

EVALUATING THE IMPACT ON SAVING OF TAX-FAVORED RETIREMENT SAVING PLANS

Monica Paiella^a & Andrea Tiseno^b

Abstract

This paper exploits a recent reform of private retirement schemes in Italy to identify treatment effects on household saving. The reform was part of the restructuring of the social security system and was aimed at rising private long-term saving by making pension funds more attractive and convenient. We control for unobserved saver heterogeneity and a central focus is on substitution across saving instruments. We find that private pension saving incentives had little, if any effect on household saving. Further, those workers who have experienced the most severe social security cut are not significantly more likely to contribute to pension funds, *ceteris paribus*. We find, however, that the pension fund legislation had a strong effect on the allocation of saving and triggered substantial substitution of non-tax-favored non-retirement wealth for tax-favored pension funds.

Keywords: household savings, pension funds, social security reforms, difference-in-difference estimation, instrumental variables.

JEL classification: H31, D14, D12

^a Corresponding author: Monica Paiella, University of Naples “Parthenope”, Dept. of Economic Studies, Via Medina 40, Naples 80133, Italy. Phone number: +39.339.3970822; fax number: +39.081.5474750. Email address: monica.paiella(at)uniparthenope.it.

^b Andrea Tiseno, Bank of Italy, Research Department, Via Nazionale 91, Rome 00184, Italy. Email address: andrea.tiseno(at)bancaditalia.it.

Acknowledgments: We would like to thank Michele Di Maio, Giuseppe Grande, Tullio Jappelli, Marco Manacorda, Fabiano Schivardi and Fabio Panetta and seminar participants at Bank of Italy, EIEF, University of Naples Parthenope, IEA in Istanbul, SIE in Catania and Econometric Society World Congress in Shanghai for their comments on an earlier version of this paper. The views expressed are those of the authors and do not necessarily reflect those of the Bank of Italy.

1. Introduction

Whether tax-favored retirement saving instruments increase net saving is of critical importance to future generations of elderly and to the health of the economy in general. All policies that give tax-favored status to some saving instrument are costly as they imply a loss in tax revenues. Therefore, in order for these policies to be successful, public sector dissaving must be offset by a substantial increase in private sector saving, and not simply by a reshuffling of existing wealth among the available saving vehicles. Further, if investors in retirement accounts exhibit a relatively higher propensity to save and would have saved the same amount without the tax incentives, these incentives would simply represent a transfer from taxpayers to savers. On the other hand, in general saving for retirement through contributions to retirement saving plans can be desirable in itself even if it occurs through the reallocation of resources from other instruments. In fact, pension fund investments are generally a form of long term saving which can be cashed in before retirement and used for current expenditure only at a cost. For all these reasons, a rigorous evaluation of existing private pension schemes may lead to insights as to the debate on the effectiveness of fiscal incentives and also regarding the implementation of similar systems in other countries.

This paper concerns the evaluation of a targeted reform establishing pension funds as separate legal entities and designed to boost and protect long term private saving by Italian households to offset major reductions in their social security wealth. The reform that we study was implemented as part of a major social security reform package which was prompted by the huge Italian budget deficit and the severe political crisis of the early 1990s. It combines tax incentives for pension fund contributors and a strict market discipline for fund managers. Our analysis suggests that the pension fund legislation has had little, if any effect on Italian household saving flows. However, the legislation has not been completely ineffective. In fact, the generous tax incentives attributed to retirement saving instruments have triggered a non-negligible substitution of non-retirement for retirement wealth.

Our results are in line with some of the evidence from the studies on the impact of tax-favored private retirement plans on household saving in the US for which the

literature is voluminous but results are mixed. Similarly to what we find for Italy, Attanasio and DeLeire (2002), Engen et al. (1994 and 1996) and others find that US households finance their private pension contributions mainly from existing savings or from saving that would have done anyway. Engen et al. find also that US households significantly substitute other assets for private pensions. By contrast, Poterba, Venti and Wise (1994, 1995, 1996 and others) find that the bulk of individual retirement account contributions are net additions to saving and claim that these plans work to increase overall household saving.¹ As to most other countries, the evidence on the issue is scarce. Despite the financial imbalances of most social security systems and although in recent years the governments of several large European countries have scaled back public retirements benefits and developed and subsidized new channels for private retirement savings, most governments have not gone too far in this direction or have done so only in the most recent past and data are still scarce. Italy is an ‘exception’ as its government passed a set of laws establishing the basic principles for the discipline of private retirement saving plans between 1993 and 1995. Data on the contributions to these plans have been regularly collected as part of a long living periodic survey on household income and wealth.

In Italy the reform regarding private pensions was issued with the reform of the social security system. The social security reform, which induced a substantial reduction in public pension wealth, had a differential impact on different groups of workers, such that the public pension of some workers was cut more than the pension of others. From a policy perspective, it matters whether the workers who underwent the most severe public pension cut and for whom the pension fund legislation was issued exploit this instrument and take advantage of the tax saving. Hence, in addition to evaluating the impact on saving of the pension fund legislation we also analyze how the social security cut affected pension fund investment. Specifically, we do that by allowing the pension fund legislation to have a heterogeneous effect depending on the extent of the individual social security cut. We find that those workers who have experienced the most severe social

¹ The contrasting results appear to be due partly to differences in the data used, partly to differences in the methods used to control for saver heterogeneity, but the question remains open. See Poterba, Venti and Wise (1997) for an attempt to reconcile the existing evidence.

security cut are not significantly more likely to contribute to pension funds, *ceteris paribus*.

Overall, the key impediment that one meets when determining the effect on saving of retirement plans is unobservable saver heterogeneity, which is such that the inclusion of the policy variable, i.e. tax-favored pension fund contribution, on the right hand side of a simple regression model for saving may leave estimates open to omitted variable bias. In fact, when tastes for saving are heterogeneous, some people save more than others and, those who do tend to save more in all forms and are also more likely to take advantage of the reform and invest in pension funds. Since the unobservable preferences for saving are likely to affect the policy variable and the outcome of interest, their exclusion from the saving equation may bias upward the policy's effect. To address this issue of endogeneity due to unobservables, we use two alternative approaches to evaluation. The first uses a combination of pension fund contribution status and time to construct a simple difference-in-difference (DID) estimator. This is the approach used by most of the existing studies for the US based on series of cross-sectional data. A central part of this evaluation methodology is the choice of the comparison group, who must respond similarly to common shocks and whose composition must remain stable over the period considered. These conditions, which will be made plain below, cannot be taken for granted. Our second estimator consists in a more standard instrumental variable (IV) procedure to rid the analysis of potential endogeneity bias. Our estimates from using instrumental variables are very similar to those based on the difference-in-difference estimator. Such an outcome suggests either that the reform has not affected the composition of the group of contributors (in particular its average taste for saving) relative to non-contributors or that compositional changes cancel out.

In addition to the papers mentioned earlier on tax-favored retirement schemes in the US, other related studies include the works on Italy by Attanasio and Brugiavini (2003) and Bottazzi et al. (2006) who also look at the social security reform of the early nineties, but focus on the effect on saving of the public pension cut.² These studies provide evidence on the substitutability between private wealth and pension wealth and

² The focus of our work is not the impact on saving of the social security cut.

show convincingly that Italian household saving rates have increased as a result of the reduction in pension wealth and the offset is substantial. Another paper by Bottazzi et al. (2008) consider also the effect of the pension cut on the allocation of private saving and find that, following the social security reform, real assets have increased more than financial assets. Consistent with our evidence, they also find that the reduction in social security wealth has not affected the propensity to invest in private retirement plans. Another recent, related study is Cesari et al. (2008) which examines the features of supplementary pension schemes in Italy and comments upon the system outlook and the opportunities for workers.

The rest of the paper is organized as follows. Section 2 introduces the market for pension funds in Italy and discusses the pension fund legislation. Section 3 presents the methodology that we use for the evaluation. We discuss the potential sources of bias related to difference in difference estimation, which is widely used in similar studies for the US, and propose standard instrumental variables as alternative. Section 4 describes the data and Section 5 details the empirical results. Section 6 summarizes the evidence and offers some concluding comment.

2. Description of the structure and regulation of pension funds in Italy, before and after the 1993-1995 acts

The Italian social security system as it is known today was set up in the early 1970s. Over time it became progressively more generous and, by the end of the 1980s, it was clearly unsustainable. In the first half of the 1990s it underwent a major transformation which has led to a system consisting of three sources of retirement income: social security, occupational and other collective private pension funds, and individual retirement accounts (IRAs). As to social security, the reform modified substantially the rules for computing benefits with respect to the past, inducing a substantial reduction in public pension wealth. Further, the legislator envisaged a long transitional phase such that public sector, younger, and educated employees were affected more than older, private sector, and uneducated employees. As to occupational pension funds and IRAs, they were originally devised as two separate and distinct supplementary pension pillars. Occupational pensions represent the real novelty of the reform. They were intended as

collective investment schemes to be set up to provide explicitly for retirement, supplementing public pensions. They were to be financed through tax-deductible contributions from new saving's flows and through diverting saving from other uses (e.g. severance pay). Individual retirement accounts were intended to add an additional instrument for own or dependants' saving for retirement and to lengthen the duration of financial investment to provide for retirement. For contributions to enjoy the same favorable tax treatment of pension fund contributions, accounts must satisfy a set of constraint as to their duration and managing institution. In practice, there has hardly ever been a real distinction between these two pillars as portability between the two types of schemes was allowed in order to increase competition among private pension providers.

The basic principles for the discipline of private retirement saving plans (pension funds and IRAs) were set between 1993 and 1995. Before 1993, a supplementary social security system was in place, but was barely regulated and at the beginning of the 1990s only around 3 percent of workers contributed to the system.³ Private pension funds were available but only to some workers as they belonged to some large firm, such as some multinational companies which provided their employees with private schemes (with or without the employer matching employee contributions), or to some sector (e.g. banking, insurance, or journalism) or worker association, organization or union (e.g. management). Alternatively, savers could invest in insurance-based saving schemes which could be turned into a capital or an annuity at retirement. These latter products, which shared most characteristics with the post-1993 individual retirement accounts, were widely available to everybody as they were sold by banks and insurance companies and contributions were tax-deductible.

The 1993-1995 reform encouraged the creation of a proper private pension system as a relevant supplementary pillar of social security by establishing pension funds as separate legal entities subject to a set of specific rules. Pre-existing employers' funds had also to adhere to the new regulation.⁴ The reform set participation to be voluntary. As

³ Estimate based on the number of contributors to the funds existing before the pension reform, as reported in the COVIP 1998 Annual Report.

⁴ Some exception was allowed, mainly as to benefit computation, but only for the workers who had began investing in the fund before 1992. See Messori, 2006, for a description of the system in place before the reforms.

opposed to most pre-existing employers' pension funds, schemes had to be defined benefits, which ensures funding and eases portability, encouraging competition among suppliers. Explicit criteria were established regarding pension fund governance, asset allocation strategies, contributor insurance and activity transparency and supervision. In particular and in contrast with the past, funds had to be held in a depository bank and their accounting had to be completely separate from that of the employer. Limits were set as to the amount to be invested in individual company shares and as to leverage through derivatives. Investment in real estate was forbidden. Also, a specific and separate surveillance authority was set up to supervise the pension industry and employers who administer pension schemes.

The reform aimed at increasing participation rates and pension fund financing by allowing and promoting severance pay contribution into the scheme and making all other contributions tax-deductible up to a limit. At present, it is such that contributions are tax-deductible up to €5200.⁵ Interests earned on the contributions are taxed at a rate that slightly lower than that on bonds and stocks. The pension payout (annuity or capital) is taxed at favorable rates. This system makes participation in private retirement schemes particularly advantageous for the young (who can defer more the tax payments) and the wealthy (for whom the tax break is relatively larger).

Overall, the legislation had several effects. First, it increased the transparency of pension fund investments and reduced their riskiness (real and perceived), as it subdued their providers to strict rules of conduct. Second, it spurred an intense debate around pension funds, their features and use, which may have reduced the (fixed) costs of information of investing in these products. In fact, pension funds are quite complex financial instruments in terms of risks and benefits and their cost in terms of information gathering and processing can be expected to be quite high. Third, the legislation ensured a very favorable tax treatment for contributions and payouts which makes pension fund investment particularly convenient. Finally, the increase in competition among providers and the increase in the fund size, with related economies of scale, have brought about

⁵ The limit was raised from around €1300 in year 2000. Pension fund taxation is an area that has undergone a number of changes and will probably undergo again as many in the future.

substantial fee cuts. Currently, fees on pension funds are lower than fees on most other managed saving vehicles.⁶

The private pension system underwent another transformation in 2007. The most recent intervention builds on the 1993-1995 reform and was intended to increase participation further and boost investment by means of additional fiscal stimuli and by making the investment of severance pay automatic, unless otherwise requested by the worker. In the paper we do not analyze this further policy change and restrict the evaluation to the effects of the 1993-1995 reform.

3. The Evaluation Problem

The focus of this analysis is on the impact of the 1993-1995 pension fund acts on household saving. The choice is dictated by the desire to concentrate on the stated government goals of rising private long term saving to offset the public pension cut. In addition to this we also look at the impact on the stock of household non-retirement assets to check whether households finance their pension fund contributions by reallocating their wealth to exploit the fiscal benefits. As mentioned earlier, Attanasio and Brugiavini (2003) and Bottazzi et al. (2006) provide evidence that private wealth accumulation increased as a consequence of the social security reduction. Our objective is to verify whether the regulation of the pension fund industry induced an additional increase.

3.1 Identification and estimation methods

Consider an outcome denoted by Y_h . The canonical policy incidence equation is then:

$$Y_h = \delta D_h^c + \alpha' X_h + \varepsilon_h, \quad (1)$$

where D_h^c is the policy variable, which is a dummy equal to 1 if the household contributes to a private retirement scheme; X_h denotes a vector of household socio-demographic characteristics, controlling for systematic differences in attributes that might

⁶ Fees are very heterogeneous across pension fund types and providers. See the annual reports of the surveillance authority (available at <http://www.covip.it/RelazioneAnnuale2004.htm>) for summary statistics and an analysis of the trends.

affect Y_h ; ε_h is a zero mean error, capturing all the unobservable factors determining the outcome that are orthogonal to X_h .

The key issue from a policy point of view concerns the sign, size and significance of the parameter δ . The most critical feature of this evaluation is how to control for unobserved heterogeneity in the taste for saving. Some people save more than others and, those who do, tend to save more in all forms. Hence, they are more likely to invest in pension funds. The presence of unobservable factors that may affect both the outcome of interest and the choice of investing in a fund represents a potential source of bias. There are several methods to control for this, although no one, other than a perfectly run, randomized, controlled trial, can control for every possible aspect of the heterogeneity. The choice among the available alternatives is typically data driven.

One way of controlling for the heterogeneity in household propensities to save is to try to identify the policy effect by comparing saving differentials between pension fund contributors and non-contributors before and after the reform. As mentioned in Section 2, even before 1993 households could contribute to private retirement saving plans. In fact, even though not all households could invest in a pension fund, all could enroll in a tax-favored insurance-based retirement saving scheme. This difference in difference (DID) estimator relies on the assumption that participation in a pension fund or in an individual retirement saving scheme is a signal of the taste for saving. The double differencing “differences out” different (unobservable) saving propensities.⁷ This is the approach adopted by most related studies on the US that use series of cross-sectional data to estimate the impact of private retirement accounts on US household savings.⁸

In practice, policy incidence analysis with difference in difference estimation is performed by pooling data from the *pre*- and *post*-reform periods and either calculating the simple difference in outcomes over time, across the groups of contributors and non-contributors ($\Delta Y_{post} - \Delta Y_{pre}$), where Δ denotes a difference across groups, or running a regression of the form:

⁷ See the appendix for details.

⁸ See for example Poterba, Venti and Wise (1995) and Gale and Scholz (1994).

$$Y_{h,t} = \beta D_{h,t}^c + \gamma D_{h,t}^{post} + \delta D_{h,t}^c D_{h,t}^{post} + \alpha_1' X_{h,t} + u_{h,t}, \quad t = pre, post. \quad (2)^9$$

$Y_{h,t}$ denotes the outcome variable for household h in period t , with $t = pre/post$ if h is surveyed before/after the reform. $D_{h,t}^c$ is the pension fund contribution status dummy. Its coefficient, β , captures the differences in $Y_{h,t}$ between contributors and non-contributors that are due to unobserved differences in their preferences for savings. $D_{h,t}^{post}$ is a dummy that is equal to one if the household is surveyed in the post-reform years. It accounts for aggregate shocks to savings that are common to households. Its coefficient, γ , captures the effect on $Y_{h,t}$ of all common shocks that may have modified household behavior over time. $X_{h,t}$ denotes a vector of household socio-demographic characteristics controlling for systematic differences in attributes that might affect household savings. Finally, $u_{h,t}$ is a zero mean error, which is assumed to be uncorrelated with the $X_{h,t}$. The coefficient δ gives the estimate of the policy incidence on the group of contributors (the *treatment* group). Within this difference in difference estimation framework, the effect of the policy is estimated as the post treatment change in outcome for the treatment group, after controlling for the mean change in outcomes observed pre and post treatment ($D_{h,t}^{post}$) and for the mean difference in outcomes between the treatment and control group ($D_{h,t}^c$). In other words, the coefficient δ provides an estimate of the impact of the pension fund legislation on pension fund contributors' savings, separating the effect of the policy from that of other observed and unobserved factors that possibly changed over the same period. It tells whether pension fund contributors save more than what they would have saved in the absence of the reform.

There are two key identification assumptions maintained in difference in difference estimation. The first (hereafter designated the *common trend* assumption) is that, except for the control variables included ($X_{h,t}$), there are no other factors affecting contributors and non-contributors differentially before and after the reform. The second

⁹ Subscript t is not strictly needed because our data are a sequence of cross sections and are therefore such that h identifies uniquely the household and the year of interview. Nevertheless, we have chosen to use it to convey the idea that we take differences over time.

assumption is that the composition of the treatment (pension fund contributors) and of the control group (non-contributors) are stable over the period.¹⁰

In practice, the common trend assumption requires that, except for the policy change, all shocks affecting saving that have occurred over the period considered are aggregate. We checked the validity of this assumption by comparing pension fund contributors and non-contributors over time with respect to savings. The common trend assumption appears to hold because the curves for the two groups are roughly parallel.¹¹

As to the assumption of no group compositional changes, the standard DID estimator allows to control for the unobservable heterogeneity in the taste for saving only *if* the latter is not affected by the reform, so that average (unobserved) tastes for saving among contributors and among non-contributors are the same before and after the reform. The assumption of no reform-related changes in the taste for savings is common to all studies of the effect of private retirement schemes that use DID.¹² However, its validity cannot be taken for granted. In fact, if individuals select into pension fund contributing according to some unobservable rule that depends on the policy, the unobservable propensity to save among contributors and non-contributors will change with the reform in a systematic way. As a consequence, the unobservable preference component will not be eliminated by differencing. Indeed, there are reasons to believe that systematic compositional changes may occur. In fact, it can be objected that the legislation has brought to the pension fund market households with a lower taste for savings because it has made pension funds more easily available and has reduced their cost. If the groups' composition varies, the DID estimator is biased, as we show in the appendix. Notice that the direction of the bias is unclear because when the most dedicated savers among non-contributors become contributors both the average taste for saving among contributors and that among non-contributors fall. It is even possible that the two effects cancel out.

¹⁰ The DID method relies also on the assumption of exogeneity of the reform with respect to individual decisions – in particular to saving decisions. We believe that the endogeneity of the pension fund regulation can be ruled out. In fact, it was implemented as part of a major social security reform package, which was in turn prompted by the huge budget deficit and the severe political crisis of the early 1990s, which was exacerbated by the dramatic devaluation of the Italian lira in 1992.

¹¹ Graphs are available upon request (included for referees in the appendix).

¹² Poterba, Venti and Wise (1995), Gale and Scholz (1994) and many others make this assumption in their studies for the US.

However, if, after the reform, the average unobservable propensity to save falls among contributors relative to non-contributors, the estimator will underestimate the impact of the reform. Instead, if the drop is relatively larger among non-contributors, the estimator will overestimate it.

We address this problem of systematic compositional changes by estimating equation (1) with instrumental variables. Indeed, the main alternative candidate to searching for a control group when confronted with an endogeneity problem is instrumental variable estimation. The key issue becomes finding some variables that have an independent effect on the choice of contributing to a fund and not on saving. It is worth stressing that, just as it is necessary to take a hard look at control groups when using difference in difference estimation, it is crucial to justify instrument selection when using instrumental variables. Indeed, the criteria that must be met by the two estimators are different sides of the same coin.

4. The Data

We analyze the impact of the pension fund legislation on household saving in Italy using data from the Bank of Italy Survey of Household Income and Wealth (SHIW), which is run every two years.¹³ We consider the pre-reform years 1989 and 1991 and the post-reform ones 1998 through 2006 (5 surveys) and exclude the 1993 and 1995 surveys which were carried out when most of the social security and pension fund reforms took place. Each survey contains interviews from a random sample of around 8,000 Italian households and collects detailed data on household balance sheets together with thorough information on demographic characteristics, income and other variables. We carry out the analysis at the household level. Carrying out the analysis at the individual level is problematic for two reasons. First, it is only from 1995 onwards that information on *who* in the household contributes to a pension fund is available. The 1989 and 1991 surveys report only whether *someone* in the household contributes to a pension plan.¹⁴ Second,

¹³ The 1998 survey is an exception because it was run three years after the previous survey.

¹⁴ In the 1989 and 1991 surveys, households were asked the following question: “In (year), did someone in your family contribute to a supplementary pension scheme?”. If so, they were asked to report the amount contributed. From 1995 onwards, they were asked the following question: “In (year), did someone in your family, alone or with employer contribution, contribute to a private (or supplementary) pension scheme,

many variables that are relevant for our analysis such as total savings and wealth are available only at household level.

From the initial sample, we drop those households whose heads are aged less than 20 or more than 60 (because of the complications in modeling savings by the very young and the elderly) and those who are not in the labor force (e.g. the retired, the unemployed, first-job seekers, students, housewives, ...). This leaves us with about 3,500 households per year.

Table 1 reports some statistics on the distribution of private pensions in the pre- and post-reform years. Overall, the percentage of households with someone contributing to a private pension has risen over time and gone from less than 9 percent to 15 percent after the reforms. In the post-legislation period, the share of households whose head contributes to a pension fund is just over 12 percent, which implies that, in around 3 percent of households, it is someone other than the head that holds a private pension. The table reports also the ratio of households with someone contributing to a private pension to the number of individuals in survey who work (potential contributors). This ratio has risen from 5 to 9 percent.

Next, we check whether there are differences in the distribution of private pensions depending on the extent of the public pension cut. We mentioned that the pension fund legislation was part of a social security reform that substantially cut public pensions, but was such that some workers were hit more than others. Public sector employees and the self-employed underwent larger social security reductions than private sector payroll employees. Furthermore, the reduction was larger for those workers who had contributed relatively less years to the system. Indeed, based on the number of years of contributions to the social security system, we can then group workers in three categories. The “young” underwent a larger cut than the “middle-aged” who, in turn, were hit more than the “old”.¹⁵

annuity plan, or any plan designed to build a lump sum for your future needs?”. If the answer is positive, they were asked to report who in the family contributes, whether it is an individual or collective scheme, with or without employer contributions, when they started contributing and the amount contributed.

¹⁵ The label “young” denotes those households whose head has started contributing to the social security system after the end of 1995. The label “old” denotes those households whose head had contributed to the social security system for 18 years or more at the end of 1995. The label “middle-aged” denotes those

The table shows that private pension holding is highest among the self-employed, whose replacement ratio has traditionally been lower than that of payroll workers and has fallen relatively more after the reform. Holdings by public sector workers, whose public pension cut was also substantial, increased substantially after the reform, but remain low compared to the other groups of workers. After the reforms, participation among private sector employees doubled, reaching a level indistinguishable from that of the self-employed. The sharp increase in participation among private sector employees could be due to the provision of “closed” supplementary pension funds promoted by the social partners (trade unions and sectoral employers' associations) - and thus by non-profit organizations. These “closed” funds are established by collective agreements and are available only to those workers employed in the firm or sector for which the union signed the collective agreement establishing the fund. There are no such funds for public sector employees, with the exception of education employees.

Finally, we consider pension fund diffusion among post-reform “young”, “middle-aged” and “old” workers. “Young”, “middle-aged” and “old” are not well-defined categories of workers in the pre-reform period as the pension reform was yet to be implemented. Hence, participation rates according to this classification are not reported for the pre-reform years. In the 1998-2004 period, the rates of participation in the market for pension funds among the “old” and the “middle-aged” are higher than among the “young”.¹⁶

At the bottom of the table, we report household median (nominal) contribution and the median contribution-to-income ratio. Median contribution is below the limit for the tax benefit, which was set to around €1300 per person until 2000 and then raised to

households whose head had started contributing to the system before 1996, but had contributed for less than 18 years at the end of 1995.

¹⁶ A criticism that could be made is that the figures in the table might overstate participation among the “old” and the “middle-aged” and understate the participation among the “young” because the classification is based on the labor market experience of the household head, who is often the oldest individual in the house, whereas the pension fund contributor could be someone other, and possibly younger (i.e. a child) than the head. However, in our data, in 94 percent of cases the pension fund contributor is either the head or the spouse, who often have similar ages and education and, consequently, contribution histories.

around €5200.¹⁷ As a ratio of income, contributions have held basically constant over time.

Table 2 presents data on demographic and financial characteristics of contributors and non-contributors during the pre- and post-legislation periods. The table shows that there are significant differences in income, assets and net wealth between those with and without pension funds. The differences between the two groups are quite stable across the periods. The median contributor earns 30 percent more income, has twice as many financial assets and almost 70 percent more wealth than the median non-contributor. This evidence is consistent with the hypothesis that pension funds are a costly instrument, in terms of brokerage and management charges and fees, and are *available* only to wealthy investors. Furthermore, it seems that the median pension fund holder has enough financial (liquid) assets to be able to exploit the tax benefits by reallocating some of her wealth into pension funds, without increasing her saving rate, but still maintaining a sizable buffer stock of wealth. The issue is whether she actually does it. The fact that she does not contribute to the limit for tax deferral implies that the pension fund legislation may still provide a marginal incentive to save.

Contributors' saving rate is 20 percent higher than non-contributors', which is consistent with both the hypothesis that contributors exhibit a greater propensity to save and with the hypothesis that the fiscal incentives of pension fund contributions have a positive effect on household savings.

Pension fund holders are more likely to own their home and invest more in real estate, despite the fact that housing can be viewed as a substitute for pension funds. In fact, real estate, in excess of owner-occupied housing, is a type of long-term investment and, like pension funds, it is largely illiquid. However, contributors may substitute between pension funds and housing by taking out larger mortgage loans, by not accelerating mortgage repayments or by not trading up into a bigger house. This may be indeed the case as they appear to be more likely to hold a mortgage. On the other hand, the greater percentage of indebted households among contributors may be read as

¹⁷ Excluding the survey on 2000 and restricting the sample to 2002 through 2006, we find that the median contribution is around 1400 euros per household per year (vs. less than 800 in the 1989-1991 sample).

evidence that this group has easier access to credit which makes them more inclined to hold illiquid assets in general.

As a final point, pension fund contributors are more educated in terms of years of schooling. They are also more likely to hold some relatively complex financial instrument such as stocks, corporate bonds or mutual funds. This is consistent with the hypothesis that it is the more financially educated who take greatest advantage of the tax shield, but it could be simply related to the fact that these households are substantially wealthier than the median household and typically have more diversified portfolios.

5. The Empirical Evidence

This section presents estimates of the impact of the 1993-1995 pension fund legislation on household saving and on the stock of household non-retirement assets. As mentioned, our goal is to determine whether the pension fund reform generated new savings by increasing contributor savings and whether households finance their contributions by reallocating their wealth to exploit the fiscal benefits. If, after the reform and relative to non-contributors, contributors save less and/or accumulate less non-retirement assets, one cannot rule out that the pension fund legislation has led to some substitution across saving instruments. If, instead, there is no difference between contributors and non-contributors in terms of non-retirement assets before and after the reforms, there would be no evidence of substitution. In this instance and in the absence of a saving increase by contributors, the reform would turn out to be ineffective, but not costly from a tax-payer perspective. Finally, an increase in contributors' savings would support the hypothesis that the reform achieved policy makers' objectives.

This section is organized as follows. Sub-section 5.1 presents the results obtained for household saving using both the difference in difference methodology and the instrumental variable estimator. Sub-section 5.2 presents the results based on regressions for various definitions of non-retirement assets as dependent variable. Sub-section 5.3 allows for heterogeneity in the effect of the reform. As mentioned earlier, the pension fund legislation was part of a pension reform which had a differential impact on different

groups of workers.¹⁸ From a policy perspective, it matters whether the workers who underwent the most severe public pension cut and for whom the pension fund legislation was issued exploit this instrument and take advantage of the tax saving.

5.1 The effect on saving

Table 3 reports the estimates of the effect of the pension fund legislation on household saving rates using difference in difference estimation in the first and third columns and instrumental variables in the second and fourth. The difference in difference estimator is implemented by running ordinary least squares (OLS) on equation (2). We pool the observations from the surveys run in 1989 and 1991 and those from the surveys run in 1998, 2000, 2002 and 2004 and denote them as ‘pre-reform’ and ‘post-reform’, respectively. Since, from the descriptive analysis, systematic differences between pension fund contributors and non-contributors are apparent for education, marital status, income, home-ownership status and debt, in our regressions we include all these and some other socio-demographic variables that could influence saving behavior. In addition to difference in difference estimation, to address the issue of endogenous participation in pension funds and to avoid issues of reform-related group compositional changes, we report the results based on two-stage least squares (2SLS) on (1) treating the participation choice as endogenous.¹⁹ We restrict the analysis to post-reform years, as we no longer need a control group. As instruments, we use 9 dummies for the sector of employment of the household head.²⁰ For the instruments to be valid, they have to be correlated with pension fund contribution status (i.e. with the choice of joining a pension fund), but must be otherwise independent of saving rates. Our choice can be rationalized by the fact that

¹⁸ Bottazzi et al. (2006) carry out an accurate analysis of the implications of the social security reform on workers’ replacement ratios.

¹⁹ For the first stage of our 2SLS estimator we make the assumption of linear probability model for the likelihood of contributing to pension funds. An alternative to 2SLS would be instrumental variable estimation as suggested by Angrist and Pischke (2009). Angrist and Pischke suggest to instrument the endogenous dummy with the fitted probability based on the estimation of a probit for the endogenous dummy. In this instance testing the instruments would not be possible because of no overidentifying restrictions.

²⁰ See the notes to the tables displaying the results for the exact definition of the employment sector dummies used as instruments and also for a complete list of the socio-demographic variables included in the regressions.

most pension funds have been set up by trade unions and sectoral employers' associations and are available only to the workers of that sector. On the other hand, the sector of employment does not appear to affect the saving rate once we control for income, education and other observable characteristics. Over identification tests can be used to single out instruments that are inappropriate because they have independent effects on the outcome of interest.

It is worth stressing that our study is the first, to the best of our knowledge, to address the issue of reform-related systematic compositional changes among contributors and non-contributors. In contrast, as mentioned, the large literature on the effects of retirement saving programs on savings in the US typically simply rules them out.

Table 3 reports the estimates of only the coefficient of the variable of interest, capturing the effect of the policy. The estimates of the coefficients of the other controls included in the regression, and listed in the note to the table, are not reported for brevity, but are available upon request. In the first two columns of the table we look at the ratio of total savings, computed as difference between total household income and expenditure on non-durable goods and services, to income. The difference in difference estimate of the policy effect, in the first column, is positive, but small and statistically insignificant, which suggests that contributors' saving did not change relative to non-contributors' after the pension fund legislation was passed. In other words, contributors' saving did not increase in response to the reform.

In the second column we report the results of 2SLS estimation. The instruments are jointly highly significant ($p\text{-value} = 0.0000$). At 11 the F-statistics of the first-stage regression is above the rule of thumb of 10 suggested by Staiger and Stock (1997), below which the 2SLS estimator is likely to have some bias towards the OLS estimator and (small) size-distorted confidence intervals due to weak instruments. The table also reports the Hansen J statistic and its p-value from an over identification test showing that we cannot reject the null that the instruments are uncorrelated with the regression residual with 5 percent confidence. The 2SLS estimate is larger than the DID one, but it remains insignificant. Thus, based also on the 2SLS, results we cannot reject the hypothesis that the reform had no impact on household saving.

In the last two columns of table 3 we look at non-retirement saving, computed as total saving minus any contribution to pension funds, as a ratio of income. Both the DID and 2SLS estimates imply that after the reform also contributors' non-retirement savings did not change relative to non-contributors'. This is additional evidence that composition changes in the two groups, if any, are not a significant source of bias. In fact, if the legislation had induced less dedicated savers to invest in pension funds, we would record a drop in contributors' non-retirement saving. Instead, we find that the estimated coefficient is statistically insignificant.²¹

5.2 The effect on non-retirement assets

Table 4 reports the results of the estimation of the effect of the policy on various types of non-retirement assets. In general, the 2SLS estimates are similar in sign and significance to the DID ones and are just slightly larger in magnitude (absolute value), but also standard errors are larger, like in the regressions for saving rates. For the regressions we use only the observations on asset holders, i.e. we drop the zeros.²²

In the first two columns we look at liquid financial assets, which consist of bank accounts and government bonds. We do not consider shares, corporate bonds and other risky assets because ownership of these assets is not widespread and is higher among pension fund contributors, who are wealthier on average. Hence, stock market fluctuations (aggregate shock) tend to affect contributors' assets more than non-contributors', in violation of the assumption of common time effects across groups. The estimated policy effect on bank accounts and government bonds is negative and statistically significant. This suggests that contributors' liquid assets fell relative to non-contributors' after the reform was passed, i.e. we cannot rule out that after the reform

²¹ Notice that also the Wu-Hausman F tests of regressor exogeneity (not reported but available upon request) do not reject the null of no systematic changes in participation due to the reform both for the regression for total savings and for that for non-retirement savings.

²² We are aware that these estimates could be affected by sample selection bias. The most widely used procedure to address sample selection is Heckman two-step estimator (Heckman, 1976). This estimator implies augmenting the equation of interest by a non-linear correction term. To implement this procedure we would need to find a variable that determines participation in an asset market, but not the size of the investment. Since finding such variable is extremely difficult, for the identification of the effects of interest we would have to rely on the non-linearity of the correction term. However, the correlation between this term and the regressors can cause severe collinearity problems which can in turn lead to large standard errors of the coefficients of interest, hence reducing the likelihood of rejection of the null of no effects.

contributors financed their investment in pension funds by substituting out of some of their liquid wealth. The effect is economically large because the reduction in liquid assets corresponds to over half of contributors' sample mean (25 percent of their average total financial wealth).

In the other columns of the table, we verify whether pension wealth shows up as a reduction in other net worth, which appears to be the case for the US as illustrated by Engen et al. (1994) and Gale (1998). Examining the substitution between pension funds and housing wealth is motivated by the fact that both are illiquid, tax-preferred assets that are often held for long periods. Since homeownership is widespread, and housing represents a substantial fraction of most households' wealth, ignoring savings that occur in housing may severely understate household savings. We also consider the impact on debt because home equity loans, such as mortgages, allow to extract equity from one's home. According to our analysis, over the reform period, contributors' real assets increased relative to non-contributors', if anything. Part of this increase was financed through higher debt (last two columns of the table), but the overall effect was a slight rise in total net real assets – in contrast with the evidence for the US. These results are robust to the exclusion of owner-occupied housing and to a split between homeowners and renters. The positive effect on housing wealth could be rationalized in two ways. The first calls for a wealth effect of pension funds on consumption of housing services. Indeed, housing is not only an investment good, but also a consumption (durable) good. The second works through the tax relief on pension fund contributions which may relax liquidity constraints and allow households to afford larger mortgages for larger houses.

The results from the analysis on non-retirement assets do not change if we scale assets and liabilities by income and use these ratios as left-hand-side variables in the regressions.

5.3 Social security cut and pension fund contribution

As mentioned earlier, the pension fund legislation was part of a pension reform package aimed at reducing public expenditure on pensions. The pension reform had a differential impact on different groups of workers and was such that, at retirement, the most severely hit by the pension reform are likely to receive public pension benefits which are not

adequate to enjoy decent standards of living. The pension fund legislation was intended to help these workers to accumulate (private) pension wealth in order to offset the public pension cuts. The workers who underwent the largest reduction in social security wealth are the “young” who started contributing to the social security system after 1995 and the “middle-aged” who had less than 18 years of contributions in 1995. Further, public employees and the self-employed underwent larger cuts than private sector payroll employees. The goal of this section is to verify whether these workers invest in pension funds and take advantage of the tax savings relatively more than those workers whose social security wealth was affected the least. The question will be addressed by looking at the diffusion of private pensions in section 5.3.1 and then at differentials in saving and non-retirement wealth in section 5.3.2.

5.3.1 *The diffusion of pension funds*

The analysis reported in Table 5 is aimed at verifying whether the most affected by the public pension cut participate in the market for pension fund relatively more than the least affected. Participation is appraised by considering the propensity to invest in pension funds, as captured by the probability of investing. Let $D_{h,t}^g$ be a dummy singling out a category of workers who has been hit relatively *more* by the public pension cut. To predict participation in the market for pension funds, we estimate the following probit model on post-reform data, pooling the observations of the surveys run between 1998 and 2004:

$$\Pr ob(D_h^c = 1) = \Phi(\beta D_h^g + \alpha' X_h), \quad (3)$$

where Φ is the standard normal cumulative distribution.

The first and second column of Table 5 compare the propensity of the “young” and that of the “middle-aged”, respectively, to the propensity of the “old”. The third and fifth column compare public employees and the self-employed, respectively, to private employees.²³ The estimated β_s are negative and imply that the “young” invest in pension

²³ Hence, in the first column, the dummy $D_{h,t}^g$ denotes a “young” and, in the second column, a “middle-aged” worker. “Old” workers are the benchmark. For the analysis reported in the first column we drop the observations on the “middle-aged”. For that in the second, we drop the observations on the “young”. In the third and fifth columns, the dummy $D_{h,t}^g$ denotes a public employee and a self-employed, respectively, and

funds less than the “old” and public employees invest less than private employees. The differences are not only significant, but also sizable as the “young” are 7 percentage points less likely to invest in pension funds than the old (almost 50 percent of the mean) and public employees are over 3 percentage points less likely than private employees. There are no significant differences between the “middle-aged” and the “old”, nor between the self-employed and private employees.

It is worth pointing out that the coefficient of the dummy D_h^g gives a snapshot of the diffusion of pension funds after the social security and pension fund reforms were implemented. It is not informative as to the effect of the reform on the decision to invest in pension funds. The negative coefficient in the regression “young” vs. “old” could capture life-cycle differences. The negative coefficient in the regression public vs. private employees could capture the greater availability of pension funds to private sector workers that we discussed in section 4.

In order to appraise the effect of the reform and whether participation by the most affected by the pension cut has relatively increased, a control group is needed. For the comparison between public employees and the self-employed versus private employees we can look at diffusion differentials before and after the reform. Columns (4) and (6) report the results of the estimation of a probit model on pre- and post-reform data where we control for post-reform years with the post-reform dummy $D_{h,t}^{post}$ and estimate the following model:

$$\Pr ob(D_{h,t}^c = 1) = \Phi\left(\beta D_{h,t}^g + \gamma D_{h,t}^{post} + \delta D_{h,t}^g D_{h,t}^{post} + \alpha' X_{h,t}\right), \quad t = pre, post. \quad (4)$$

The coefficient of the interaction term $D_{h,t}^g D_{h,t}^{post}$ captures the effect of interest, i.e. the effect of the reform on participation by households of type g . These probit imply that, after the reforms, participation in the market for pension funds increased. In fact, the coefficients on $D_{h,t}^{post}$ are positive and statistically significant. The coefficients on the interaction are negative and statistically significant, implying that the increase is smaller for public employees (column 4) and the self-employed (column 6) than for private employees, despite the former experienced a greater cut in their social security wealth. A similar exercise, based on differences over time, cannot be carried out for the comparison

private employees are the benchmark. For the analysis reported in the third column we exclude the self employed; for that in the fifth we exclude public employees.

between “young” and “middle-aged” versus “old” workers because these are well-defined categories only in the post-reform period.

Overall, these results are consistent with the evidence of Bottazzi et al (2008) who find that the demand for private pension plans is not related to social security wealth and that, controlling for social security wealth, the most severely hit by the social security reform are not significantly more likely to invest in pension funds.

Finally, since private retirement schemes are quite complex products, we investigate the impact of financial education on the propensity to invest in these instruments and report the results of the analysis in table 6. We proceed by interacting the dummy D_h^g by a dummy that singles out the financially most educated ($D^{fin.ed.}_h$) and estimate the following model, on post-reform data:

$$Pr ob(D_h^c = 1) = \Phi(\beta D_h^g + \gamma D_h^{fin.ed.} + \delta D_h^g D_h^{fin.ed.} + \alpha' X_h). \quad (5)$$

As financially educated ($D^{fin.ed.}_h=1$) we take those who have at least a high school diploma - and, thus, presumably exhibit higher numeric literacy - and are relatively more involved in financial markets, i.e. invest in either mutual funds, or stocks or corporate bonds, or all. According to our indicator, 35% of pension fund contributors are financially educated vs. 10% of non-contributors.

Our indicator of financial literacy is undoubtedly very rough and is likely to be correlated also with other unobservable and uncontrolled for determinants of asset demand. Caution is therefore due when reading the evidence. Nevertheless, $D^{fin.ed.}_h$ turns out to be statistically significant in the probit regressions even after controlling for education and for ownership of mutual funds, stocks and corporate bonds, except for the regression comparing the “middle-aged” to the “old” where it is not significant. In the other instances, the coefficient of $D^{fin.ed.}_h$ is positive and large: being financially educated raises the probability of investing in a pension fund by over 20 percent of the sample means. Further, in the regression in the first column that compares the “young” to the “old”, the coefficient of the interaction $D_h^g D^{fin.ed.}_h$ is positive, statistically significant and large and implies that the educated “young” are substantially more likely to hold a pension fund than the “old”, even though on average the “young” participate less than the “old”. Instead, financial education does not seem to affect the propensity difference between “middle-aged” and “old”. Private employees are more likely to invest in pension

funds than public employees in general and also more than financially educated public employees, even if the difference is smaller. By contrast, and finally, the educated self-employed invest more than educated employees.

5.3.2 Heterogeneous effect on saving and non-retirement asset accumulation

In the regressions of table 7 we check whether the pension fund legislation had a differential impact on workers' savings and non-retirement asset accumulation depending on the extent of the social security wealth cut that they have undergone. The relevant policy incidence equation is:

$$Y_h = \delta D_h^c + \theta D_h^g + \rho D_h^c D_h^g + \alpha' X_h + \varepsilon_h, \quad (6)$$

where the coefficient on the interaction between the policy variable (D_h^c) and the worker category dummy (D_h^g), ρ , is the object of interest.²⁴

Like before, we can address the policy endogeneity issue by 'differencing out' the unobserved heterogeneity in the taste for saving and estimate the following regression:

$$\begin{aligned} Y_{h,t} = & \beta D_{h,t}^c + \gamma D_{h,t}^{post} + \delta D_{h,t}^c D_{h,t}^{post} + \\ & + \phi D_{h,t}^g + \varphi D_{h,t}^c D_{h,t}^g + \theta D_{h,t}^{post} D_{h,t}^g + \rho D_{h,t}^c D_{h,t}^{post} D_{h,t}^g + \quad t = pre, post; \quad (7) \\ & + \alpha_1' X_{h,t} + v_{h,t}, \end{aligned}$$

which is like equation (2), except that now we have added the dummy $D_{h,t}^g$ and interacted it with the pension fund contribution status dummy ($D_{h,t}^c$), with the post-reform year dummy ($D_{h,t}^{post}$) and with their interaction. If there are no reform-related systematic compositional changes across the groups of most-affected contributors versus most-affected non-contributors, then differencing across contributors and non-contributors

²⁴ $D_{h,t}^c$ is equal to 1 if someone in the household contributes to a pension fund, whereas $D_{h,t}^g$ refers to the household head. Hence, we are implicitly assuming that, if the head does not contribute to a pension fund, but someone else in the household does, the head and the pension fund holder have similar social security contribution histories (first two columns of the table) or that they work in the same sector (last two columns). According to the post-reform surveys, which allow us to single out exactly who in the household has a private pension, in 75 percent of cases the household head does. When it does not, in 75 percent of cases it is the spouse. Since the head and the spouse have often similar ages and education achievements, we feel that it is acceptable to assume that they have similar contribution histories and therefore have been hit in the same way by the pension reform. Regarding the assumption on the sector of employment, the working spouse of a public-sector employed household head is also a public employee in 60 percent of cases. The spouse of a self-employed is self-employed in 50 percent of cases. Finally, the spouse of a private-sector employee is a private employee in 90 percent of cases.

$(D_{h,t}^c)$, years ($D_{h,t}^{post}$) and worker categories ($D_{h,t}^g$) gives an unbiased estimate of ρ , i.e. of the impact of the pension fund legislation on the savings of the pension fund contributors who underwent the most severe public pension cut.²⁵ Since we cannot rule out a priori reform-related compositional changes in the groups of contributors and of non-contributors, we estimate equation (6) also using two-stage least squares, restricting the analysis to post-reform years and treating participation as endogenous. Two-stage least squares is the only estimator available for the comparison between “young” and “middle-aged” versus “old” workers because, as mentioned, these are not well-defined categories of workers before the reform.²⁶

In the first four columns of table 7, we report the effect of pension funds availability on saving and wealth accumulation by sector of activity as we compare public employees and the self employed with private sector workers. In the last two columns of the table, we compare the “young” and “middle-aged” workers with the “old”.

After the reform, public employees (first two columns) do not appear to have taken advantage of the pension fund legislation relative to private employees by saving more or substituting non-retirement assets with retirement assets, as all reported coefficients are statistically insignificant. In contrast, the saving rate of the self-employed (third and fourth columns) appears to have fallen relative to that of private employees. As to the comparison of “young” and “middle-aged” versus “old” workers (last two columns), the estimation suggests that some substitution may be occurring. Specifically,

²⁵ See the appendix for the derivation.

²⁶ When running two-stage least squares, we instrument both the dummy for pension fund contribution and its interaction with D_h^g . As instruments, we use the same dummies for the sector of employment of the household head that we have used for Table 5. In addition to these, for the regressions by sector of employment we include a dummy that takes on value 1 if D_h^g is equal to one *and* if more than one household member contributes to a pension fund. The rationale for using this variable is that a public employee or a self-employed may be more likely to participate in the market for pension funds if someone else in the house does. For the 2SLS regression for the self employed, as instruments, we use also the variables resulting from the interaction between the sector dummies and the dummy for self employment. For public employees, we cannot construct such variables as there is no variation in the sector of employment for these workers. For the regressions distinguishing between “young” and “middle-aged” versus “old”, in addition to the dummies for the sector of employment, we use their interaction with the dummy D_h^g .

the “young” and “middle-aged” appear to have significantly reduced their real assets compared to the “old” (conditional on having some).

Hence, in summary, based on the evidence of table 7, public employees, the self-employed, the “young” and the “middle-aged”, i.e. the workers who were most severely hit by the pension reform, do not appear to save more as a result of the pension fund regulation. At best, they appear to contribute to private retirement schemes through substitution out of other saving instruments.

6. Concluding remarks and policy implications

Based on the evidence presented, we cannot reject the hypothesis that the pension fund legislation has not increased household aggregate savings. One would have expected that the lower risk and cost of pension funds would have had a positive effect on private savings, but this appears not to have been the case. Further, participation in the private pension market appears to be unrelated to the loss of retirement wealth due to the pension reform. Indeed, the most affected by the social security reform do not appear to save more, or to be more likely to invest in supplementary retirement schemes than the least affected.

There are several reasons why the saving incentives may have not worked. One possibility is that they are poorly designed. Based on a through review of existing academic works on tax incentives and personal saving, Bernheim and Scholz, (1993) and Bernheim (1996) claim that the life-cycle hypothesis may have had an excessive influence on the design and conceptualization of empirical investigations concerning taxation and saving. While other behavioral hypotheses are mentioned in the literature with increasing frequency, this usually occurs to explain anomalous results, rather than at the stage of designing an empirical strategy. In part, this is no doubt attributable to the absence of sufficiently well-developed organizing principles for a compelling behavioral alternative. But even so, it is important to be aware of the potential for reaching misleading conclusions by imposing a potentially false structure on the data.

Another reason why saving incentives may have not worked is that households have very low intertemporal elasticities of substitution (Hall, 1988). If so, it may prove difficult to raise savings via any voluntary mechanism. Furthermore, people may remain

uninformed about the need and opportunities for savings or may have not understood the scope of the benefits enjoyed by pension fund contributions. This would make a clear case for investing public resources in the dissemination of information about future pension rights and about the instruments available to accumulate a suitable level of wealth at retirement. The importance of financial education is confirmed by the fact that the more educated are significantly more likely to invest in pension funds than the uneducated. Also, financial education appears to be a crucial determinant of participation among the “young” after the pension reforms.

A final possibility is that saving incentives may eventually raise savings, even if they have not done so, yet. In this instance, the policy implication is to be patient.

Still, the pension fund legislation has not been completely ineffective because households do appear to contribute to pension funds, even though they seem to do so by reallocating some of their wealth from other saving instruments. In particular, they have substituted liquid assets, and in particular government bonds and bills, with pension fund investments and have financed contributions by borrowing.

These findings are consistent with the hierarchy of behavioral responses to taxation developed by Slemrod (1992) and Auerbach and Slemrod (1997). These authors find that at the top of the hierarchy of behavioral response is the effect of taxes on the *timing* of economic transactions. The classic example is corporate stock sales and the realization of capital gains. The next tier of responses includes financial and accounting choices, such as just the allocation of a given amount of savings to tax-favored vs. other assets. The least responsive category of behavior applies to agents’ real decisions, such as the level of savings.

The effect on the allocation of savings vis à vis no effect on the level of savings raises issues relating to the efficiency and equity of tax-based saving incentives. If the tax incentives do not raise private savings, but just lead to a reallocation of existing savings, a question of costs arises. Still, there may very well be good reasons to provide access to saving incentives to some groups, such as those with limited pension coverage. These issues are beyond the scope of this paper.

Finally, it is worth stressing that the analysis points towards one factor that could significantly affect the choice to invest in a private retirement plan, which is the provision of “closed” pension funds.

References

- Angrist, J. and J. Pischke, 2009. *Mostly Harmless Econometrics: An Empiricist's Companion*, Princeton University Press.
- Attanasio, O., Brugiavini, A., 2003, Social security and households' saving, *Quarterly Journal of Economics*, 118(3), 1075-1120.
- Attanasio, O., DeLeire, T., 2002, The Effect of Individual Retirement Accounts on Household Consumption and National Saving, *The Economic Journal*, 112(6), 504-538.
- Attanasio, O., Rohwedder, S., 2003, Pension Wealth and Household Saving: Evidence from Pension Reforms in the United Kingdom, *American Economic Review* 93, 1499-1521.
- Auerbach, A., Slemrod, J., 1997, The Economic Effects of the Tax Reform Act of 1986, *Journal of Economic Literature*, 35(2), 589-632.
- Bernheim, D., Scholz, J.K., 1993, Private Saving and Public Policy, in: Poterba, J. (Ed.), *Tax Policy and the Economy*, vol. 7. MIT Press, Cambridge, Mass..
- Blundell, R., Costa Dias, M., 2002, Alternative Approaches to Evaluation in Empirical Microeconomics, IFS Cemmap Working Paper 10/02.
- Bottazzi, R., Jappelli, T., Padula, M., 2006, Retirement Expectations and Pension Reforms, *Journal of Public Economics*, 90, 2167-2213.
- Bottazzi, R., Jappelli, T., Padula, M., 2009, Pension Reforms and the Allocation of Retirement Savings, mimeo.
- Cesari, R., Grande, G., Panetta, F., 2008, Supplementary Pension Schemes in Italy: Features, Development and Opportunities for Workers, *Giornale degli Economisti, e Annali di Economia*, 67(1), 21-73.
- La Previdenza Complementare in Italia: Caratteristiche, Sviluppo e Opportunità per i Lavoratori, Bank of Italy, *Quaderni di Economia e Finanza* 8.

- COVIP Annual report (various years). Available in Italian at: <http://www.covip.it/RelazioneAnnuale2004.htm>.
- Engen, E., Gale, W., Scholz, J.K., 1996, Do Saving Incentives Work? *Brookings Papers on Economic Activity* 1, 85-180.
- Engen, E., Gale, W., Scholz, J.K., 1994, The Effects of Tax-Based Saving Incentives on Saving and Wealth, NBER Working Paper 5759.
- Fornero, E., several works. See: <http://web.econ.unito.it/fornero/pubblicazioni>.
- Gale, W., 1998, The Effects of Pensions on Household Wealth: A Reevaluation of Theory and Evidence, *Journal of Political Economy*, 106 (4), 706-723.
- Gale, W., Scholz, J.K., 1994, IRAs and Household Saving, *American Economic Review* 84(5), 1233-1260.
- Hall, R., 1988, Intertemporal Substitution in Consumption, *Journal of Political Economy*, 96 (2), 339-357.
- Messori, M., 2006, *La previdenza complementare in Italia*. Il Mulino, Bologna.
- Poterba, J., Venti, S., Wise, D., 1995, Do 401(k) Contributions Crowd Out Other Personal Saving? *Journal of Public Economic*, 58, 1-32.
- Poterba, J., Venti, S., Wise, D., 1994, Targeted Retirement Saving and the Net Worth of Elderly Americans, *American Economic Review*, 84(2), 180-185.
- Poterba, J., Venti, S., Wise, D., 1996, How Retirement Saving Programs Increase Saving, *Journal of Economic Perspectives*, 10(4), 91-112.
- Poterba, J., Venti, S., Wise, D., 1997, Personal Retirement Saving Programs and Asset Accumulation: Reconciling the Evidence, NBER Working Paper 5599.
- Rossi N., Visco, I., 1994, Private Saving and Government Deficit in Italy, in: Ando, A., Guiso, L., Visco, I. (Eds.), *Saving and the Accumulation of Wealth: Essays on Italian Household and Government Saving Behavior*. Cambridge University Press, Cambridge, U.K..

- Rossi N., Visco, I., 1995, National Saving and Social Security in Italy, *Ricerche Economiche*, 49(4), 329-356.
- Slemrod, J., 1992, The Economic Impact of the Tax Reform Act of 1986, in: Slemrod J., (Ed.), *Do Taxes Matter? The Impact of the Tax Reform Act of 1986*. MIT Press, Cambridge, Mass..
- Staiger, D., Stock, J.H., 1997, Instrumental Variables Regression with Weak Instruments, *Econometrica*, 65, 557-586.
- Stock, J. H., Yogo, M., 2005, Testing for Weak Instruments in Linear IV Regression, in: Andrews, D.W. and Stock, J. H. (Eds.), *Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg*. Cambridge University Press, Cambridge, Mass., 80-108.

Appendix

DID estimation with unobserved heterogeneity in the taste for saving

The difference in difference estimator that takes care of the policy endogeneity issue due to unobservable preference heterogeneity is implemented by estimating equation (2), which is reported here for convenience, omitting household observable characteristics for brevity:

$$Y_{h,t} = \beta D_{h,t}^c + \gamma D_{h,t}^{post} + \delta D_{h,t}^c D_{h,t}^{post} + \varepsilon_{h,t}. \quad (1A)$$

The zero mean error $\varepsilon_{h,t}$ can be decomposed as follows:

$$\varepsilon_{h,t} = \phi_{h,t} + \omega_t + \mu_{h,t}, \quad (2A)$$

where $\phi_{h,t}$ is an individual specific effect capturing the unobservable preference for savings, ω_t is a common macroeconomic effect and $\mu_{h,t}$ is the standard residual, possibly capturing any measurement error. *If* there are no reform-related compositional changes in the groups of contributors and of non-contributors, then:

$$\begin{aligned} E(\phi_{h,post} - \phi_{h,pre} \mid D_{h,t}^c = 1) &= 0; \\ E(\phi_{h,post} - \phi_{h,pre} \mid D_{h,t}^c = 0) &= 0. \end{aligned}$$

If the common trend assumption holds, it follows that:

$$E(\varepsilon_{h,post} - \varepsilon_{h,pre} \mid D_{h,t}^c = 1) - E(\varepsilon_{h,post} - \varepsilon_{h,pre} \mid D_{h,t}^c = 0) = 0,$$

and differencing savings across groups and years gives:

$$\left\{ E[Y_{h,t} \mid D_{h,t}^c = 1, D_{h,t}^{post} = 0] - E[Y_{h,t} \mid D_{h,t}^c = 0, D_{h,t}^{post} = 0] \right\} - \left\{ E[Y_{h,t} \mid D_{h,t}^c = 1, D_{h,t}^{post} = 1] - E[Y_{h,t} \mid D_{h,t}^c = 0, D_{h,t}^{post} = 1] \right\} = \delta.$$

Hence, the difference-in-difference estimator, which can be implemented by running OLS on (1A), is unbiased. The coefficient δ provides an estimate of the impact of the pension fund legislation on the amount of savings of pension fund contributors, separating the effect of the policy from that of other observed and unobserved factors that possibly changed over the same period.

However, if individuals select into pension fund contributing according to some unobservable rule that depends on the policy and, as a consequence of this, the unobservable propensity to save among contributors and non-contributors changes with

the reform in a systematic way, the unobservable preference component, $\phi_{h,t}$, will not be eliminated by differencing. Indeed, as mentioned, there are reasons to believe that systematic compositional changes may occur.

The problem can be illustrated as follows. Let's write the unobservable individual effect, which may influence saving decisions, as:

$$\phi_{h,t} = \phi_h^0 + \phi_{h,t}^1, \quad (3A)$$

where ϕ_h^0 is an individual fixed effect and $\phi_{h,t}^1$ is a time-varying effect. If:

$$E(\phi_{h,post}^1 - \phi_{h,pre}^1 | D_{h,t}^c = 1) - E(\phi_{h,post}^1 - \phi_{h,pre}^1 | D_{h,t}^c = 0) \neq 0,$$

then:

$$\begin{aligned} & \left\{ E[Y_{h,t} | D_{h,t}^c = 1, D_{h,t}^{post} = 0] - E[Y_{h,t} | D_{h,t}^c = 0, D_{h,t}^{post} = 0] \right\} - \\ & \left\{ E[Y_{h,t} | D_{h,t}^c = 1, D_{h,t}^{post} = 1] - E[Y_{h,t} | D_{h,t}^c = 0, D_{h,t}^{post} = 1] \right\} = \\ & \delta + E(\phi_{h,post}^1 - \phi_{h,pre}^1 | D_{h,t}^c = 1) - E(\phi_{h,post}^1 - \phi_{h,pre}^1 | D_{h,t}^c = 0), \end{aligned}$$

and DID is biased. The direction of the bias is unclear because when the most dedicated savers among non-contributors become contributors both the average taste for saving among contributors and that among non-contributors fall. It is even possible that the two effects cancel out.

In Section 5.3.3, when allowing for a heterogeneous impact of the reform depending on the extent of the worker public pension cut, we do difference in difference by estimating the following regression (omitting household characteristics for brevity):

$$\begin{aligned} Y_{h,t} = & \beta D_{h,t}^c + \gamma D_{h,t}^{post} + \phi D_{h,t}^g + \\ & + \delta D_{h,t}^c D_{h,t}^{post} + \varphi D_{h,t}^c D_{h,t}^g + \theta_{h,t}^{post} D_{h,t}^g + \rho D_{h,t}^c D_{h,t}^{post} D_{h,t}^g + \varepsilon_{h,t}. \end{aligned} \quad (4A)$$

Equation (4A) is like equation (1A), except that now we have added the dummy $D_{h,t}^g$, denoting most affected groups, and interacted it with the pension fund contribution status dummy ($D_{h,t}^c$), with the post-reform year dummy ($D_{h,t}^{post}$) and with their interaction.

If:

$$\begin{aligned} & \left[E(\varepsilon_{h,post} - \varepsilon_{h,pre} | D_{h,t}^c = 1, D_{h,t}^g = 1) - E(\varepsilon_{h,post} - \varepsilon_{h,pre} | D_{h,t}^c = 1, D_{h,t}^g = 0) \right] - \\ & \left[E(\varepsilon_{h,post} - \varepsilon_{h,pre} | D_{h,t}^c = 0, D_{h,t}^g = 1) - E(\varepsilon_{h,post} - \varepsilon_{h,pre} | D_{h,t}^c = 0, D_{h,t}^g = 0) \right] = 0, \end{aligned}$$

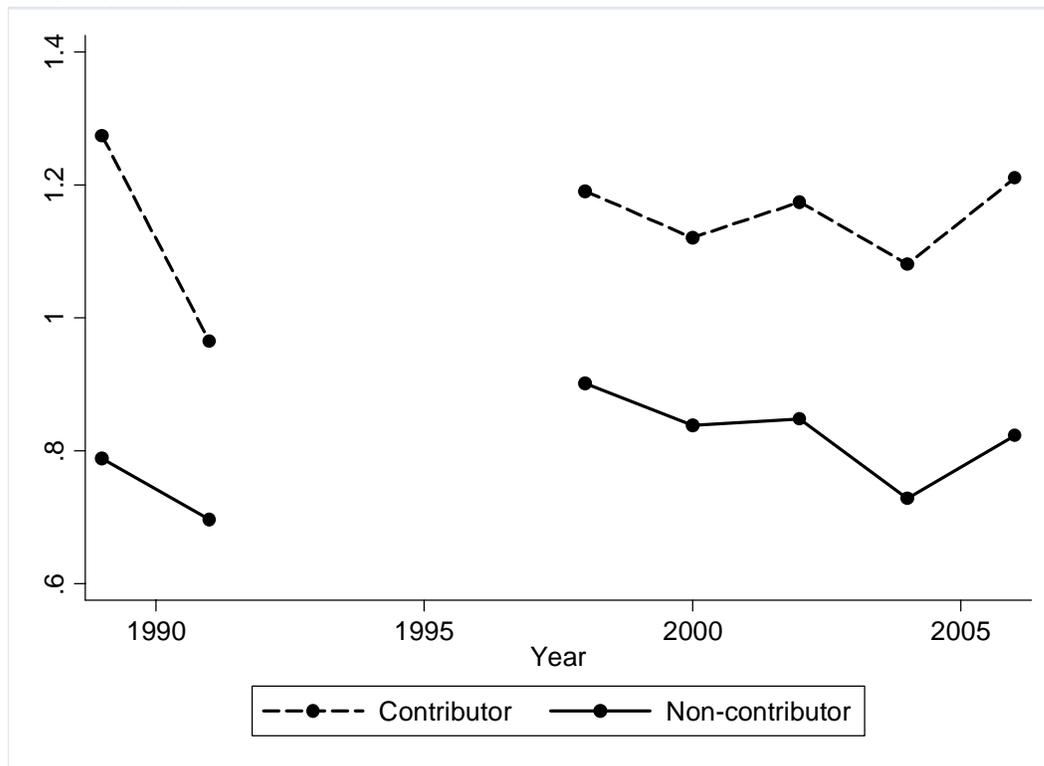
i.e. if there are no reform-related systematic compositional changes across the groups of most-affected contributors versus most-affected non-contributors, then differencing

across contributors and non-contributors ($D_{h,t}^c$), years ($D_{h,t}^{post}$) and worker categories ($D_{h,t}^g$) gives:

$$\left\{ \left[E\left(Y_{h,t} \mid D_{h,t}^c = 1, D_{h,t}^g = 1, D_{h,t}^{post} = 0\right) - E\left(Y_{h,t} \mid D_{h,t}^c = 1, D_{h,t}^g = 0, D_{h,t}^{post} = 0\right) \right] - \left[E\left(Y_{h,t} \mid D_{h,t}^c = 0, D_{h,t}^g = 1, D_{h,t}^{post} = 0\right) - E\left(Y_{h,t} \mid D_{h,t}^c = 0, D_{h,t}^g = 0, D_{h,t}^{post} = 0\right) \right] \right\} - \left\{ \left[E\left(Y_{h,t} \mid D_{h,t}^c = 1, D_{h,t}^g = 1, D_{h,t}^{post} = 1\right) - E\left(Y_{h,t} \mid D_{h,t}^c = 1, D_{h,t}^g = 0, D_{h,t}^{post} = 1\right) \right] - \left[E\left(Y_{h,t} \mid D_{h,t}^c = 0, D_{h,t}^g = 1, D_{h,t}^{post} = 1\right) - E\left(Y_{h,t} \mid D_{h,t}^c = 0, D_{h,t}^g = 0, D_{h,t}^{post} = 1\right) \right] \right\} = \rho.$$

Hence, the triple difference estimator, which can be implemented by running OLS on (4A), takes care of all issues related to any unobservable heterogeneity in the taste for savings and the estimator is unbiased. If reform-related compositional changes are an issue, the estimation is biased.

Graph (for referees): Pension fund contributors' and non-contributors' saving



Note: Year means of contributors' and non-contributors' saving. Saving is in nominal terms and in 10.000 of euros.

(this version: January 2011)

Table 1 – Pension fund contributors

	1989-91	1998-2006
Share of households with someone contributing to a pension fund (%)	8.5	14.7
Share of households <u>with head</u> contributing to a pension fund (%)	-	12.2
Households with someone contributing to a pension fund-to-“potential contributors” ^(a) (%)	5.1	8.9
Share of households contributing to a pension fund with head employed in the <u>private sector</u> (%)	7.2	15.3
Share of households contributing to a pension fund with head employed in the <u>public sector</u> (%)	7.0	13.2
Share of households contributing to a pension fund with <u>self-employed</u> head (%)	13.3	15.4
Share of households contributing to a pension fund with an “ <u>old</u> ” head ^(b) (%)	-	14.9
Share of households contributing to a pension fund with a “ <u>middle-aged</u> ” head ^(c) (%)	-	15.0
Share of households contributing to a pension fund with a “ <u>young</u> ” head ^(d) (%)	-	11.2
Median contribution (for contributors)	775	1,106
Median ratio of contribution to income (percent)	3.3	3.1
N. of observations	9,767	17,188

Note: Data are weighted to represent the Italian population in the year of the survey.

^(a) “Potential contributors” include all household members who are aged between 20 and 60 and are employed. ^(b) “Old” workers denote those workers who had contributed for 18 years or more to the social security system at the end of 1995 and underwent a relatively small social security cut. ^(c) “Middle-aged” workers denote those who had contributed for less than 18 years and underwent a social security cut that was larger than that of the “old” and smaller than that of the “young”. ^(d) “Young” workers denote those who started contributing after the end of 1995 and underwent the largest social security cut. Median contributions are in euros of year 2004.

Table 2 – Characteristics of households with and without pension funds

	All	1989-1991		All	1998-2006	
		Without pension funds	With pension funds		Without pension funds	With pension funds
Age (mean)	43	43	43	43	43	43
Years of schooling (mean)	9.6	9.4	11.4	11.0	10.8	12.1
Married (%)	85.5	85.8	82.4	74.0	73.5	77.0
Household size (mean)	3.4	3.5	3.2	3.1	3.1	3.1
Household income (median)	29,800	29,200	38,500	29,400	28,100	38,100
Per-ad. equiv. cons. ^(a) (median)	9,100	8,800	11,800	9,800	9,400	12,000
Saving (median)	5,800	5,600	8,200	6,000	5,600	9,100
Saving rate (median)	20.6%	20.3%	24.6%	22.2%	21.4%	25.4%
Financial assets (median)	6,800	6,200	13,300	8,500	7,500	16,800
Household with risky assets ^(b) (%)	8.6	7.0	26.2	23.2	18.6	49.9
Wealth (median)	93,500	90,100	154,000	123,000	113,000	193,000
Household with debt (%)	22.2	21.8	25.9	34.8	32.8	46.1
Liabilities of indebted hh. (median)	7,900	7,800	9,300	11,400	10,500	16,300
Homeowners (%)	60,5	60,0	64,9	63,7	62,2	72,2
Homeown. with mortgage ^(c) (%)	24,4	24,0	27,9	15,3	15,0	16,8
N. of observations	9,767	9,055	712	17,188	14,602	2,586

Note: Data are weighted to represent the Italian population in the year of the survey. Real values, in euros of year 2004. ^(a) Per-adult equivalent consumption is computed using an adult-equivalent scale that attributes weight 1 to the household head, weight 0.8 to the other adults in the household and weight 0.5 to children. ^(b) Risky assets include investments in stocks and shares, corporate bonds, mutual funds and foreign assets. ^(c) The information on mortgages is not available in 1989 and 1991. Hence, for 1989-1991 we report the share of homeowners with positive financial liabilities.

Table 3 – The effect of the pension fund legislation on household savings

	Total saving-to-income		Saving less pension fund contributions-to-income	
	OLS	2SLS	OLS	2SLS
$D_{h,t}^c D_{h,t}^{post}$	0.011 (0.010)	-	0.015 (0.010)	-
$D_{h,t}^c$	-	0.077 (0.077)	-	0.056 (0.078)
N. observations	26,216	16,551	26,220	16,553
Adjusted R2	0.212	-	0.213	-
F-test of instruments (p-value)	-	8.40 (0.000)	-	8.26 (0.0000)
Over identification test (p-value)	-	14.714 (0.065)	-	14.647 (0.066)

Note: In addition to the variables reported, the right-hand-side control set includes household income, age, education, gender, marital status, household size, number of income recipients, a dummy for children, dummies for public and self-employment, number of years in the labor force, dummies for homeownership and debt and dummies for municipal size and for area of residence. The instruments used in 2SLS are 9 dummies for working in: agriculture; manufacturing; construction; trade; transport and communication; real estate and renting services and other professional or business activities; general government and defense; and, education or health and other private services. From the sample, we dropped those households in the top and bottom 1 percent of the savings distribution. Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4 – The effect of the pension fund legislation on non-retirement wealth

Dummy variables	Liquid fin. assets		Real assets		Debt	
	OLS	2SLS	OLS	2SLS	OLS	2SLS
$D_{h,t}^c D_{h,t}^{post}$	-0.106*** (0.035)	-	0.113*** (0.041)	-	0.052* (0.030)	-
$D_{h,t}^c$	-	-0.396* (0.214)	-	0.216 (0.285)	-	0.124** (0.062)
N. observations	21,657	14,503	24,045	15,081	8,055	5,068
Adjusted R2	0.103	-	0.563	-	0.145	-
F-test of instr. (p-value)	-	7.29 (0.000)	-	6.92 (0.000)	-	3.79 (0.000)
Over identific. test (p-value)	-	10.032 (0.263)	-	49.957 (0.000)	-	11.173 (0.192)

Note: Liquid financial assets include only bank accounts and Italian government bonds and bills. The left-hand side variables are in 100,000 of euros. From the sample, for the regressions in the first two columns, we dropped those households with less than 1000 euros in liquid assets (bottom 10 percent of the distribution of the left-hand-side variable); for the regressions in the third and fourth column, we dropped those households with zero real assets (bottom 1 percent of distribution) and those with more than 500,000 euros (top 5 percent); for the regressions in the last two columns we dropped those with no liabilities (70 percent of the sample). See note to Table 3 for a list of the right-hand-side variables. Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5 – The propensity to contribute to pension funds: a comparison across different groups of workers

Dummy variables	“Young” vs. “old”	“Mid-aged” vs. “old”	Public vs. private employees	Public vs. private employees	Self-empl. vs. private employees	Self-empl. vs. private employees
$D_{h,t}^g$	-0.068*** (0.018)	-0.013 (0.008)	-0.033*** (0.006)	-0.010 (0.008)	-0.001 (0.007)	0.078** (0.010)
$D_{h,t}^{post} D_{h,t}^g$				-0.017* (0.009)		-0.058*** (0.007)
$D_{h,t}^{post}$				0.049*** (0.006)		0.065*** (0.007)
N. obs.	7,268	16,345	14,002	21,215	12,425	19,451
Pseudo R2	0.1082	0.1037	0.1191	0.1346	0.1039	0.1185

Note: The estimates are based on probit regressions. The table reports changes in the probability of holding a pension fund for a discrete change in the dummy variables. See Note to Table 3 for a list and description of the right-hand-side variables. Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6 – Financial education and propensity to contribute to pension funds

Dummy variables	“Young” vs. “old”	“Mid-aged” vs. “old”	Public vs. private employees	Self-empl. vs. private employees
$D_{h,t}^g$	-0.085*** (0.016)	-0.014* (0.008)	-0.020** (0.007)	0.013** (0.008)
$D_{h,t}^g D_{h,t}^{fin.ed.}$	0.139*** (0.050)	0.017 (0.013)	-0.034*** (0.010)	-0.044*** (0.012)
$D_{h,t}^{fin.ed.}$	0.032** (0.017)	0.011 (0.014)	0.042*** (0.016)	0.045*** (0.015)
N. observations	7,268	16,345	14,002	12,425
Pseudo R2	0.1360	0.1295	0.1450	0.1360

Note: The estimates are based on probit regressions. The table reports changes in the probability of holding a pension fund for a discrete change in the dummy variables. $D_{h,t}^{fin.ed.}$ is a dummy that takes on value 1 if the household head has at least a high school diploma and hold either stocks, corporate bonds or mutual funds, in addition to a bank account. In addition to the variables whose coefficients are reported in the table, we include the same controls of the regressions reported in Table 3.

Table 7 – The effect of the pension fund legislation on the saving behavior of public sector employees and of the self employed

		Public vs. private employees		Self-employed vs. private employees		“Young” and “mid-aged” vs. “old” “Young” “Mid-aged”	
		OLS	2SLS	OLS	2SLS	2SLS	2SLS
Saving rate	$D_{h,t}^c D_{h,t}^g D_{h,t}^{post}$	0.033 (0.024)		-0.049 (0.024)**			
	$D_{h,t}^c D_{h,t}^g$		-0.086 (0.064)		-0.110 (0.067)*	0.090 (0.156)	0.127 (0.079)
	N. obs	20,774	13,609	18,835	11,893	7,005	15,739
	Adj. R2	0.216		0.214			
	Over-id. test (p-value)		15.990 (0.0252)		25.089 (0.0683)	12.093 (0.7376)	25.076 (0.0685)
Liquid fin. assets	$D_{h,t}^c D_{h,t}^g D_{h,t}^{post}$	0.066 (0.058)		0.056 (0.084)			
	$D_{h,t}^c D_{h,t}^g$		0.113 (0.263)		0.440 (0.328)	0.146 (0.257)	0.097 (0.235)
	N. obs	17,066	11,795	15,377	10,279	6,292	13,834
	Adj. R2	0.168		0.109			
	Over-id. test (p-value)		8.423 (0.2968)		23.526 (0.1004)	21.126 (0.1737)	27.962 (0.0320)
Real assets	$D_{h,t}^c D_{h,t}^g D_{h,t}^{post}$	-0.158 (0.094)		-0.056 (0.105)			
	$D_{h,t}^c D_{h,t}^g$		-0.188 (0.235)		0.030 (0.273)	-1.954 (0.500)***	-0.990 (0.293)***
	N. obs	19,275	12562	17,157	10760	6,364	14,348
	Adj. R2	0.596		0.564			
	Over-id. test (p-value)		55.641 (0.0000)		92.618 (0.0000)	37.834 (0.0016)	62.828 (0.0000)
Debt	$D_{h,t}^c D_{h,t}^g D_{h,t}^{post}$	-0.076 (0.055)		0.091 (0.087)			
	$D_{h,t}^c D_{h,t}^g$		-0.156 (0.052)**		-0.055 (0.053)	-0.087 (0.138)	0.092 (0.071)
	N. obs	6,297	4,071	5,864	3,722	2,037	4,857
	Adj. R2	0.162		0.154			
	Over-id. test (p-value)		3.704 (0.8132)		25.307 (0.0646)	27.761 (0.0338)	16.587 (0.4128)

Note: The dummy $D_{h,t}^g$ takes on value 1 (0) if the household head is a public (private) employee in the regressions in the first and second column, if she is a self-employed (a private employee) in the third and fourth column, if she is a “young” (“old”) worker in the fifth column, and if she is a “middle-aged” (“old”) worker in the last column. The sample used in the first two columns excludes the self-employed; that in the third and fourth columns excludes public employees, that in the fifth column excludes “mid-aged” workers, and that in the last column excludes “young” workers. The right-hand-side control variables are the same as those used in the regressions reported in Table 3. The instruments used in 2SLS include the dummies for sector of employment used in the regressions of Table 3, plus a dummy that takes on value 1 if two or more household members invest in pension funds and the household head is a public employee (regression in the second column) or a self-employed (regression in the fourth column). For the regressions in the fourth and in the last two columns, as instruments we use also the interaction between the sector dummies and $D_{h,t}^g$. Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.