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RETIREMENT EXPECTATIONS IN THE AFTERMATH OF A PENSION REFORM

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Abstract

We investigate the effects of a pension reform on workers' retirement expectations, controlling for pessimism during a recession. To assess whether individuals revise their expectations in the direction imposed by changes in legislation, we exploit the 2011 Italian pension reform. Using data from the 2010 and 2012 Survey of Household Income and Wealth, analyzed with both pooled OLS and fixed effects models, we find that the reform worsened workers' expectations on replacement rate. Yet, this is not consistent with the tightening of age requirements in an NDC context. One explanation is that workers may not be fully aware of the mechanism of a defined contribution pension system.

Retirement Expectations in the Aftermath of a Pension Reform

1. Introduction

In recent decades, the retirement landscape has undergone many radical changes. The shift from defined benefit (DB) to defined contribution (DC) pension schemes has increased individuals' responsibility for their retirement security, even in systems with high compulsory contributions. In this context, knowledge and information about pensions are critical to households' inter-temporal decisions, and investigating retirement expectations becomes increasingly relevant. Moreover, in most advanced economies pension reforms have changed both the requirements for accessing retirement and the way benefits are computed, and the lack of knowledge of pension incentives "is troubling since workers may save or consume suboptimally, […] or retire earlier than they would have if equipped with better pension information" (Mitchell, 1988). Especially in countries where the public pension is the major component of retirement income, understanding its functioning is crucial for retirement preparedness. An important issue in this context is to what extent people, and workers in particular, perceive changes in the pension legislation (Bottazzi, Japelli, and Padula, 2006). In fact, it is not clear whether individuals are aware of the economic and financial implications of pension reforms introduced in recent years.

In this paper, we investigate the effects of a pension reform on workers' expectations on retirement age and replacement rate, i.e., the ratio of the pension benefit to pre-retirement labor income. In order to identify the effects of a change in pension legislation on subjective expectations, we take advantage of a completely unanticipated reform introduced in Italy in 2011.[1] Differently from previous reforms implemented in Italy, such reform set higher retirement age leading to higher replacement rates. In fact, in a DC pension system

[1] The 2011 pension reform is also known as the "Fornero reform" from the name of the Minister of Labor who proposed it.

"postponing retirement contributes twice to the increase of individual benefits: through higher contributions and lower expected longevity" at the time of retirement (Fornero, Oggero, and Puglisi, 2019).

Our paper offers several innovations over the existing literature. First, we exploit rich nationally-representative longitudinal data, while previous studies faced the data limitations of cross-sectional datasets. Second, whereas some previous research documented that pension expectations worsened since the economic and financial crisis, we contribute to the literature by disentangling the effects of a pension reform from those of the recession. In fact, we analyze how expectations changed in response to a pension reform controlling for the crisis perception and pessimism during a crisis. Third, from a methodological standpoint, the use of fixed effects estimation allows us to take into account unobserved heterogeneity which affects expectations. Fourth, we exploit a completely unanticipated pension reform, which has thus been a source of exogenous variation in retirement expectations. Finally, this reform, differently from others, increased both the average retirement age and replacement rates, as a consequence of the application of the DC rule.

We investigate whether individuals revised their expectations in the *direction* imposed by the reform using data from the 2010 and 2012 Bank of Italy's Survey of Household Income and Wealth (SHIW), analyzed with both pooled OLS and fixed effects models. Our framework allows us to control for potential confounders such as pessimism during a crisis in an effort to identify a causal effect. Our estimates show that the expected retirement age increased after the reform, consistently with the variation in the pension legislation. Yet we also find that expected replacement rates decreased. While the increase in the expected retirement age is in line with the direction imposed by the pension reform, the expected decrease in the replacement rate is not consistent with the tightening of age requirements in a DC context. Indeed, if a reform increases the average retirement age, this translates into

higher future pension benefits and replacement rates, due to both higher contributions and lower expected longevity. One explanation is that workers may not be fully aware of the functioning of a DC pension system, in particular of the principle according to which postponing retirement leads to higher pensions. Our findings suggest that individuals may benefit from pension information. Thus, it is fundamental for policymakers to adequately inform individuals to ensure they understand the pension system and its reforms.

The remainder of the paper is organized as follows. Section 2 summarizes the related literature, and section 3 presents the institutional background of the Italian pension system. Section 4 provides an overview of our data and empirical strategy, and section 5 discusses the estimation results. Finally, section 6 discusses the policy implications of our findings and concludes the paper.

2. Literature Review

Expectations play a central role in life cycle models and inter-temporal choices, such as those concerning retirement. As individuals need to be forward-looking when it comes to pensions, measuring expectations has become especially relevant in the economics of ageing (Bissonnette and van Soest, 2015). In fact, many recent empirical studies aim at measuring expectations directly using survey questions (Bissonnette and van Soest, 2012). Moreover, as the responsibility for retirement security is increasingly left in the hands of individuals, retirees' financial well-being will depend increasingly on their decisions and behavior (Lusardi and Mitchell, 2007; Lusardi, Mitchell, and Oggero, 2019).

Since in recent decades reforms have changed age requirements and the rules to compute pension benefits, some studies have tried to estimate their effects on the revision of retirement expectations. In particular, Bottazzi, Japelli, and Padula (2006) exploited a series of Italian reforms between 1989 and 2002, and found that expectations changed in the

direction suggested by the new legislation. However, differently from the reform exploited in this paper, they focused on reforms whose effect was to increase the retirement age and to reduce the replacement rate of young workers relative to older cohorts. Baldini, Mazzaferro, and Onofri (2018) considered a more recent period of reforms, but they concluded that the observed pessimism in pension expectations could be related to the macroeconomic crisis and/or the pension reform, i.e., they could not disentangle the effects and rule out the possibility that individuals' pessimism during a crisis could drive pension expectations. In this paper instead, through fixed effects estimations, we can control for individuals' tendency to be pessimistic during a recession.

Bissonette and van Soest (2012, 2015) analyzed retirement expectations in the Netherlands, and they found that expectations gradually became more pessimistic since the beginning of the crisis. The increased pessimism was in line with the ongoing Dutch debate on reforms aiming at reducing pension generosity. As several proposals were discussed and never implemented, these studies focused on a period of anticipated reforms, while the reform we exploit in this paper has been completely unanticipated.

Using a micro-simulation model, Borella and Coda Moscarola (2015) analyzed the effects of the 2011 Italian pension reform, and showed that the reform increased the average retirement age for all the cohorts, especially the youngest ones. Also, they found that average replacement rates rose, with the largest increase for each year of postponement occurring among the youngest cohorts. This is due to the fact that in a contribution-based pension scheme, the notional capital is annuitized according to residual life expectancy at the time of retirement.[2] Hence, the retirement postponement imposed by the 2011 Italian pension reform

[2] Notional capital refers to the fact that contributions are not accumulated in a fund. In fact, current workers' contributions are used to pay for current retirees' pension benefits.

increased replacement rates as a consequence of the application of the DC mechanism (Borella and Coda Moscarola, 2015).

Finally, it is worth mentioning that a growing body of the literature raises concerns about how prepared households are to make sound pension decisions (Goda, Manchester, and Sojourner, 2014). The linkage of pension benefits to contributions paid altered the incentives to work longer. Yet these incentives work only if people are aware of them. For example, US-based studies showed that individuals knowing that they can increase their pension wealth by postponing retirement are more likely to remain in the labor force (Chan and Stevens, 2008; Liebman and Luttmer, 2015). Also, workers who receive the public pension statement are more likely to be able to provide an estimate of their future benefits (Mastrobuoni, 2011).

3. Institutional Background

In the Italian pension system, we can identify workers covered by three different types of pension schemes, depending on whether they had contributed for more or less than 18 years at the end of 1995, or started working after 1995. The pension for workers who accumulated at least 18 years of contributions at the end of 1995 is calculated with the DB rule, according to which the benefit depends on an average income earned at the end of the career. For workers who started to pay contributions before 1995 but accumulated less than 18 years at the end of 1995, the pension is calculated with a pro-rata system. The pro-rata mechanism works as a weighted average of DB and Notional DC (NDC) benefits,[3] and the weights are represented by years of contribution accrued before and after January 1st, 1996 (Borella and Coda Moscarola, 2015). Finally, workers who entered the labour market after 1995 are covered by an NDC system. The pension benefit in an NDC system is equal to the

[3] An NDC pension system is based on the fact that workers' contributions are not accumulated, but used to pay for current retirees' benefits.

notional capital, i.e., the sum of all contributions paid, revalued to the GDP growth rate, annuitized according to life expectancy at retirement.

In this context, while Italy was facing a financial crisis, a technical government introduced a major pension reform that could not be anticipated by workers, as it was implemented just one month after the government installed. Indeed, the reform was introduced in December 2011 through a decree, converted into law two weeks later, and enforced starting from January 1st, 2012. Moreover, it was introduced with no discussion with the social partners (Berton, Guarascio, and Ricci, 2017). The crucial changes brought by the reform regarded the introduction of stricter requirements for both the old age and the seniority pension, which allows to access pension benefits before the standard age, imposing obligations in terms of contributions paid (Borella and Coda Moscarola, 2015). Before the 2011 reform, early retirement was possible provided that the sum of age and years of contribution reached a minimum threshold, called *quota*. After the reform, the early retirement option was abolished, and the access to seniority pensions was possible with more years of contributions (42 years and 1 month for men and 41 years and 1 month for women). For what concerned the old age pension, the requirements before the reform were 65 years old for men and depending on sectors for women (Berton, Guarascio, and Ricci, 2017). With the 2011 reform, the age requirement rose to between 66 and 70 years old. Moreover, the linkage of age requirements to the evolution of life expectancy at 65 was extended to contributory requirements. Finally, the reform extended the pro-rata mechanism to DB workers for contributions paid from 2012, with little impact on their final pension.

4. Data and Estimation Strategy

The data used to carry out our empirical analysis are drawn from the SHIW, a study that is conducted every two years by the Bank of Italy. The SHIW dataset is representative of

the Italian population and it contains several information at both household and individual level. In particular, all workers are asked about their expected retirement age and expected replacement rate. The wording of the questions is as follows: "When do you expect to retire?" and "At the time of retirement, what fraction of labor income will your public pension be? Consider the public pension only".

Since we want to investigate how expectations changed with the 2011 pension reform, and the transition phase was very short, we exploit the 2010 and 2012 waves of the SHIW. We define as the pre-reform period the year 2010, while the post-reform period is given by the 2012 wave. The timing of the interview is compatible with our identification strategy, since the 2010 data were collected between January and August 2011, and the reform was introduced later, in December 2011, and enforced starting from January 2012.

The SHIW records whether respondents or their employers ever paid any pension contributions, and the number of years they have been paying. This information allows us to compute the years of contribution at the end of 1995 for each worker, and to define individuals' pension scheme accordingly, assuming that they did not face unemployment spans during their working life. Our sample is restricted to respondents age 20-65, and we consider only workers who are employed or self-employed in the survey year, excluding the unemployed, retirees, and other individuals not in the labor force. Overall, we have 7,717 individuals answering to both questions on subjective pension expectations. Also, the number of observations is balanced across the waves, with 3,873 respondents in the 2010 SHIW, and 3,844 in the 2012 wave.

Exploiting the fact that pension expectations are elicited right before and after the 2011 reform, we pull the data drawn from the 2010 and 2012 SHIW. This allows us to use a difference-in-difference framework to study how expected retirement age and expected replacement rate have been affected by the pension reform. We specify a reduced form for

pension expectations, assuming that they are linear functions of socio-demographic characteristics. Both expected retirement age and expected replacement rate depend on the pension regime an individual belongs to. Hence, we first perform a pooled OLS regression specified as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 DB_{it} + \beta_3 Pro\text{-}rata_{it} + \beta_4 Post\text{-}reform_{it} + \beta_5 Post\text{-}reform_{it} * DB_{it} + \beta_6 Post\text{-}reform_{it} * Pro\text{-}rata_{it} + \varepsilon_{it}$$

where $i = \{1, ..., N\}$ and $t = \{2010, 2012\}$ are individual and wave identifiers, respectively. X_{it} is a set of controls for individual i in year t including gender, macro-region of residence, educational dummies, marital status, and the logarithm on net income; ε_{it} is an idiosyncratic error term. The dummy variable *Post-reform* indicates the post-reform period and it is also interacted with the pension regimes different cohorts belong to. *Post-reform* equals 1 for individuals surveyed in 2012, the first year of implementation of the reform. *DB* is a dummy variable taking value 1 if the respondent's pension is calculated according to the DB rule, while *Pro-rata* refers to individuals for whom the first part of the pension is calculated with the DB formula, and the second part of the pension is instead calculated with the NDC formula.

The coefficients β_4, β_5, and β_6 measure what we are interested in, i.e., the change in pension expectations due to the reform. If pension expectations changed consistently with the variations imposed by the reform, we should see an increase in both expected retirement age and replacement rate. Moreover, these effects should be larger for individuals under a pure NDC pension scheme. The key identifying assumption here is that retirement expectations would have been the same in both years in the absence of the reform.

Nevertheless pension expectations may also depend on the macroeconomic scenario, as negative conditions can affect individuals' perceptions. In fact, in a period of economic

downturn like the Great Recession, pension expectations may have worsened in relation to the perception of the crisis impact on future income streams (Bissonette and van Soest, 2015). Since in the period we are considering individuals might be more pessimistic about their labor income and pension entitlements as a consequence, we include proxies for the crisis and its perception in the pooled OLS specification:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 DB_{it} + \beta_3 Pro\text{-}rata_{it} + \beta_4 Post\text{-}reform_{it} + \beta_5 Post\text{-}reform_{it} * DB_{it}$$
$$+ \beta_6 Post\text{-}reform_{it} * Pro\text{-}rata_{it} + \beta_7 Z_{it} + \varepsilon_{it}$$

where Z_{it} includes regional GDP growth in the following year and respondents' expected decrease in income in real terms. In fact, crisis perceptions contain private information reflecting heterogeneity in how the crisis affects households in different ways (De Bresser and van Soest, 2015). Including regional GDP growth aims at controlling for the business cycle that may have differently affected individuals' expectations. While we elicit the expected decrease in real income from a survey question, data on regional GDP growth are calculated using the ISTAT database.

Finally and most importantly, we also take advantage of the panel structure of a portion of the dataset (3,414 out of 7,717 observations) in order to control for individuals' tendency to be pessimistic in the case of a recession. Through a fixed effects specification, we are able to control for individual-specific time-invariant observed and unobserved features. In particular, differently from what has been done in the literature, with the fixed effects estimation we can control for a tendency of optimism or pessimism, in case that is driving pension expectations. Since the economic and financial crisis started before 2010 and lasted a few years, we have reasons to believe that the pessimism related to the recession was time-invariant between 2010 and 2012. Therefore, exploiting the longitudinal component of our dataset, we control for this individual fixed effect that is affecting retirement expectations in

both years. Hence the coefficient on *Post-reform* is able to capture the actual effect of the reform. The estimated regression is specified as follows:

$$Y_{it} = \alpha_0 + \alpha_1 X_{it} + \alpha_2 Post\text{-}reform_{it} + \delta_i + \varepsilon_{it}$$

where δ is an individual-specific time-invariant effect capturing observed and unobserved individual characteristics. As we did for the pooled OLS regression, also with the fixed effects estimation we include a proxy for the crisis perception and the regional GDP growth (Z_{it}):

$$Y_{it} = \alpha_0 + \alpha_1 X_{it} + \alpha_2 Post\text{-}reform_{it} + + \alpha_3 Z_{it} + \delta_i + \varepsilon_{it}$$

5. Results

The dataset used in our empirical analysis, i.e., the SHIW, has a relatively large number of observations (19,836 in 2010 and 20,022 in 2012) which allow researchers to study population subgroups such as the one examined here, namely, working individuals age 20-65. Our sample includes 7,717 respondents: 3,873 from the 2010 wave and 3,844 from year 2012. Table 1 reports descriptive statistics by waves. The sample age appears to be slightly higher in the post-reform wave, while all the other socio-demographic characteristics such as gender, education, and marital status, are very much similar in the two waves. The proportion of respondents under a DB pension scheme is lower in 2012 with respect to 2010, since new workers entering the labor market are covered by an NDC pension system, and individuals whose pension is computed according to the DB rule are retiring over time. The percentage of individuals expecting a lower income in real terms in the following year increased from 2010 to the subsequent wave. Looking at the descriptive statistics, we already notice that the average expected retirement age increased from 63.55 in year 2010 to 65.24 in year 2012, while the average expected replacement rate decreased from 64.25 to 62.20.

Table 1 here

To investigate how subjective pension expectations changed with the implementation of the pension reform, we conduct a multivariate analysis as specified in the previous section. In Table 2, we report the results for the expected retirement age. In the first column of Table 2, the coefficient on *Post-reform* is positive and strongly significant, implying that the expected retirement age rose after the implementation of the pension reform, even after controlling for many socio-demographics like age, geographical area, education, marital status, and income. As we would expect, respondents covered by DB and pro-rata pension schemes expect to retire earlier than individuals under an NDC pension regime (our baseline category). In the second column of Table 2, we add the interactions between the post-reform dummy and the different pension schemes. Consistently with the new legislative context, the results show that individuals under a DB pension scheme expect to retire later after the reform, but to a lower extent than workers under an NDC regime. In the third column of Table 2, we include proxies for the crisis and its perception, namely, whether respondents expect a decrease in income in real terms (*Low expected income*), and GDP growth in the following year. The estimates show that our coefficients of interest remain the same as in the specification reported in the second column, and a low expected income is not statistically significant. Hence, our findings are different from Bissonette and van Soest (2015) who found a significant relation between the crisis perception and expected retirement age.

Table 2 here

The results reported in Table 2 indicate that the direction of change in individuals' expectations concerning retirement age is consistent with the variation in the pension legislation occurred through an unexpected pension reform. Next, we investigate whether the same can be said about the direction of change in the expected replacement rate. Before looking at the estimation results of our multivariate analysis reported in Table 3, it is

important to recall that under an NDC computational method, higher retirement age contributes to the increase of individual benefits in two ways, i.e., through higher contributions and lower residual life expectancy at the moment of retirement. Hence, if individuals reacted consistently with the change in pension legislation, we would observe an increase in the expected replacement rate after the reform was implemented. In fact, micro-simulation studies analyzing the effects of the 2011 Italian pension reform found an increase in average replacement rates, with the largest increase among the youngest cohorts (Borella and Coda Moscarola, 2015).

Nevertheless, our results show that the expected replacement rate decreased after the pension reform, as indicated by the negative and statistically significant coefficient on *Post-reform* in all the three columns of Table 3. This decrease is not statistically different among individuals under diverse pension regimes (second column of Table 3) and it is significant even after controlling for individuals' negative perception about their income in the following year, which we use as a proxy for the crisis perception (third column of Table 3). We notice that our proxy for the crisis perception is negatively correlated with the expected replacement rate, meaning that individuals with a negative perception of their future income are also more likely to be pessimistic about their pension replacement rate. This result is in line with the literature showing that households thinking they will be affected by the crisis are more negative about their pension entitlements (De Bresser and van Soest, 2015). However, using this estimation strategy we cannot rule out the possibility that individuals' tendency to be optimistic or pessimistic (in the case of a recession) can affect crisis perceptions and retirement expectations in the same way. With a fixed effects specification, we can control for individuals' pessimism.

Table 3 here

With a fixed effects specification, we can control for individuals' tendency of optimism or pessimism, and confidence in future public pension provisions, which, in turn, may drive pension expectations. When using a fixed effects estimation technique, our sample drops from 7,717 to 3,414 observations, as only a portion of respondents in the SHIW dataset are surveyed in both the 2010 and 2012 waves. Notwithstanding the reduction in our sample size, the results reported in Tables 4 and 5 confirm the previous findings from the pooled cross-section data. In particular, we notice that expected retirement age increased after the pension reform (first column of Table 4) and this upward trend is significant even after controlling for individuals' self-reported perception of the crisis (second column of Table 4). Our estimates show that the expected retirement age increased on average by 1.6 years with the implementation of the pension reform.

Table 4 here

Similarly, results from the pooled cross-sections concerning the expected replacement rate are confirmed by the fixed effects estimates reported in Table 5. In particular, we find that the expected replacement rate decreased even when including fixed effects to control for time-invariant individual characteristics such as pessimism due to the crisis period. More specifically, individuals' expected replacement rate felt on average by 1.7 percentage points with the pension reform. Hence, the reform worsened workers' expectations on replacement rate, but the expected decrease is not consistent with the implication of a reform which tightened the age requirements in an NDC context. One explanation is that many workers are not fully aware of the functioning of an NDC pension system, in particular that postponing retirement leads to higher pensions.

Table 5 here

Finally, as a robustness check, we perform a placebo test through which we assume the reform was introduced a couple of years before, in 2009, so that we can use the previous

wave of the SHIW dataset. We exploit again the panel structure of our dataset using a fixed effects estimation and focusing on individuals interviewed both in 2008 and 2010, i.e., before and after our placebo reform occurred. Once again, since the crisis was already there in 2008, through a fixed effects estimation we can control for individuals' pessimism during the recession, which we assume to be invariant between 2008 and 2010.[4] Our variable of interest is now *Placebo post-reform*, and the results reported in Table 6 show that individuals did not revise their expectations on the pension replacement rate between 2008 and 2010 (second column of Table 6). This non-significant estimate for the years before 2011 suggests that there is not a pre-trend confounding our main finding that the pension reform made workers' expectations worsen in terms of replacement rate. On the other hand, we do see in the first column of Table 6 that individuals' expected retirement age increased from 2008 to 2010, but this can be explained by the fact that in August 2009 the government decreed an automatic linkage of the retirement age to life expectancy. Nevertheless we note that in the placebo test for expected retirement age, the coefficient on *Placebo post-reform* is less than one fourth in magnitude with respect to the estimations reported in Table 4 (0.4 against 1.6), meaning that the increase in expected retirement age was much lower before the reform was implemented.

Table 6 here

6. Conclusions and Policy Relevance

In the last decades pension reforms have brought radical changes to the retirement landscape, but it is not clear whether individuals, and workers in particular, are aware of the economic and financial implications of such reforms. In this paper, we study the effects of changes in pension legislation on workers' expectations on retirement age and replacement rate, by exploiting an unexpected reform introduced in Italy in 2011. In particular, we

[4] In this specification, we cannot include the variable capturing the self-reported crisis perception because the related question was asked in the 2010 and 2012 waves only.

investigate whether individuals revised their expectations in the *direction* imposed by the pension reform. Using data from the 2010 and 2012 SHIW, we find that the expected retirement age increased after the reform, consistently with the variation in the pension legislation. Yet, even when controlling for individual characteristics such as pessimism during a crisis, we find that the expected replacement rate decreased after the pension reform, whose implication was instead to increase it. Indeed, if a reform increases retirement age in an NDC pension system, this translates into higher future pension benefits and replacement rates, due to both higher contributions and lower residual life expectancy at the time of retirement. A possible explanation is that many workers are not fully aware of the implications of an NDC pension regime, and in particular the mechanism according to which postponing retirement leads to higher future pension levels.

These findings suggest that individuals may benefit from information explaining the functioning of the pension system, in particular when reforms are introduced. Indeed, pension information has a positive impact on workers' knowledge and retirement planning (Kritzer and Smith, 2016; Debets et al., 2018), and only correctly informed workers are responsive to incentives to work longer (Dolls et al., 2018). Moreover, in the US, public pension statements and other educational interventions such as seminars are found to increase both enrollment in retirement plans and contributions (Duflo and Saez, 2003; Bernheim and Garrett, 2003).

As transparent pension information is likely to affect individuals' behavior, it is fundamental for policymakers to adequately inform people to ensure they understand the pension system and its reforms. In fact, there is evidence of individuals' demand for information: During periods of reforms, people try to gather information on the Internet. As showed by Fornero, Oggero, and Puglisi (2019), online searches about pensions in Italy showed a peak when the 2011 pension reform was introduced. The increase in Google searches was paired with a rise in newspaper coverage, but media attention to the need for the

reform was replaced by coverage of political actors after its enactment. Since mass media's incentives to disseminate information are different from those of the public pension institute, individual-specific pension projections provided by public institutes represent a fundamental tool to help individuals secure their retirement well-being.

Pension reforms are often unpopular, but pension information and knowledge can help citizens to understand the rationale behind reforms and to oppose less when changes in legislation are needed in the interest of future generations (or oppose more when a reform entails favoritisms). Along this line, research showed that individuals who are more informed about the basic functioning of a pension system and its costs are more willing to accept reforms (Boeri and Tabellini, 2012), although people seem to ignore or under-estimate the cost of a public unfunded system (Boeri, Boersch-Supan, and Tabellini, 2002).

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Table 1. Descriptive Statistics.

	2010 SHIW (N=3,873)			2012 SHIW (N=3,844)		
	Mean	*Min*	*Max*	*Mean*	*Min*	*Max*
Age	45.97	20	65	46.52	20	65
Female	0.43	0	1	0.43	0	1
Center	0.23	0	1	0.22	0	1
South	0.28	0	1	0.30	0	1
High school	0.48	0	1	0.48	0	1
Degree	0.19	0	1	0.19	0	1
Married	0.70	0	1	0.69	0	1
Log(Income)	10.45	0	12.59	10.38	0	12.66
DB	0.16	0	1	0.13	0	1
Pro-rata	0.48	0	1	0.49	0	1
NDC	0.37	0	1	0.39	0	1
Low expected income	0.54	0	1	0.67	0	1
GDP growth	-0.02	-0.05	0.02	-0.02	-0.08	0.01
Expected retirement age	63.55	50	100	65.24	45	90
Expected replacement rate	64.25	0	100	62.20	0	100

Note: Data are drawn from the 2010 and 2012 SHIW.

Table 2. Multivariate Regression Model of Expected Retirement Age.

	Expected retirement age	Expected retirement age	Expected retirement age
DB	-4.366***	-4.169***	-4.172***
	(0.215)	(0.249)	(0.249)
Pro-rata	-1.946***	-2.007***	-2.002***
	(0.135)	(0.163)	(0.163)
Post-reform	1.528***	1.530***	1.524***
	(0.078)	(0.143)	(0.144)
Post-reform*DB		-0.436*	-0.455*
		(0.242)	(0.242)
Post-reform*Pro-rata		0.123	0.115
		(0.181)	(0.181)
Low expected income			-0.106
			(0.091)
GDP growth			5.085*
			(2.701)
Observations	7,717	7,717	7,717
R-squared	0.166	0.166	0.167

Note: Data are drawn from the 2010 and 2012 SHIW. Controls included: Age, Female, North, Center, High school, Degree, Married, Log(Income). Robust standard errors in parentheses.
* p<0.10, ** p<0.05, *** p<0.01

Table 3. Multivariate Regression Model of Expected Replacement Rate.

	Expected replacement rate	Expected replacement rate	Expected replacement rate
DB	14.957***	14.730***	14.720***
	(0.816)	(0.915)	(0.916)
Pro-rata	6.892***	7.287***	7.345***
	(0.522)	(0.617)	(0.616)
Post-reform	-1.693***	-1.387**	-1.181**
	(0.309)	(0.543)	(0.547)
Post-reform*DB		0.528	0.476
		(0.969)	(0.971)
Post-reform*Pro-rata		-0.788	-0.837
		(0.702)	(0.701)
Low expected income			-1.872***
			(0.366)
GDP growth			12.156
			(11.884)
Observations	7,717	7,717	7,717
R-squared	0.082	0.082	0.086

Note: Data are drawn from the 2010 and 2012 SHIW. Controls included: Age, Female, North, Center, High school, Degree, Married, Log(Income). Robust standard errors in parentheses.
* p<0.10, ** p<0.05, *** p<0.01

Table 4. Fixed Effects Estimation Results of Expected Retirement Age.

	Expected retirement age	Expected retirement age
Post-reform	1.663***	1.624***
	(0.097)	(0.102)
Low expected income		0.216
		(0.163)
GDP growth		3.017
		(5.414)
Observations	3,414	3,414
R-squared	0.758	0.758

Note: Data are drawn from the 2010 and 2012 SHIW. Controls included: High school, Degree, Married, Log(Income). Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Table 5. Fixed Effects Estimation Results of Expected Replacement Rate.

	Expected replacement rate	Expected replacement rate
Post-reform	-1.574***	-1.662***
	(0.366)	(0.385)
Low expected income		-0.462
		(0.617)
GDP growth		30.264
		(20.541)
Observations	3,414	3,414
R-squared	0.749	0.749

Note: Data are drawn from the 2010 and 2012 SHIW. Controls included: High school, Degree, Married, Log(Income). Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Table 6. Placebo Test: Fixed Effects Estimation Results of Expected Retirement Age and Expected Replacement Rate.

	Expected retirement age	Expected replacement rate
Placebo post-reform	0.391***	-0.601
	(0.137)	(0.534)
GDP growth	-0.776	15.204
	(4.807)	(18.705)
Observations	3,614	3,614
R-squared	0.757	0.744

Note: Data are drawn from the 2008 and 2010 SHIW. Controls included: High school, Degree, Married, Log(Income). Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

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