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Alessandro Buccioli, Martina Manfre', Gregorio Gimenez

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Household Financial Decisions

After the 2008 Chilean Pension Reform*

Alessandro Buccioli

University of Verona

alessandro.buccioli@univr.it

Martina Manfrè[†]

University of Verona

martina.manfre@univr.it

Gregorio Gimenez

University of Zaragoza

gregim@unizar.es

Abstract

We evaluate the effect of the 2008 Chilean pension reform, that introduced a basic pension to the poorest part of the elder population, in terms of decisions regarding debts and assets. We apply a difference-in-difference estimation method to longitudinal survey data representative of the Chilean population. Our evidence suggests that those who started receiving basic pension increased their holding and amount of debt. It may be that some people used the basic pension as a collateral for acquiring more debt, rather than using it as a way to finance new investments. The increase in debt positions is proportionally higher when compared to the variation in asset positions. We interpret this measure as an indicator of debt sustainability. Moreover, debt ratio increases significantly more for women, who may be particularly exposed to financial shocks. This result raises concern on the potential financial vulnerability of the population that was targeted by the reform.

Keywords: Chile; Pension; Financial vulnerability. Gender vulnerability; Difference-in-difference.

JEL Classification: I38; D14.

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[†] Corresponding author: Martina Manfrè. Postal address: University of Verona, Department of Economics, Via Cantarane 24, 37129 Verona, Italy. Email: martina.manfre@univr.it.

1. Introduction

Changes in demographic trends and rising concerns about social welfare occurred over the past two decades have added urgency and purpose to pension reforms in both developed and developing countries (Barrientos, 1998). As the long-term consequences of population aging have become known and more widely discussed, evaluating the effectiveness of social pensions in improving household welfare has recently received considerable attention (Samwick, 2000). Pension reforms are mainly directed to address the problem of low pension coverage without imposing an excessive burden on the public finances. However, they may also be used as a way to redistribute wealth toward specific target groups.

This is the case, in particular, of Chile, a country experiencing generally higher saving rates than other Latin American countries (Morandè, 1998), although with still large inequalities (Engel *et al.*, 1999). With the 2008 reform of the pension system, the Chilean government made a great effort to improve the adequacy of pension amounts among specific groups of the population, notably the poorest households with at least one member older than 65. The goal of this paper is to evaluate the effects of the 2008 Chilean pension reform on behavior toward different financial instruments. In particular, we wish to learn how the targeted population reacted to the increase in the income stream brought by the reform.

Previous research already found that the reform increased individual spending, improved self-reported health (Berhman *et al.*, 2011) and reduced labor market participation (Attanasio *et al.*, 2011; Encina, 2013). We instead focus our attention on financial outcomes and ask the following questions: did those affected by the reform increase their participation in the debt and asset markets? Did they use their additional money to buy assets, or as a collateral for obtaining new debt? We also explore the effect of the Chilean pension reform on financial outcomes separately by gender. As most other components of social protection systems, pension reforms can have a relevant impact on gender equality (Arza, 2012). Exploiting these issues may give a more complete view of the effectiveness of the policy. In particular, the increase in household debt may raise concerns about its sustainability and the possible implications for the economy of a country. Indeed, a growing stock of household debt makes individuals more vulnerable to potential income shocks and exerts a negative impact on the aggregate saving rate (Barba and Pivetti, 2009).

We answer our research questions using two waves (years 2006 and 2009) of a large representative Chilean survey called *Encuesta de Protección Social* (EPS). Previous research on household indebtedness mainly focused on developed countries and showed the negative effect of household debt on inflation in real estate and capital markets (Servet and Saiag, 2013). However, the rise of indebtedness in Latin American countries has not been widely investigated, also because little data are available from such countries. Indeed, few household surveys in developing countries collect information on debt and assets ownership (Deere and Catanzarite, 2017). By contrast, the EPS includes several questions related to wealth and financial instruments held by respondents, which allow us to answer our research questions. We exploit the longitudinal nature of the data to perform our analysis with a difference-in-difference approach; this allows us to measure how individuals reacted to receiving the basic pension, in comparison to what happened to individuals who did not receive it.

Our results show no significant impact of the Basic Solidarity Pension (*Pensión Básica Solidaria*, henceforth PBS) on the access to asset positions. The weak effect of the policy may be due to the characteristics of the targeted population, which consists of poor households with at least one member older than 65. The increase in the income stream provided by the reform may not be large enough to stimulate their participation in financial markets. In contrast, we find an increase in both debt holding and debt amount among individuals affected by the policy. It may be that the recipients used the PBS as a collateral for acquiring more debt, rather than using it as a way to finance new investments. In order to examine whether households face immoderate or excessive leverage, we measure their total outstanding debt in relation to their available financial assets. To this end, we compare the amount of debt to the amount of assets to obtain an indicator of households' debt sustainability (debt ratio). Measured relative to households' assets, households' debt has increased in our sample. The larger increase in households' leverage compared to their amount of financial assets has negative consequences in terms of debt ratio. Indeed, having a high debt-to-assets ratio will weaken households' financial positions. These effects are significantly larger among women, who represent a particularly vulnerable group of the population.

The remainder of the paper is organized as follows. Section 2 describes the policy reform and provides an overview of the existing literature. Section 3 presents the data and some summary statistics. Section 4 comments on our findings and, finally, Section 5 concludes. An Appendix shows further robustness checks.

2. Background

2.1. Description of the reform

Chile is among the Latin American countries that have most profoundly reformed their pension systems over the years. Until 1981, the Chilean pension system was of defined benefit type and financed on a pay-as-you-go basis. Subsequently, on May 1981, it changed into a fully-funded, defined contribution system, in which working people were required to save 10% of their labor income into individual pension accounts. For the following 30 years, individual pension accounts were managed by private-sector providers called Pension Fund Managers (AFPs, *Administradoras de Fondos de Pensiones*). Working people were required to contribute for at least 20 years in order to be eligible for a guaranteed minimum pension (Berhman *et al.*, 2011).

However, this system turned out to be inadequate to meet the pension needs of a country like Chile, whose labor market is characterized by the high prevalence of self-employment and informality (López García, 2015). Low coverage, as well as low pension benefits and high administrative costs, intensified the need for a new pension reform. The 2008 reform intended to improve the solidarity in the compulsory and voluntary pillars of the old pension scheme by introducing two new components (Encina, 2013): the PBS and a top-up pension (*Aporte Previsional Solidario*).

The PBS started in July 2008. It provides a basic pension to all households with i) at least one member older than 65, ii) in the 40% less affluent fraction of the population and iii) do not satisfy minimum contributions requirements¹. The coverage of the subsidy has been gradually increased to reach the poorest 60% of the elderly population at the end of 2011, as determined by a poverty score called the “*Ficha de Protección Social*” (from now on, FPS). The PBS provided eligible households about USD 105 monthly, reaching USD 156 in July 2011 (Encina, 2013). Benefits are financed by the government through a Solidarity Fund and, in part, by local municipalities and the Pension Fund Managers (Berhman *et al.*, 2011).

The other component introduced by the 2008 reform is a welfare pension aimed at sustaining consumption for those with incomplete contributions histories in the old pension system (Attanasio *et al.*, 2011).

¹ Receipt of the benefit is conditional on having at least 20 years of residency and on being resident in the country at least four of the five years prior to the reform (OECD, 2017).

2.2. Literature review

Over the last two decades many OECD countries undertook reforms to improve pension coverage and safety benefits, with the primary goal of reducing old age poverty (OECD, 2013; 2017). Following the example of Chile, by the end of 2000 other Latin American countries implemented structural reforms to privatize their pension schemes: Peru (1993), Colombia and Argentina (1994), Uruguay (1996), Bolivia and Mexico (1997), El Salvador (1998). The introduction of privatized pension systems was expected to create beneficial impacts on private savings and, consequently, on the growth rate of the countries (Altiparmakov and Nedeljkovic, 2018). However, some myths about the positive effects of such reforms on social welfare have often been contrasted by the empirical evidence (Mesa-lago, 2002). Altiparmakov and Nedeljkovic (2018) show a positive, although limited, impact of pension privatization on aggregate saving rates in Latin American countries, but they find no evidence of higher economic growth. Using Peruvian data, Olivera (2016) highlights the existence of a trade-off between the efficiency of a reform in limiting pension debt and its social costs in terms of welfare reduction.

More recently, many Latin American countries introduced conditional cash transfers not only to address poverty alleviation, but also to enforce human capital accumulation. Berhman *et al.* (2012) examine the short-term effects of a Mexican program providing financial incentives to poor families and show an increase in school enrollment for children affected by the program. Cash transfers enacted in Brazil and Nicaragua in the early 2000s have proved to be efficient in increasing preventive healthcare and raising households' consumption (Rawlings, 2005). Conversely, Alzúa *et al.* (2013) find no significant effect on the marginal labor supply for individuals affected by welfare programs on work incentives in Honduras (2000).

However, the conditionality of the transfers has been extremely questioned by several authors, who have recently drawn more attention to the effects of unconditional transfers like social pensions (Pfütze and Rodríguez Castelán, 2015). Many Latin American countries have introduced social pensions as public policies to solve the problem of low pension coverage. In Brazil, Barrientos (2005) finds that non-contributory pension benefits can effectively help poverty reduction among the elderly. In Mexico, Aguila *et al.* (2012) find an increase in medical spending and a reduction in the consumption of alcoholic beverages among individuals affected by a program targeted to people older than 70. In the mid-2000s also Argentina introduced the “Moratorium” program, which

allowed workers in retirement age to receive a pension irrespective of their previous social security contributions. The program was successful in increasing elderly pension coverage, although it incentivized individuals to continue working in the informal sector (Bosch and Guajardo, 2012). Costa Rica also mandated an expensive social program to assist poor individuals older than 65. However, the percentage reduction in poverty among beneficiaries was lower compared to Argentina (Palacios and Sluchynsky, 2006).

With the 2008 pension system reform, the Chilean government has also made a great effort to improve the adequacy of pension amounts among specific subgroups of the population, notably the poorest and the elderly. Part of the existing literature investigates the effect of receiving additional pension benefits, such as PBS, on consumption decisions. However, Berhman *et al.* (2011) find little evidence of crowding-out private transfers: whilst individuals receiving PBS declare an improvement on self-reported health, the effects on cigarette consumption, alcohol intake and on the composition of consumer durables remain small and not statistically significant. Moreover, after the implementation of the reform, they find a significant reduction in hours worked per week among individuals receiving PBS. Similarly, Encina (2013) provides evidence of higher withdrawals from the labor market among individuals receiving PBS, who show longer periods of inactivity and lower rates of contributions. Although recognizing a positive effect of additional pension benefits on self-financed pension wealth, Attanasio *et al.* (2011) document a reduction in the formal labor market participation after the reform, with results significantly higher for women. More recently, Wong (2016) finds a greater incentive to leave the formal sector and to evade taxes for people who, after the reform, expected to face an increase in their implicit marginal tax rate.

Despite the growing interest in the effect of the 2008 Chilean pension reform on consumers' economic behavior, relatively little is known about the impact of additional pension benefits, such as PBS, on financial decisions. The present research contributes to filling this gap.

3. Data Overview

3.1. Encuesta de Protección Social (EPS)

In this research we use Chilean data from the *Encuesta de Protección Social* (henceforth, EPS). The EPS is the largest longitudinal survey in Chile, with a sample of around 16,000 respondents spread across all regions of the country. Since 2002 and up to

the time of this writing, five rounds have been carried out. Data are collected by the Microdata Center of the *Universidad de Chile*, in collaboration with the Chilean *Subsecretaría de Previsión Social* and under the guidance of a research team from the University of Pennsylvania. The EPS collects information about individuals older than 15 representative of the Chilean population. In addition to socio-demographic information, it includes data about labor and social security history, family composition, health, wealth and financial instruments held by respondents.

3.2. Sample selection

We focus on the two EPS waves which have been collected immediately before and after the 2008 pension system reform: the 2006 and 2009 waves. Our data include one respondent per household, and we restrict our attention to individuals aged less than 90 years to avoid the presence of outliers in the data. We also consider respondents who completed the survey in both years 2006 and 2009, to ensure that differences over time are representative of changes in responses rather than changes in sample composition (Berhman *et al.*, 2011).

We split our observations in two groups, treatment and control. The treatment group is made of individuals who received the pension benefit PBS in 2009; following Encina (2013), the control group is made of individuals who did not receive PBS in 2009, but could have been eligible based on the information we have². In particular, we consider respondents older than 65 at the time of the implementation of the reform, and with a FPS score of 12,666 points or lower (Behrman *et al.*, 2011).

The FPS score is measured at the household level and reflects the capacity of generating income, properly corrected to account for the economic needs (Herrera *et al.*, 2010). This indicator is computed by considering a wide set of socioeconomic characteristics, such as household size and composition, income, health status and years of education (Attanasio *et al.*, 2011).

The official FPS scores are not public information, as they are only provided by administrative data. The actual formula used to calculate them is not publicly released either. In 2009 the survey asked individuals whether they filled in the FPS, and if so to report their FPS score. However, only 12% of the respondents reported the score. In our analysis, we follow the approach proposed by Wong (2016) to predict the FPS score as a

² They may have not received PBS because they are already receiving other pensions or because they did not apply for the FPS.

function of the socioeconomic components listed above. We then estimate with tobit the following equation on the 2009 data among those who reported their FPS score:

$$FPS_i = \beta_0 + \beta_1 Age_i + \beta_2 Household\ size_i + \beta_3 Health_i + \beta_4 Income_i + \beta_5 Education_i + \varepsilon_i \quad (1)$$

where FPS_i is the predicted vulnerability indicator of household i after the implementation of the reform. Regression results are reported in Appendix Table A1. We then used predictions from the above equation to associate each individual with a 2009 FPS score. The predicted FPS score has been used to determine eligibility for the new pension benefits. As a robustness check, i) we also predict the same indicator by means of a principal component analysis, and ii) we generically define eligible all those who declare in 2009 they have filled in the FPS. Results are shown in the Appendix; they are consistent with our benchmark analysis, although they are based on different samples.

As a result of this sample selection, our final benchmark sample consists of 4,316 observations on 2,158 individuals, 344 of which belong to the treatment group. Figure 1 plots the distribution of FPS in our sample, separately for treatment and control groups. The two distributions are very similar, although the FPS score is on average slightly smaller in the treatment group (6,871.95 as opposed to 7,087.35).

FIGURE 1 ABOUT HERE

3.3. Key variables

We divide the variables in outcome and explanatory variables. Table 1 provides descriptive statistics of the variables used in our research³.

Our outcome variables concern holdings and accumulation of debts and financial assets. Regarding debt, we consider such instruments as bank lines of credit, credit cards, store credit cards, consumer credits and other financial debts (i.e., student loans, social or private debts). The variable *Debt* is a dummy equal to one if the respondent holds at least one of the above-mentioned instruments, and zero otherwise, while the variable *Debt amount* represents the total amount in US dollars on the same debt instruments.

³ Monetary values are reported to 2009 prices using the consumer price index (source: <https://inflationdata.com>) and converted into US dollars (source: <https://www.investing.com>).

Regarding assets, we consider such instruments as homebuyer savings accounts, voluntary pension savings, saving accounts, time deposits, mutual funds, bonds and stocks. The variable *Assets* is a dummy equal to one if the respondent holds at least one of these instruments, and zero otherwise, while the variable *Assets amount* represents the total amount in US dollars held in such assets.

In our sample, those who report to have at least one debt instrument are about 34%, whilst having financial assets is not so widespread (15%). The average amounts of debt and assets are about USD 403 and 829, respectively.

We consider two further outcome variables, meant to make a comparison between assets and debts. The variable *More debt* is a dummy equal to one if the amount of debt held by the household is greater than the corresponding amount of assets. Finally, the variable *Debt ratio* is the ratio between debt and assets amounts.

Concerning the explanatory variables, it is worth noticing that the variable *Treatment* is a dummy equal to one if the individual in 2009 receives PBS, and zero otherwise, while the variable *After* is a dummy equal to one if the observation refers to the period after the implementation of the reform (year 2009), and zero otherwise.

The remaining variables are socio-demographic controls. The average age in our sample is 72, most respondents are women (51%) and more than a half of the sample lives with a partner (59%). As regards educational levels, only a small percentage of individuals (5%) report to have high education, that we identify with having at least a high school degree. In our sample, 22% of respondents worked in the past three years and the average annual income is about 7,000 US dollars. Slightly more than one third of respondents (36%) declare to be in good health and the vast majority of individuals (85%) own their homes.

TABLE 1 ABOUT HERE

4. Econometric analysis

4.1. Identification strategy

We study the impact of the 2008 pension reform by using a difference-in-difference (DiD) identification strategy. Specifically, we exploit differences in reception of PBS to compare changes in financial outcomes between households affected by the intervention, who constitute the treatment group, with those from a comparable control group, before and after the implementation of the reform.

We estimate the following regression:

$$y_{it} = \beta_0 + \beta_1 Treatment_{it} + \beta_2 After_{it} + \beta_3 Treatment_{it} * After_{it} + X'_{it}\beta_4 + \varepsilon_{it} \quad (2)$$

where y_{it} is one of the dependent variables of interest representing financial behavior of respondent i at time t , $Treatment_{it}$ is the treatment indicator, $After_{it}$ indicates the post-treatment period, and the vector X'_{it} represents control variables including socio-demographic information provided by the respondent, such as age, gender, education, marital status, occupation, income, health and housing property. Finally, ε_{it} is the error term.

In our analysis, the parameter of interest is the coefficient β_3 on the interaction term between the treatment indicator and the post-treatment period, which represents the impact of PBS on financial behavior of poor households, after the reform.

In principle, one could identify the causal impact of PBS on individuals' financial decisions in a Regression Discontinuity Design (RDD) framework, where the discontinuity is set around the FPS threshold for PBS eligibility. However, given the existence of serious distortions in data about FPS (Herrera *et al.*, 2010), estimating the impact of the treatment by using this approach may be misleading. Indeed, it is plausible to have sorting by some individuals, or score manipulation by the authority, which may alter the priority of the households in the eligibility for social benefits. As one of the main assumptions behind the RDD approach requires that eligibility cannot be manipulated, meaning that individuals do not sort into treatment, our benchmark analysis relies on the DiD approach to estimate the causal effect of the pension reform on our outcomes of interest.

4.2. General results

Table 2 reports average marginal effects obtained with the models where the dependent variables indicate holdings or amounts of debts and assets. We first concentrate on debt (Columns 1 and 2). We find similar evidence for the extensive and intensive margins, with the holding probability and the amount increasing with the presence of a partner, and if the respondent is younger, has worked in the past or has high education. The treatment group is 16.9% less likely to hold debt positions (Column 1), and on average has a debt 86.3% lower than the control group (Column 2). We see a small but

significant effect of the policy reform in the the debt holding, which increases by 6% among the treated after the introduction of PBS. Moreover, the debt amount increased by 31% among those who have been reached by the reform.

Regarding assets (Columns 3 and 4), we obtain that the holding probability and the amount increased among people with high education, who worked or are in good health. The treatment group is 5.7% less likely to have any assets (Column 3), and on average has assets 26.6% lower than the control group (Column 4). We notice that the amount of assets generally fell in 2009 (by 11.8%, Column 4). However, our findings suggest that asset market participation is not significantly affected by the policy reform. Indeed, we find no significant change in the holding and in the amount of assets after the introduction of PBS. This evidence is in line with findings in Cerda (2008), who used EPS data to study a previous pension reform in Chile.

Taken together, this evidence suggests that the PBS did not alter the access to asset positions, but it had an impact on the probability to hold debt and on the debt amount. It may be that some people used the PBS as a collateral for acquiring more debt, rather than using it as a way to finance new investments.

TABLE 2 ABOUT HERE

The analysis performed so far evaluates the effect of the policy reform by looking separately at the holdings and the amounts of debts and assets. Knowing the existence of an underlying relationship between debt and asset dimensions, we now take a different approach to assess the impact of PBS on households' financial behavior. We consider as dependent variable the household debt-to-assets ratio, which represents households' total outstanding debt divided by their total assets⁴. We compare the amount of debt to the amount of assets to obtain an indicator of households' debt sustainability. Indeed, the higher the debt-to-assets ratio, the higher the level of households' leverage, and the weaker their financial position. We carry out the regression whose output is reported in Table 3. In Column 1 we measure the probability that the amount of debt is higher than the amount of assets, while in Column 2 we take as dependent variable the ratio between debt and asset amounts. Both analyses show that, with PBS, the treatment group has relatively more debt: the probability to have more debt than assets increases by 6%

⁴ Following the OECD definition, available at (accessed June 12 2019): <https://www.oecd.org/sdd/na/statisticalinsightswhatdoeshouseholddebtsayaboutfinancialresilience.htm>

(Column 1, although the coefficient is significant at 10% only), and the debt-to-assets ratio is 33.1% higher (Column 2).

All in all, our findings indicate that the introduction of PBS has the effect to stimulate the accumulation of debt. Policy makers probably did not expect this effect. Measured relative to households' assets, households' debt has increased more in our sample, with negative effects on debt sustainability. As our results depend on the selection of the control group that we base on the estimation of FPS, we carry out a robustness check analysis in Appendix (see Tables A2-A5). We replicate the analyses of Tables 2-3 using two different samples, in which the sample is defined in a different manner: in one case (Tables A2-A3) we derive a FPS factor from a principal component analysis based on the same explanatory variables as in Equation (1). We then select for our sample the observations with factor below its median. The advantage of this approach is that we do not need to rely on the answers of those who reported their FPS. Our benchmark results are confirmed with this alternative dataset. In the other case (Tables A4-A5) we simply keep all those individuals who declared they filled in a FPS form. In so doing we avoid relying on assumptions concerning the estimation of FPS. The impact of PBS on the probability to have more debt than assets is not statistically significant when we consider this alternative specification. This might be related to the reduction in sample size given the low percentage of answers in the question about FPS. This notwithstanding, our results are consistent in sign with the baseline estimations.

TABLE 3 ABOUT HERE

4.3 Gender differences

Chilean women have traditionally experienced notable differences with respect to men in access to credit and assets, also due to their lower labor participation rates compared to developed countries (e.g., Ramírez and Ruben, 2015). This has important implications in terms of dependency and economic and social well-being. For this reason, gender analysis of the consequences of the Chilean pension reform on debt and assets accumulation has particular interest. In the analyses of Table 2 and Table 3 we found no significant gender effects. However, the coefficients of the gender variable were obtained net of differences in terms of socio-demographic characteristics.

It happens that females are more vulnerable than males, as they are less frequently highly educated (3.70% as opposed to 5.43% in our sample) and on average earn lower

incomes (7,253 instead of 7,452 USD). Moreover, they are less likely to live with a partner, to work and be in good health conditions. Table 4 shows the statistics of the amount of debt and assets by gender, before and after the pension reform. In contrast to our previous analyses, this time the gender comparison does not control for differences in income or other characteristics. We see that women who received the PBS had the largest increase in the amount of debt among all groups (138%), and the largest decrease in the amount of assets (-81%). This led to a sizable increase in their debt ratio, the largest among all groups. The financial behavior of men who took advantage of the PBS was very different. They reduced both their amount of debt and assets in a 57% and 20%, respectively.

TABLE 4 ABOUT HERE

The gender differences in outcome, in debt and assets, can be a consequence of the pension reform, but can also be due to differences in the rest of predictors of the model. To compare to what extent the differences in the financial behavior of men and women can be attributed to the reform, we estimate the predicted mean of the holding probabilities and the amounts of debt and assets once we have controlled for the rest of the predictors. Figure 2 shows the results. All those individuals who received the PBS increased both their debt and assets more than those who did not (with the exception of the holding probability of assets in the case of women).

FIGURE 2 ABOUT HERE

All in all, the steepness of the lines suggests significant differences in the size of the effect of the PBS between men and women. Table 5 displays the estimate of the slopes for each line. This is the effect of receiving PBS on the debt and assets (in probability and amount) while holding the rest of regressors constant at their means. The effect between women receiving and not receiving PBS is highly steep and statistically significant in the case of debt and debt ratio (indicating a weaker financial position) and not significant in assets. No effects are significant for men.

We conclude that receiving PBS has different effects on the financial behavior of men and women: women increased their debt and debt ratio significantly more. This makes a particularly exposed group (low-income elderly women) more vulnerable. The

consequences in terms of their well-being might be important, as their consumption of basic goods and medical treatments may be affected, as well as their psychological well-being and possibilities of facing unexpected expenses.

TABLE 5 ABOUT HERE

5. Conclusions

The primary goal of this research was to evaluate the impacts of the 2008 Chilean pension reform on individuals' behavior toward different financial instruments. The 2008 reform intended to improve the solidarity in the compulsory and voluntary pillars of the old pension scheme by introducing two new components (Encina, 2013): the Basic Solidarity Pension (*Pensión Básica Solidaria*) and a top-up pension (*Aporte Previsional Solidario*). In our analysis we focus on the Basic Solidarity Pension or PBS, a monthly benefit directed towards poor households with at least one member older than 65.

We use Chilean data from a large representative survey called *Encuesta de Protección Social*. Previous research already found that the reform increased individual expenditures, improved self-reported health (Berhman *et al.*, 2011), and reduced labor market participation (Attanasio *et al.*, 2011; Encina, 2013). We instead investigate whether the increase in the income stream affect participation in the debt and asset markets. We also explore the effect of the Chilean pension reform on financial outcomes separately by gender. Exploring these issues may give a more complete view of the effectiveness of the policy.

We found that those who received a basic pension modified their behavior by increasing their holding and amount of debt. Importantly, they increased the amount of debt proportionally more than the amount of assets. A possible interpretation is that some people used the PBS as a collateral for acquiring more debt, rather than using it as a way to finance new investments. Moreover, our findings reveal that women increased their debt and debt ratio significantly more than men, leading to a weaker financial position. This result has important consequences in terms of social well-being. As poor women constitute a particularly vulnerable group in Chile, this may help to perpetuate inequality. The increase in household debt raises concerns about its sustainability and the possible policy implications. On the one hand, higher households' borrowing could be an important source of economic efficiency, rising investment opportunities and,

consequently, enhancing macro-finance stability. However, the long-term excessive private debt exposes households to financial risks and potential economic vulnerabilities that may weaken their spending, with a negative impact on the growth rate of the country (Reinhart and Rogoff, 2010). This is even more relevant in emerging market economies, whose debt securities markets have only recently grown (Hattori and Takáts, 2015).

This work presents one main limitation: the absence of the original FPS scores for most of the households, which forced us to make assumptions on it. However, our results seem robust to the alternative checks we carried (predictions obtained through regressions, principal component analysis and self-declarations in the survey). Moreover, we are aware that the consequences of this kind of reforms sometimes take long to manifest. Hence, a promising extension for future research would be to assess the effects of the reform in later periods.

References

- Aguila E., Arie K., Rosalba R., Beverly W., 2012. Experimental analysis of the health and well-being effects of a non-contributory social security program. Rand Corporation Working Paper WR-903.
- Altiparmakov N., Nedeljković M., 2018. Does pension privatization increase economic growth? Evidence from Latin America and Eastern Europe. *Journal of Pension Economics and Finance*, 17(01), 46-84.
- Alzúa M., Cruces G., Ripani L., 2013. Welfare programs and labor supply in developing countries: Experimental evidence from Latin America. *Journal of Population Economics*, 26(4), 1255-1284.
- Arza C., 2012. Pension reform and gender equality in Latin America. UNRISD Research Paper 2012–2.
- Attanasio O., Meghir C., Otero A., 2011. Formal labor market and pension wealth: Evaluating the 2008 Chilean Pension Reform. University College London, mimeo.
- Barba A., Pivetti M., 2009. Rising household debt: Its causes and macroeconomic implications – a long-period analysis. *Cambridge Journal of Economics*, 33(1), 113-137.
- Barrientos A., 1998. Pension reform, personal pensions and gender differences in pension coverage. *World Development*, 26(1), 125-137.
- Barrientos A., 2005. Non-contributory pensions and poverty reduction in Brazil and South Africa. University of Manchester, mimeo.
- Behrman J.R., Calderon M.C., Mitchell O., Vasquez J., Bravo D., 2011. First-round impacts of the 2008 Chilean Pension System Reform. PARC Working Paper Series. 33.
- Bosch M., Guajardo J., 2012. Labor market impacts of non-contributory pensions: The case of Argentina's Moratorium. IDB Working Paper IDB-WP-366.
- Cerda R.A., 2008. Social security and wealth accumulation in developing economies: Evidence from the 1981 Chilean reform. *World Development*, 36(10), 2029-2044.
- Deere C.D., Catanzarite Z.B. (2017). Who borrows to accumulate assets? Class, gender and indebtedness in Ecuador's credit market. *CEPAL Review*, 122, 107–126.
- Encina J., 2013. Pension reform in Chile: A difference in difference matching estimation. *Estudios de Economía*, 40(1), 81-95.

- Engel E.M.R.A., Galetovic A., Raddatz C.E. 1999. Taxes and income distribution in Chile: Some unpleasant redistributive arithmetic. *Journal of Development Economics*, 59(1), 155–192.
- Hattori M., Takáts E., 2015. The role of debt securities markets. BIS Paper 83c.
- Herrera R., Larrañaga O., Telias A., 2010. La ficha de protección social. PNUD Documento de Trabajo, Agosto 2010.
- Mesa-Lago C., 2002. Myth and reality of pension reform: The Latin American evidence. *World Development*, 30(8), 1309–1321.
- Morandè F.G., 1998. Savings in Chile. What went right?. *Journal of Development Economics*, 57(1), 201–228.
- OECD, 2013. Pensions at a Glance 2013: OECD and G20 Indicators, OECD Publishing.
- OECD, 2017. Pensions at a Glance 2017: OECD and G20 Indicators, OECD Publishing.
- Olivera J., 2016. Welfare, inequality and financial effects of a multi-pillar pension reform: The case of Peru. *Journal of Development Studies*, 52(10), 1401–1414.
- Palacios R., Sluchynsky O., 2006. Social pensions Part I: Their role in the overall pension system. World Bank SP Discussion Paper 36237.
- Pfütze T., Rodríguez Castelan C., 2015. Can a small social pension promote labor force participation? Evidence from the Colombia Mayor program. World Bank PEGP Working Paper 7516.
- Ramírez E., Ruben R., 2015. Gender systems and women's labor force participation in the salmon industry in Chiloé, Chile. *World Development*, 73(10), 96-104.
- Rawlings L.B., 2005. A new approach to social assistance: Latin America's experience with conditional cash transfer programmes. *International Social Security Review*, 58(2-3), 133-161.
- Reinhart C.M., Rogoff K.S., 2010. Growth in a time of debt. *American Economic Review*, 100(2), 573-578.
- Samwick A.A., 2000. Is pension reform conducive to higher saving? *Review of Economics and Statistics*, 82, 264-272.
- Servet J.M., Saiag H., 2013. Household over-indebtedness in contemporary societies: A macro-perspective. In Guérin, I. Morvant-Roux, S. & Villarreal, M. (eds.), *Microfinance, Debt and Over-indebtedness : Juggling with Money*, London: Routledge.
- Wong B., 2016. Formal sector labor supply responses to the 2008 Chilean Pension System Reform. University of California at San Diego, mimeo.

Table 1. Summary statistics before the reform (wave 2006); 2158 observations

Variable	Mean	Std.Dev.	Min	Max
<i>Outcome variables</i>				
Debt	0.337	0.473	0	1
Debt amount (x1000 USD)	0.403	2.223	0	27.976
Assets	0.148	0.355	0	1
Assents amount (x1000 USD)	0.829	10.848	0	399.801
More debt	0.226	0.418	0	1
Debt ratio	290.530	0.418	0	47976.18
<i>Explanatory variables</i>				
Treatment	0.159	0.366	0	1
Age	71.506	6.053	63	90
Female	0.513	0.500	0	1
If partner	0.585	0.493	0	1
High education	0.045	0.208	0	1
Worked in the past	0.215	0.411	0	1
Income (x1000 USD)	7.350	38.999	0	399.810
Good health	0.359	0.480	0	1
Home owner	0.851	0.356	0	1

Table 2. Regression output: debt and assets

Margin Method	(1) Extensive Probit	(2) Intensive OLS	(3) Extensive Probit	(4) Intensive OLS
Dep. variable	Debt	ln(Debt amount)	Assets	ln(Assets amount)
Treatment	-0.169*** (0.028)	-0.863*** (0.126)	-0.057** (0.022)	-0.266** (0.105)
After	0.015 (0.013)	0.120 (0.083)	-0.008 (0.011)	-0.118* (0.068)
Treatment x After	0.063* (0.036)	0.319* (0.168)	-0.011 (0.029)	0.008 (0.120)
Age	-0.013*** (0.001)	-0.059*** (0.007)	-0.001 (0.001)	-0.002 (0.006)
Female	0.018 (0.016)	0.062 (0.096)	-0.003 (0.012)	-0.058 (0.076)
If partner	0.103*** (0.016)	0.475*** (0.092)	0.007 (0.012)	0.043 (0.073)
High education	0.310*** (0.034)	1.482*** (0.298)	0.142*** (0.021)	1.728*** (0.309)
Worked in the past	0.083*** (0.019)	0.707*** (0.138)	0.038*** (0.014)	0.285** (0.112)
ln(Income)	-0.006* (0.003)	-0.023 (0.017)	0.002 (0.002)	0.019 (0.015)
Good health	0.036** (0.015)	0.025 (0.095)	0.057*** (0.011)	0.362*** (0.076)
Home owner	0.001 (0.021)	-0.019 (0.119)	-0.012 (0.015)	-0.036 (0.094)
Constant		5.402*** (0.523)		0.686 (0.454)
Individuals	2,158	2,158	2,158	2,158
Observations	4,316	4,316	4,316	4,316
Pseudo R-squared	0.080		0.039	
R-squared		0.072		0.049

Note: Columns (1) and (3) report average marginal effects.
Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 3. Regression output: debt and assets comparison

Method	(1)	(2)
Dep. variable	Probit Debt > Assets	OLS Ln(Debt ratio)
Treatment	-0.140*** (0.028)	-0.745*** (0.117)
After	0.044*** (0.012)	0.132* (0.079)
Treatment x After	0.062* (0.035)	0.331** (0.162)
Age	-0.010*** (0.001)	-0.050*** (0.006)
Female	0.012 (0.015)	0.055 (0.090)
If partner	0.068*** (0.015)	0.413*** (0.087)
High education	0.108*** (0.030)	0.771*** (0.270)
Worked in the past	0.086*** (0.017)	0.562*** (0.129)
ln(Income)	-0.004 (0.003)	-0.027* (0.015)
Good health	-0.008 (0.014)	-0.072 (0.088)
Home owner	0.004 (0.019)	0.065 (0.111)
Constant		4.573*** (0.492)
Individuals	2,158	2,158
Observations	4,316	4,316
Pseudo R-squared	0.051	
R-squared		0.050

Note: Column (1) reports average marginal effects. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 4. Statistics on the amount of debt and assets by gender. Constant 2009 USD

	Individuals who did not receive PBS						Individuals who received PBS					
	Amount of debt in			Amount of assets in			Amount of debt in			Amount of assets in		
	2006	2009	Δ debt	2006	2009	Δ assets	2006	2009	Δ debt	2006	2009	Δ assets
Men	585	981	68%	1,381	902	-35%	134	58	-57%	64	51	-20%
Women	331	357	8%	514	383	-25%	71	169	138%	160	30	-81%

Table 5. Contrasts of marginal linear predictions: Differences between those who received the PBS and those who did not

	Debt probability	Debt amount	Assets probability	Assets amount	Probability debt > assets	Debt ratio Ln(Debt ratio)
Men	0.005 (0.161)	0.084 (0.232)	0.008 (0.182)	0.031 (0.158)	0.066 (0.173)	0.139 (0.226)
Woman	0.274** (0.122)	0.433** (0.192)	-0.084 (0.161)	-0.003 (0.139)	0.278** (0.134)	0.426** (0.185)

Note: Regressors constant at their means. Standard errors in parentheses;

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

Figure 1. Distribution of FPS in the treatment and control groups

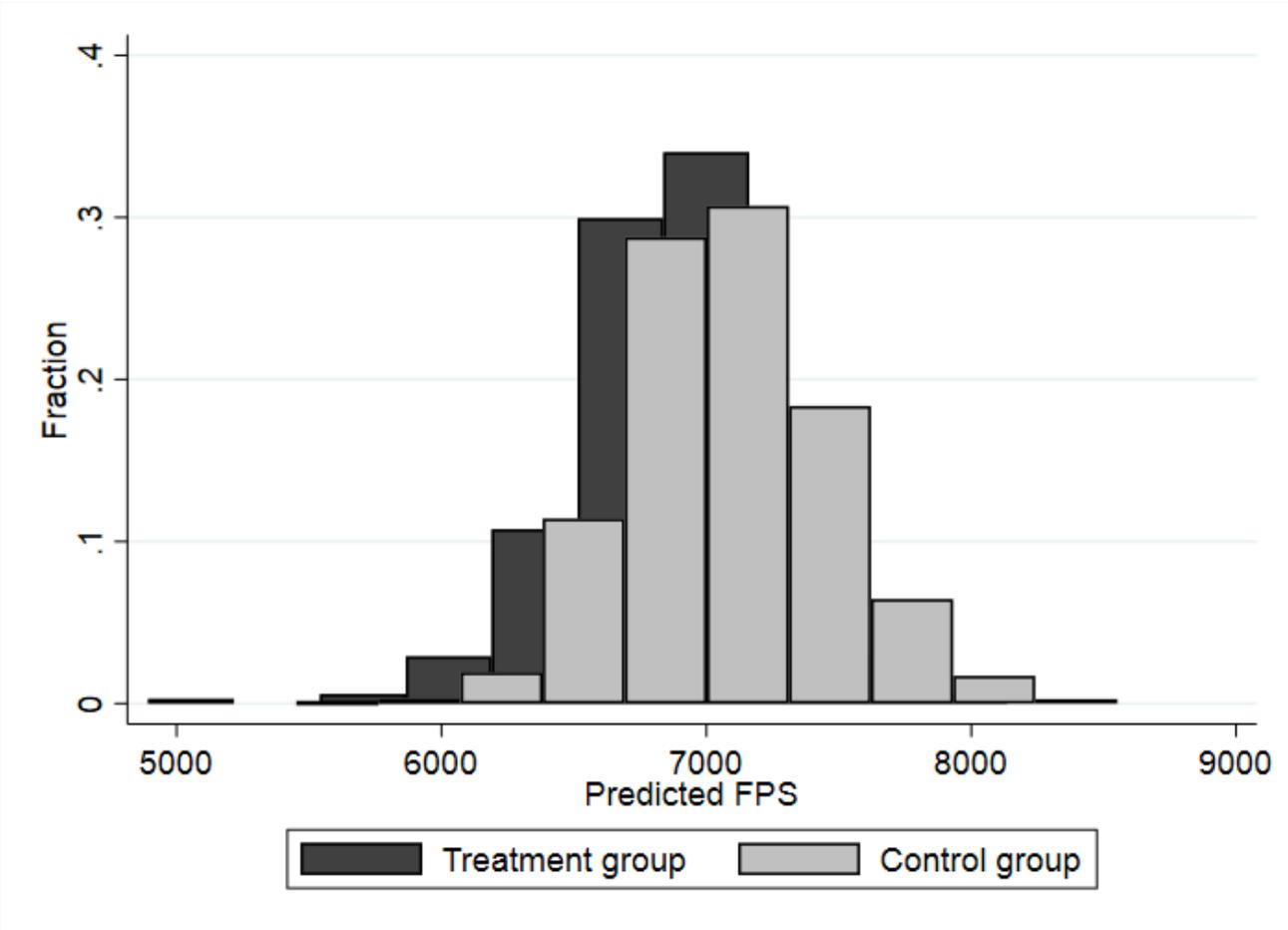
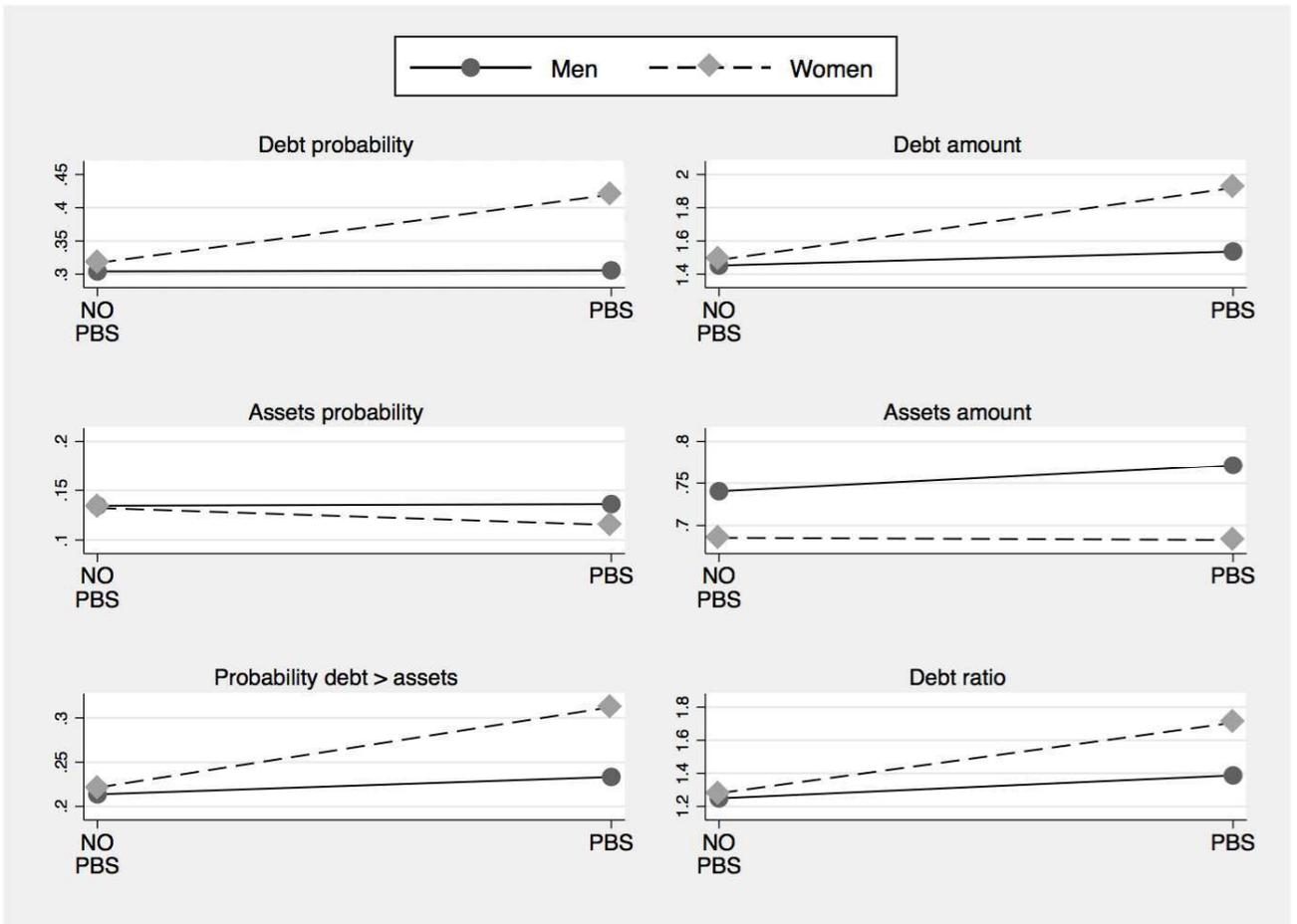


Figure 2. Adjusted linear predictions of debt and assets positions



Note: Regressors constant at their means.

APPENDIX

A. Predicted FPS

Table A.1. Regression output: predicted FPS score

Method	(1)
Dep. variable	Tobit Predicted FPS
Age	17.691*** (6.639)
Household size	-49.157 (32.004)
Health	-299.971*** (84.775)
Income	-1.399 (0.925)
Education	56.280*** (18.590)
Constant	6,912.037*** (462.375)
Observations	2,286

Note: Table A.1 reports coefficient estimates on the predicted FPS indicator according to Equation (1) described in Section 3.2. Health status of respondents is measured on a 1-6 scale from “excellent” to “very bad”; Education of respondents is measured on a 1-13 scale from “none” to “master or postgraduate course”. Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

B. FPS retrieved with principal component analysis

Table A.2. Regression output: debt and assets

Margin Method	(1) Extensive Probit	(2) Intensive OLS	(3) Extensive Probit	(4) Intensive OLS
Dep. variable	Debt	ln(Debt amount)	Assets	ln(Assets amount)
Treatment	-0.171*** (0.029)	-0.885*** (0.125)	-0.055** (0.022)	-0.262** (0.106)
After	0.013 (0.013)	0.107 (0.083)	-0.010 (0.011)	-0.127* (0.068)
Treatment x After	0.068* (0.036)	0.353** (0.167)	-0.010 (0.028)	0.010 (0.120)
Age	-0.013*** (0.001)	-0.060*** (0.007)	-0.001 (0.001)	-0.000 (0.006)
Female	0.021 (0.016)	0.093 (0.096)	-0.003 (0.012)	-0.048 (0.074)
If partner	0.106*** (0.016)	0.479*** (0.093)	0.012 (0.012)	0.079 (0.072)
High education	0.316*** (0.034)	1.522*** (0.304)	0.138*** (0.021)	1.672*** (0.312)
Worked in the past	0.077*** (0.020)	0.664*** (0.138)	0.038*** (0.015)	0.278** (0.111)
ln(Income)	-0.006* (0.003)	-0.021 (0.017)	0.002 (0.002)	0.022 (0.015)
Good health	0.036** (0.015)	0.012 (0.095)	0.053*** (0.011)	0.342*** (0.076)
Home owner	0.000 (0.021)	-0.017 (0.120)	-0.009 (0.015)	-0.023 (0.091)
Constant		5.416*** (0.526)		0.530 (0.449)
Individuals	2,128	2,128	2,128	2,128
Observations	4,256	4,256	4,256	4,256
Pseudo R-squared	0.065		0.024	
R-squared		0.071		0.047

Note: Columns (1) and (3) report average marginal effects.
Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A.3. Regression output: debt and assets comparison

Method	(1)	(2)
Dep. variable	Probit Debt > Assets	OLS Ln(Debt ratio)
Treatment	-0.143*** (0.028)	-0.767*** (0.116)
After	0.044*** (0.012)	0.121 (0.080)
Treatment x After	0.066* (0.035)	0.367** (0.162)
Age	-0.010*** (0.001)	-0.051*** (0.006)
Female	0.014 (0.015)	0.066 (0.091)
If partner	0.067*** (0.015)	0.404*** (0.088)
High education	0.117*** (0.030)	0.845*** (0.277)
Worked in the past	0.081*** (0.018)	0.515*** (0.130)
ln(Income)	-0.004 (0.003)	-0.026* (0.016)
Good health	-0.007 (0.014)	-0.075 (0.089)
Home owner	0.003 (0.019)	0.061 (0.111)
Constant		4.657*** (0.496)
Individuals	2,128	2,128
Observations	4,256	4,256
Pseudo R-squared	0.051	
R-squared		0.049

Note: Column (1) reports average marginal effects. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

C. Only individuals who filled in the FPS

Table A.4. Regression output: debt and assets

Margin Method	(1) Extensive Probit	(2) Intensive OLS	(3) Extensive Probit	(4) Intensive OLS
Dep. variable	Debt	ln(Debt amount)	Assets	ln(Assets amount)
Treatment	-0.144*** (0.043)	-0.858*** (0.212)	-0.052* (0.031)	-0.219 (0.156)
After	0.007 (0.028)	0.064 (0.170)	0.005 (0.019)	-0.030 (0.117)
Treatment x After	0.094* (0.054)	0.524* (0.288)	-0.048 (0.041)	-0.097 (0.181)
Age	-0.009*** (0.003)	-0.043*** (0.013)	-0.001 (0.002)	0.001 (0.010)
Female	0.009 (0.032)	-0.033 (0.185)	-0.004 (0.022)	-0.063 (0.135)
If partner	0.096*** (0.030)	0.575*** (0.167)	-0.017 (0.022)	-0.031 (0.125)
High education	0.231*** (0.080)	1.489* (0.899)	0.140*** (0.046)	1.737** (0.698)
Worked in the past	0.020 (0.041)	0.243 (0.247)	0.046* (0.026)	0.236 (0.194)
ln(Income)	-0.003 (0.006)	-0.023 (0.031)	0.001 (0.004)	0.029 (0.022)
Good health	0.046 (0.029)	0.115 (0.180)	0.053*** (0.020)	0.303** (0.133)
Home owner	-0.042 (0.039)	-0.005 (0.215)	-0.002 (0.027)	-0.026 (0.168)
Constant		4.396*** (0.980)		0.462 (0.756)
Individuals	616	616	616	616
Observations	1,232	1,232	1,232	1,232
Pseudo R-squared	0.036		0.045	
R-squared		0.045		0.035

Note: Columns (1) and (3) report average marginal effects.
Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A.5. Regression output: debt and assets comparison

Method	(1)	(2)
Dep. variable	Probit Debt > Assets	OLS Ln(Debt ratio)
Treatment	-0.131*** (0.042)	-0.713*** (0.198)
After	0.050** (0.025)	0.146 (0.158)
Treatment x After	0.076 (0.052)	0.474* (0.273)
Age	-0.007*** (0.003)	-0.039*** (0.013)
Female	-0.006 (0.029)	-0.040 (0.178)
If partner	0.089*** (0.029)	0.570*** (0.162)
High education	0.068 (0.088)	0.669 (0.874)
Worked in the past	0.008 (0.036)	0.060 (0.225)
ln(Income)	-0.007 (0.005)	-0.041 (0.029)
Good health	0.011 (0.027)	0.025 (0.168)
Home owner	-0.009 (0.035)	0.029 (0.204)
Constant		3.911*** (0.932)
Individuals	616	616
Observations	1,232	1,232
Pseudo R-squared	0.033	
R-squared		0.036

Note: Column (1) reports average marginal effects. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1