	(0.122)	(0.166)	(0.255)	(0.009)
Pers. Info.*Some college	0.080	0.348***	0.128	0.249	0.006
	(0.060)	(0.126)	(0.168)	(0.286)	(0.006)
Pers. Info.*University	0.229*	0.349	-0.232	-0.278	0.015
	(0.120)	(0.233)	(0.234)	(0.381)	(0.009)
R^2	0.595	0.551	0.550	0.540	0.063

Robust standard errors in parentheses. Sample size is N=2270 for each outcome *** p<0.01 ** p<0.05 * p<0.1

Table 11. Impact of Personalized Information on behavior within the pension system, by pension mistake

	(1) N. of Voluntary Cont.	(2) Voluntary Savings (logs)	(3) N. of Mandatory Cont.	(4) Mandatory Savings (logs)	(5) Retired
Pers. Info.*Overest. Pension	0.064	0.201**	-0.042	0.228	0.023**
by more than 25 percent	(0.042)	(0.085)	(0.196)	(0.336)	(0.010)
Pers. Info.*Est. Pension	0.164	0.611**	-0.060	0.151	0.017
within $\pm$ 25 percent	(0.125)	(0.244)	(0.231)	(0.347)	(0.014)
Pers. Info.*Underest. Pension	0.044	0.090	-0.247*	-0.393**	0.001
by more than 25 percent	(0.064)	(0.124)	(0.138)	(0.197)	(0.007)
R^2	0.586	0.548	0.495	0.481	0.083
Control Mean	0.254	14691	5.065	310330	0.011

Robust standard errors in parentheses. Sample size is N=2032 for each outcome *** p<0.01 ** p<0.05 * p<0.1

Table 12. Impact of Personalized Information on behavior within the pension system, by financial literacy and system knowledge

	(1) N. of Voluntary Cont.	(2) Voluntary Savings (logs)	(3) N. of Mandatory Cont.	(4) Mandatory Savings (logs)	(5) Retired
			Panel A: By Financial Literacy		
Pers. Info.*Low	0.080*	0.223**	-0.088	-0.140	0.002
	(0.048)	(0.097)	(0.142)	(0.223)	(0.007)
Pers. Info.*High	0.077	0.236**	-0.156	-0.018	0.017**
	(0.059)	(0.112)	(0.133)	(0.219)	(0.007)
R^2	0.595	0.551	0.549	0.540	0.062
			Panel B: By Pension System Knowledge		
Pers. Info.*Low	0.128*	0.258**	-0.187	-0.254	0.009
	(0.072)	(0.126)	(0.170)	(0.279)	(0.010)
Pers. Info.*Medium	0.012	0.111	-0.149	-0.091	0.013**
	(0.055)	(0.106)	(0.143)	(0.230)	(0.006)
Pers. Info.*High	0.135*	0.438**	0.057	0.285	0.002
	(0.070)	(0.178)	(0.209)	(0.328)	(0.009)
R^2	0.596	0.552	0.549	0.540	0.061

Robust standard errors in parentheses. Sample size is N=2270 for each outcome *** p<0.01 ** p<0.05 * p<0.1