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Tax incentives and household investment in complementary pension insurance: some recent evidence from the Italian experience

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Abstract

We show, by a simple difference-in-difference methodology that, contrary to prior research, robustly raising the deductibility limit associated to pension fund holdings in Italy did not succeed in boosting households' contributions to this form of savings. Some other empirical finding also suggest that this policy measure may have not even increased the average amount of first time contributors to such funds. In view of the specific features of the Italian market for complementary insurance (relatively young and less developed), these empirical results might be of interest to policymakers acting in countries with similar features (for instance, some of the more recent EU members).

JEL Classification: H31, D12

Keywords: Pension funds, fiscal incentives, difference-in-difference.

1. Introduction

During the last thirty years, the issue of retirement savings has become more and more important in the agenda of governments across industrialized countries, as public pension systems have progressively fallen short of providing adequate retirement insurance, also in view of increased longevity

The objective of stimulating private retirement savings has been pursued by governments by means of two set of measures. First, there have been registered efforts devoted to create an institutional environment favourable to private retirement savings, such as the introduction of more conservative asset management rules for private funded pension schemes.

Second, economic incentives aimed at increasing the convenience of retirement savings with respect to ordinary savings have been introduced. As underlined by Yoo and de Serres (2004), for a large number of OECD countries these policies are very

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relevant for public finances. According to their estimates, the present net value of revenues lost by governments as a consequence of fiscal incentive to private retirement savings can reach up to the 40 per cent of total contributions to these tax-favoured plans, and most OECD countries incur into a cost corresponding to more than 10 per cent of the overall sums saved by individuals.

In year 2000, the budgetary costs of these measures, computed with an accrued criterion, has been larger than 1 per cent of GDP for a high number of OECD countries. The main economic arguments which justify the loss of revenues implied by these policies, as summarized by Hubbard and Skinner (1996), originate from the existence of market and individual failures: without an appropriate intervention, the stock of capital is generally lower than its optimal social value; moreover, the constitution of an adequate pension can reduce future government's expenditure for impoverished elderly; lastly, families tend to be "impatient", i.e. to over-consume in the present with respect to what would be done by a really rational agent. On the other hand, this kind of behaviour could also be imputed to some form of hyperbolic discounting, as was made clear by Laibson (1997).

The economic literature in the field has therefore reached a wide consensus as regards the need of increasing family private savings of real world economies, but there is no consensus on the fact that fiscal incentives are really effective in pursing the objective of bringing a remedy to all the aforementioned market imperfections.

Indeed, if one considers the issue from a theoretical point of view, within the traditional life-cycle theory a fiscal incentive can be assimilated to an increase in the return of savings, originating two opposite effects: a substitution effects which increases saving, and an income effect which reduces it. In general, the final effect cannot be established a priori without specifying consumer preferences. Moreover, the empirical analysis developed within this framework has not reached a clear answer over the sign of the relationship between the interest rate and savings.

The failure of the traditional theory in explaining real-world saving behaviour has led many economists to consider the issue within the framework of behavioural economics (Thaler 1994, Busana Banterle 2002), where the hypothesis of full rationality is removed. Under this perspective, fiscal incentives to retirement saving plans are fully justified on the grounds that individuals respond positively to public

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policies aimed at reducing their myopia and to enhance their self-control for a rational temporal distribution of their lifetime resources.

Aside from these recent theoretical developments, the debate over the effectiveness of fiscal incentives to retirement savings has remained mainly an empirical one and the focus of applied research has been that of assessing the effectiveness of specific incentives introduced across industrialized countries. The issue of their effectiveness can be considered under different perspectives; first of all, it is relevant to establish if these incentives are effective in stimulating the participation and the accumulation of wealth into tax favoured private funded pension scheme. In fact, to the extent that wealth is redressed toward more illiquid assets, improving on the intertemporal distribution of lifetime individual resources, these policies can be regarded as successful from a microeconomic point of view.

This is, however, not enough to prove that these policies are effective in obtaining the more ambitious macroeconomic objectives of increasing overall family private savings and aggregate national savings. Indeed, the accumulation of wealth in tax favoured plans may have been entirely financed by a reduction in the stock of other financial and real assets.

Lastly, some authors have underlined that even if these measures turned out to be effective in stimulating family private savings, this would not necessarily imply an increase in national aggregate savings, for these policies are costly for the public budget and thus reduce public savings.

The aim of this paper is an explorative analysis, by using Italian micro-data, of the impact of a fiscal measure designed to spur households' investment in supplemental pension insurance, i.e. retirement funds owned by individuals in addition to those for which participation is made compulsory by law (public or private).

Italian complementary pension legislation has had a long and fairly complex history. The last few years, starting from the beginning of the 90's, witnessed a comprehensive reform of social security, induced by the lack of macroeconomic sustainability of the old welfare system.

A key element in this reformation process has been the tax treatment of pension funds. Under that respect new guidelines allowing for the deduction of premiums paid by workers from their gross income were introduced, replacing some older regulation dating back to 1993. As in the case of life insurance products, a deduction limit of about 1291 euros (or 2 percent of the overall yearly wage) was introduced for pension funds, but it was made clear that this limit might be increased

for policy purposes. An important increase of that limit, up to about 5000 euros (or 12% or income), has been introduced by a new decree, n. 47, in 2000, coming into effect as of January 1st, 2001.

We believe that this large modification in the tax treatment of private pension contributions, which has brought the deductibility options more in line with those of other large European markets (approximately as in Denmark, Germany and United Kingdom, for instance) constitutes a sort of natural experiment, whose effect we intend to evaluate in the next few paragraphs. The new fiscal treatment of premiums made pension funds relatively more convenient with respect to competing saving instruments, and did so to quite a large extent. This is why we would like to understand whether the intended goal of this measure was achieved, in the sense of succeeding in boosting private retirement savings. Our findings seem to indicate that this was not the case; for some reasons, yet to be investigated, investors did not seem to be particularly reactive to that policy measure. Our effort will constitute one of the few attempts to explore the working of the Italian market for complementary pension funds, and might be of some relevance under various respects. First and foremost, they will shed some light onto the mechanisms at work in a relatively young and less developed market for complementary pension products, compared to the more mature markets in otherwise similar countries in the European Union. Second, the policy change is quite robust and unprecedented in Italy, which should turn it into a sort of natural experiment. Third, unlike in some previous empirical research, data from the Bank of Italy Survey on Households' Income and Wealth will allow us to track the behaviour of current or prospective investors over a time horizon which is not too short (two years) to allow the effects to become apparent.

The remainder of this work is organized as follows: section 2 contains a review of empirical contributions to this research field. Section 3 will present data used for the analysis, with some descriptive statistics. Section 4 illustrates the results of a difference in difference methodology applied to complementary retirement savings. Section 5 wraps up, with some final comments.

2. Fiscal policy measures and retirement savings: some empirical results.

Even though many experiences of fiscal policies favouring retirement savings worldwide have actually been carried out, the empirical analysis presents some difficulties that could be mainly attributed to the inappropriateness of the available

statistical evidence, which also motivates the lack of consensus among applied economists and econometricians.

The main problem, that is common to almost all policy evaluation studies, originates from the fact that, by definition, family savings (in a given country) induced by a fiscal incentive is obtained as a difference between family savings when the fiscal incentive is introduced, minus the amount of savings that would have resulted (in the same country) in the absence of fiscal incentives, at the same date. Now, this difference involves two quantities, of which only one can be observed, the other being only identifiable by imposing some structure to the data, a procedure that is generally implemented on the basis of non-testable a priori beliefs. Thus, the main issue of the empirical analysis has been that of introducing reasonable hypotheses allowing for the correct identification of the aforementioned difference.

The main difficulty lies in the fact that, when estimating the effect of the policy, one has to define a control group that differs from the treatment group only by the fact that it has not received the treatment (the fiscal incentive). In fact, what is generally available is the outcome of individuals who chose to participate in private retirement saving programs and that of individuals who have chosen not to participate. Many authors have stressed that these two groups are characterized by different tastes for saving, possibly implying an overestimate of the effect associated to the policy.

With regard to USA, the empirical analysis has focussed over the effectiveness of 401(k) and Individual Retirement Accounts (IRAs), that are saving plans where contributions and investment earnings are subject to tax exemptions, while withdrawals are subject to taxation. Poterba, Venti and Wise (1996) use three different empirical strategies to assess the effectiveness of these plans: a within-group comparison of savings made by the same set of families at different dates; a between-group comparison of savings of different groups of family at the same date; a between-group comparison of savings made by different cohorts of families. Their analysis concludes that a large part of contributions to these two tax-favoured plans represents additional savings and not only a substitution for other financial and real assets owned by families.

At the opposite, Engen, Gale and Scholtz (1996) underline that there are many confounding factors that determine an overstatement of the impact of these plans (IRAs, 401(k) and Keogh plans); on the basis of their estimates, these tax-favoured saving programs had no significant impact on private savings, although they find a strong effect of such plans upon the allocation of saving and wealth.

Attanasio and DeLeire (2002) find that families who begin to participate in IRAs do not exhibit, in the short term, a consumption pattern which is unambiguously different from that of families that already participated in the market (it is, however, under some specification of the model used). Therefore, they conclude that IRAs do not generate additional private saving, resulting in a mere reshuffling of existing assets.

Attanasio, Banks and Wakefield (2004) have recently examined the same empirical issue for USA IRAs as well as for the tax-favoured retirement saving plans TESSAs (Tax Exempt Special Savings Accounts) and ISAs (Individual Savings Accounts), introduced in the United Kingdom. These last two schemes differ from IRAs in the fact that they guarantee fiscal exemptions on accrued income and capital gains as well as on withdrawals, but not on contributions coming from net income.

As regards IRAs, the authors find that consumption dynamics of new contributors do not significantly differ from that of continuing contributors and conclude that the plan is quite ineffective in generating new private savings. As regards UK, the authors reach the same conclusion: the introduction of TESSAs and ISAs has not brought about a clear increase of net private savings, but rather a reshuffling of existing financial and real assets. All in all, they conclude that "only relatively small fractions of the funds going into tax-advantaged savings vehicles can be considered to be 'new' saving" and that those plans are in any case very costly to the public budget. However, we must stress that the empirical results are based on a very short term kind of behaviour, and the authors themselves recognize that their evidence "is limited in its scope by the nature of the data and policy variation available to researchers".

Disney, Emmerson and Wakefield (2007) consider the effectiveness of the Stakeholder Pension, a retirement saving vehicle recently introduced in the UK, which guarantees tax reliefs proportional to contributions and where returns accruing to the plan are tax exempt, while withdrawals are subject to taxation. The authors, by applying a difference in differences methodology, conclude that this plan is effective in increasing aggregate private retirement savings, but they do not face the wider question of establishing if this plan affects aggregate private savings.

Corneo, Keese and Schroder (2008) analyse the effectiveness of the Riester scheme, a recently introduced plan that favours private retirement saving in Germany through allowances and tax reliefs. Once again, the authors do not reach a clear-cut conclusion, but on the basis of their results it is not possible to exclude that these

plans are ineffective in increasing the probability to participate and in increasing the propensity to savings.

A different conclusion has been reached by Paiella and Tiseno (2009), who have considered the effectiveness of the introduction of tax incentives to private retirement savings in Italy. The authors, employing a difference in differences approach, find that these policies have been effective in generating a substantial substitution of non tax-favoured non-retirement wealth for tax-favoured pension funds, but have been ineffective in increasing private family savings.

To sum up, we might argue that the only widely accepted empirical evidence is that tax incentives may indeed be effective in favouring the participation and the amount of contributions to retirement saving plans. On the opposite, no consensus has been reached concerning the effect of tax incentives on private aggregate savings as well on the effects of these incentives on aggregate national savings in the long run. However, this last issue has been less analyzed in the empirical literature, due to the high level of uncertainty involved in the calculations of the long run effects on public savings associated to a tax expenditure, especially if one incorporates in the analysis the behavioural responses of the private sector, and due to limitations in data.

When reviewing the empirical findings, it is also important to underline that the tax-favoured plans examined in this literature have different structures which make them not totally comparable, so that conclusions drawn cannot be generalized. The scope of findings is also limited by the fact that many authors have shown that the underlying institutional context strongly conditions the outcome of these policies, implying that those policies that have proven to be successful in a given country may not be easily exportable to other countries. In what follows we will somehow (with all necessary caveats) challenge the consensus about the effectiveness of fiscal incentives in promoting retirement funds, by analyzing data from a specific policy measure which should have affected the choice of consumers on the Italian market.

3. The Italian case: a preliminary look at data

The data we use come from the Bank of Italy Survey on Household Income and Wealth (SHIW, in the sequel), an extremely comprehensive and detailed survey run every two years, containing information about households (around 8000 for each wave) and individuals' (about 20000) income, wealth, savings, expenditures and

socio-demographic features[1]. For reasons made clear below, we just used the 2000 and 2002 waves of the survey for the econometric analysis, but waves from 1995 to 2006 for the descriptive analysis.

It is worth noticing that our survey actually refers to "private/supplementary pensions, annuities and other forms of insurance-based saving"; as these forms of insurance all share the same fiscal treatment, we will keep on simply referring to them as complementary retirement funds, although they are a mixture of some different saving instruments.

Only household level data will be used, as the survey does not always distinguish among the various contributors to private pension schemes making it difficult, if not impossible, to attribute the various payments to the proper family members, and because many variables of interest are only available at the household level. Moreover, in the sequel we will focus upon households possessing just one private retirement insurance, since in the case of multiple insurance we may not distinguish among the various contributions, which also makes it hard to assign the corresponding household to the treatment or the control group, as will be made clearer in the sequel. All economic variables have been expressed in real terms, by suitably deflating them with a chain-linked GDP deflator, based at the year 2000. Observations have also been weighted by the weights provided in the surveys.

In table 1 we have summarized, in terms of sample means, some socio-demographic and economic features of all households taking part in the surveys, and of those households contributing to private pension plans, for the pre-treatment and the post-treatment periods, namely the 1995, 1998 and 2000 waves for the former, and 2002, 2004 and 2006 for the latter. Comparing those sets of descriptive variables will help us to qualitatively assess the differences between contributors and non contributors, in terms of socio-economic variables, and their dynamics.

In particular, odd columns from (1) to (6) contain the values for some variables related to all households in the survey, for the pre-treatment waves (1995, 1998, 2000), whereas even columns contain those values for households contributing to exactly one private pension. Columns (7) to (12) contain exactly the same information, but for the post-treatment period (2002, 2004 and 2006 waves of the survey), for the two groups.

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[1] Cfr. Brandolini and Cannari (1994) for an extensive and methodological description of the Bank of Italy Survey.

Table 1

A cursory look at columns 1-3-5 yields some interesting insights: first of all, we notice a good degree of homogeneity of households across the pre-treatment periods, in terms of demographics and socio-cultural variables. As for the more economic variables we may notice, over the period 1995-2000, an increase in net wealth and, to a lesser extent, in income.

The picture of the representative household we get from columns 2-4-6, related to contributors to one pension fund is fairly different. In particular, we have younger and more educated heads of households, more often residing in the north. That education, grossly speaking, is a key issue in spreading the use of supplemental retirement funds has been made clear, for example, by Busana Banterle (2002). In terms of economic variables, contributors are far better off than the average in the whole sample.

Columns (7) to (12) describe the same features for households in the post-treatment period (2002–2006), again for the whole sample and for the subsample of contributors to one pension fund. As for socio-demographics, we observe a certain degree of homogeneity with respect to the pre-reform period, except for a slight increase in (years of) education.

The same differences we noticed between the whole sample and the sub-sample also hold in the post-reform period.

In particular, the head of household is, on average, ten years younger than his counterpart in the whole sample, and possesses a higher level of education. Moreover, 65% of those households reside in northern Italy.

Looking more closely at economic variables, we find again that the participants to private pension funds are on average richer individuals, with a larger overall net wealth.

Table 2 here

To get a more complete picture, we present in table 2 the percentages of households, over the pre and post-treatment horizons, contributing to at least one pension fund and *exactly* to one pension fund, and the average amounts contributed by those households possessing just one complementary pension plan. It seems evident that,

although an increase in average contribution seems to have occurred, no clear cut change shows up in 2002, with respect to 2000.

Table 3 reports the results of pairwise comparison between mean average contributions of "first time" contributors, where by "first time" we mean people who did not contribute anything at *t-2,* while positively contributing at period *t.* We cannot be sure, of course, that those agents did not contribute anything in periods before *t-2,* and in period *t-1* (as the survey is conducted every two years).

Insert table 3 here

From a cursory inspection of table 3 we understand that the only significant difference is that between years 2000 and 2004, and not much because of an increase in 2004, but rather for a somehow lower average contribution in 2000.

4. A difference-in-difference analysis

A preliminary, and crucial step in performing a difference-in-differences analysis is the choice of a suitable treatment and a control group.

As we already mentioned, it should be the case that members of the control group are not influenced by the experiment (in our case, the increase in tax deductibility of pension savings, in 2001); this is so because we intend to evaluate the statistical significance of the difference:

$$(P_{ta} - P_{tb}) - (P_{ca} - P_{cb}) \qquad (1)$$

where P_{ta} and P_{tb} are payments for pension funds by members of the treatment group after and before treatment, and P_{ca} and P_{cb} are payments by members of the control group after and before treatment. If the increase in payments by the treatment group statistically exceeds that of the control group, all else equal, we will conclude that the treatment has been effective.

To identify the treatment and control group we might start from a very simplified and abstract representation of the decision problem of a household living for two periods,

having to allocate income or wealth in the first period over consumption and savings for retirement.

This simple optimization problem can be cast as:

$$\max{}_s U(c_1, c_2)$$

$$sub \ c_1 = w_1 - \alpha s \qquad\qquad s \leq L$$

$$c_1 = w_1 - \alpha L - s_1 \qquad s = L + s_1 > L$$

$$c_2 = w_2 + s(1+r)$$

where w_1 and w_2 are the first and second period endowments, r is the period interest rate, L is the deductibility limit for pension savings (therefore, s_1 is the share of savings exceeding the limit), and $\alpha(\leq 1)$ captures the fiscal benefit of this deductibility opportunity (in practice, devoting one unit of income to pension savings reduces consumption in the first period by α, which is less than one).

The household's choice can be represented graphically as in figure 1, illustrating a simple comparative static exercise, corresponding to a change in the limit from L_1 to L_2 (with $L_2 > L_1$), as in year 2000, where that limit was raised from about 1291 euros to 5165 euros (and from 2% to 12% of gross income). The presence of L in the budget constraint generates a kink in the budget line, corresponding to $c_1 = w_1 - \alpha L$. The higher the limit, the higher the kink in the budget line.

It is quite evident from figure 1 that if a household buys less pension insurance than L_1, as for example at point A on indifference curve I_1, then raising the limit to L_2 should not bring about any change in its optimal choice, all else equal. On the other hand, if the household's choice were represented by point B on the graph, corresponding to a purchase of insurance larger than L_1, the change in policy will tilt the budget line upwards, and allow the household to move up to a possibly higher indifference curve, I_3, to a new optimal point C. Supposing that (aggregate) consumption is a normal good, this will correspond to less consumption at period 1, and more pension savings.
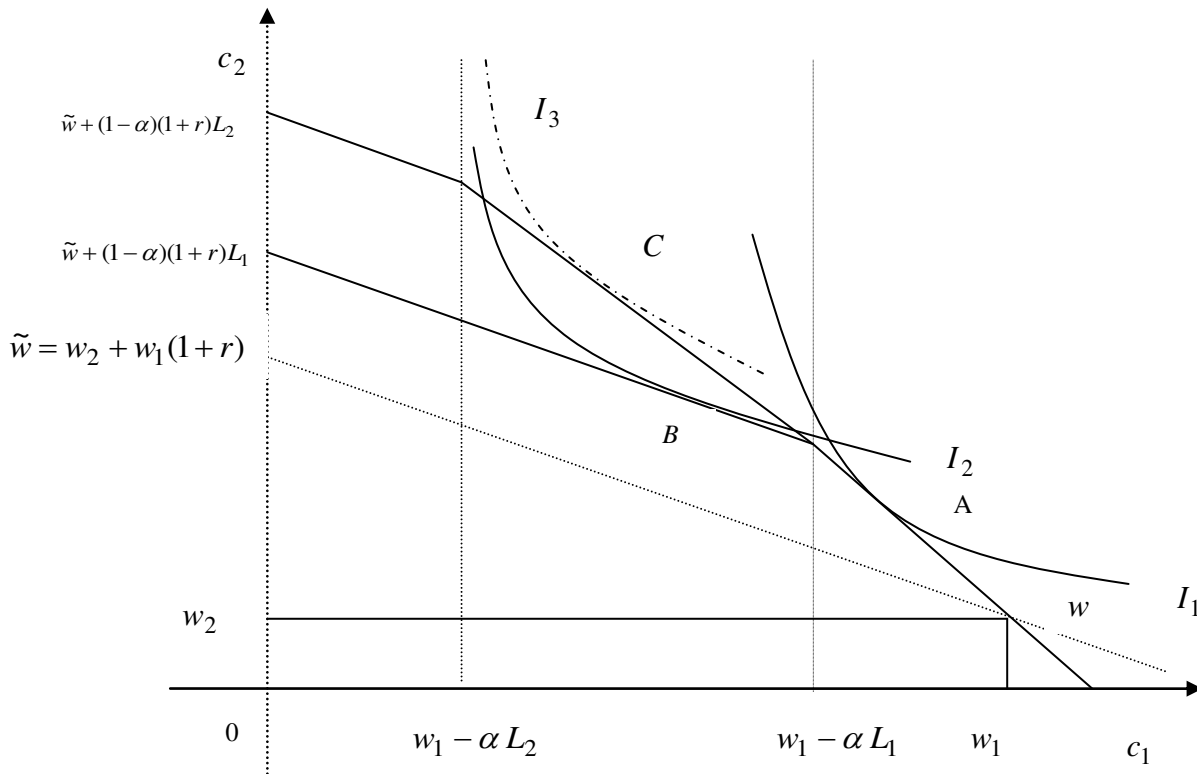
Figure 1. Effect of tax incentives on savings.

This simple exercise helps us select an appropriate treatment and control group for our empirical exercise. In particular, we will define a control group as that made up of those households spending less than 1291 euros on pension funds at year 2000 and less than 2% of gross income, and a treatment group as one made up of households spending more than that threshold, or being constrained by the 2% percent of income limit at year 2000. Although the response variable, the object of our analysis, is also used to affect agents to either group, we take care of the endogeneity issue by using expenditure on pension funds at *t-2*, in order to assign a given family to the control or to the treatment group. Even supposing that people who have spent more on pension funds in 2000 will be more inclined to spending in 2002, our empirical results will be unambiguous (i.e. they will hold a fortiori, if we are ready to assume a positive contemporaneous relationship between the classification variable and the dependent variable), as will be explained in the sequel.

However, in order for the methodology to properly work, we should make the two groups as homogeneous as possible; in other words, the "coeteris paribus" assumption must hold. For that to be the case, we have to take care of the following issues: 1) differences in the composition of the two groups, in terms of socio-demographic and economic variables; 2) aggregate macroeconomic shocks, which

might have had an impact on the overall level of spending on pension funds, as well as on other forms of savings; 3) features which are specific to members of the treatment as opposed to members of the control groups (i.e. a higher propensity to save, etc…).

The first issue will be dealt with by including appropriate control variables in the regression models, the second by including time specific dummies (or a "post" dummy variable, $D_{i,t}^{post}$, taking value one if the observation relates to the period after the measure has been introduced), while the third problem will be taken care of by inserting dummies specific to the treatment and the control groups ($D_{i,t}^{tr}$, taking value one if the observation belongs to the treatment group, zero otherwise). Key to the analysis will also be the "interacted" dummy variable $D_{i,t}^{tr}D_{i,t}^{post}$, which takes value one if the corresponding observation relates to the treatment group *and* to the post treatment period, and zero otherwise.

Therefore, the "difference in differences" model can be estimated by regressing the following equation:

$$y_{i,t} = a + \beta D_{i,t}^{tr} + \delta D_{i,t}^{post} + \gamma D_{i,t}^{tr}D_{i,t}^{post} + \alpha' X_{i,t} + \varepsilon_{i,t} \tag{2}$$

where the dependent variable is the amount paid for complementary pension funds by family i at time t, where $t = ante$ for all time periods up to year 2000, and $t = post$ for later time periods; $X_{i,t}$ is a vector of controls, which we believe might play a role in determining the amounts of insurance bought (in particular, gender, income, wealth, number of dependent workers, number of income earners, years of education, and geographic area). Coefficient β captures differences between the amounts paid by families belonging to the treatment and the control groups, while coefficient δ captures the effects of common shocks intervening between ex-ante and ex-post periods (recessions or booms, for example). As anticipated above, the most important coefficient in our regression, corresponding to the estimate of expression (1), is γ, the coefficient of the composite dummy variable $D^{tr}D^{post}$, yielding the effect of treatment after controlling for all other aggregate and idiosyncratic variables. As for the descriptive analysis, all quantities (except for the nominal threshold) have been deflated by a suitable deflator; this is however not crucial in the present set-up, where only quantities at years 2000 and 2002 are taken into consideration.

The results of the OLS estimates of equation (2) are contained in table 4. It is important to stress that a "general to specific" methodology has been applied to all regressions, and only the most parsimonious version of the model has been reported in the subsequent tables. Moreover, the same regressions were run in log-levels instead of levels, to account for heteroskedasticity; those regressions yielded similar results, but did not solve the heteroskedasticity issue (results not reported, but available on request). As the inclusion of income as a distinct regressor did not solve the problem either, Huber-White heteroskedasticity corrections for the variance-covariance matrix have been used (robust standard errors).

Insert Table 4

The coefficient δ's estimate is statistically significant, meaning that any change in yearly payments has been influenced by an aggregate common factor, over time. The γ coefficient is negative and also highly significant, suggesting the failure of the fiscal policy measure to boost pension fund savings.

We need some caution in interpreting this result, which appears at first a bit puzzling. Two remarks are in order. First, most important, our (negative) result would hold also in the presence of a correlation between the response variable and the variable used to classify individuals (in terms of treatment or control group). In fact, if such a problem were present in our dataset, it would positively bias the coefficient γ. Our result can therefore be looked at as an upper bound of the actual effect of the reform.

The negative sign might be possibly explained by looking at the composition of the control group, mainly formed by people with zero (retirement fund) investments in 2000, and with positive expenditure in 2002. Our estimated coefficient γ says that, on average, and conditional on the explanatory variables included in the regression, investments in retirement funds by people who were constrained by the previous fiscal regulations were substantially lower than those of people passing within two years from zero to a positive expenditure on pension funds.

From table 4 we also realize that some other factors played a role in determining the amount of insurance bought. In particular, we notice that income has a positive effect, whereas the dummy corresponding to the number of income earners has a negative and statistically significant coefficient. Wealth, as well as other variables (home ownership, status of dependent worker, number of family components) did not turn out to play a (statistically) significant role, and were dropped, by implementing a

14

general to specific methodology. In other words, our regression results report only coefficients' estimates for variables whose effect turned out to be statistically significant.

To check whether our results crucially depend on the composition of the sample (many zeros in the control group) we repeated the same analysis on the more restricted sample containing only people who have positively contributed both in 2000 and in 2002.

Despite the necessarily smaller size of the sample the results, reported in table 5, are in line with those previously discussed. Once again, agents who were constrained in 2000 have contributed less than the others, one year after the new regulation came in place.

Insert table 5 here

Our results cannot constitute compelling evidence, given the nature of the sample. We cannot, in fact, check whether immediately after the introduction of the new regulation there has been an increase in retirement fund contribution, as the sample does not contain data for 2001. However, it seems clear that the policy measure did not have a (moderately) lasting impact on such investment, if it did have such an impact at all.

It would be tempting to run a difference-in-differences logit or tobit analysis, to understand whether and up to what extent the new fiscal measures boosted fresh participation in the market. To do that, however, we would need identifying the treatment and control group in a substantially different way from the one we used, (in fact, both the treatment and control group should contain some individuals with zero expenditure on pension funds at year 2000, which is not true in our case for the treatment group); however, we do believe that even a simple logit regression may provide some additional evidence as to effectiveness of the policy measure.

Table 6 contains the results of two separate logit regressions run on the 2000 and 2002 sample.

Insert table 6

Using the estimated coefficients we ran a simple experiment, consisting in assessing the probability of contributing to pension funds for, respectively, an average (with

respect to the continuous variables) individual, in four possible scenarios, defined by the job status (a=dependent or b=autonomous worker) and area of residence (1= north or 2= south). As is clear from a rapid inspection of table 7, in three cases out of four there has been a decrease in the probability of contributing to a complementary form of retirement saving, if anything. Even in the case where an increase has been recorded (dependent worker in the south), this is very modest.

Insert table 7 here

5. Final remarks

This paper has empirically analyzed the response of Italian households to an important fiscal policy change introduced in 2000 to boost investments in complementary pension plans. Using a simple difference-in-differences methodology we suggested that, contrary to our earlier expectations, a sizeable increase in the tax deductibility of retirement funds contributions did not lead to a substantial increase in such investments. We also suggested that such a measure did not augment the average contribution of new contributors. Some threshold effects might therefore called for to rationalize these results.

These findings are at odds with some of the previous literature contributions on this topic, which dealt with other countries' frameworks, both in Europe and elsewhere. They are not in contrast, however, with some recent results concerning the Italian market, which still lags behind most other countries in Europe, in term of size of the market and number of participants.

As enphasized in the introduction, we believe our results may be interesting under some respects. First, because they concern a relatively young and less developed market for complementary pension products, for which relatively little empirical evidence has been produced. Second, in view of the extent of the policy change and, third, because of the data set used to carry out the analysis. However, we are also convinced that new evidence, possibly based on even more detailed datasets, would be extremely welcome to get new and more robust evidence on this issue.

6. References

Attanasio, O., Banks, J., Wakefield, M. (2004). "Effectiveness of Tax Incentives to Boost (Retirement) Saving: Theoretical Motivation and Empirical Evidence", *IFS Working Paper*, n° 33.

Attanasio, O., DeLeire, T. (2002). "The Effect of Individual Retirement Accounts on Household Consumption and National Savings", *The Economic Journal*, vol. 112, pp. 504-538.

Auerbach, A., Slemrod, J. (1997). "The economic effects of the Tax Reform Act of 1986", *Journal of Economic Literature*, vol. 35, 2, pp. 589-632.

Brandolini, A., Cannari, L. (1994). "Methodological appendix: The Bank of Italy's Survey of Household Income and Wealth", in Ando, A., L. Guiso and I. Visco, eds., *Saving and the Accumulation of Wealth: Essays on Italian Household and Government Saving Behaviour*, Cambridge University Press, Cambridge, U.K..

Busana Banterle, C. (2002). "Incentives to Contributing to Supplementary Pension Funds: Going Beyond Tax Incentives", *Geneva Papers On Risk And Insurance: Issues And Practice,* vol. 27, 4, pp. 555-570.

Cesari, R., Grande, G. and Panetta, F. (2007). "La previdenza complementare in Italia: caratteristiche, sviluppo e opportunità per i lavoratori, Bank of Italy", *Questioni di Economia e Finanza*, Bank of Italy Occasional Papers, n. 8.

Corneo, G., Keese M., Schroder, C. (2008). "Can Government Boost Voluntary Retirement Savings via Tax Incentives and Subsidies? A Germany Case Study for Low-Income Households", *CAU Economics Working Papers,* n° 18.

Disney, R., Emmerson, C., Wakefield, M. (2007). "Tax Reform and Retirement Saving Incentives: Evidence from the Introduction of Stakeholder Pensions in the UK", *IFS Working Paper*, n° 19.

Engen, E.M., Gale, W.G., Scholz, J.K. (1996). "The Illusory Effect of Saving Incentives on Savings", *Journal of Economic Perspective*, vol. 10, 4, pp.113-118.

Guerra, M.C. (2001). "La previdenza complementare deve essere incentivata fiscalmente?", *CAPP Working Papers, n°2..*

Hubbard, R.G., Skinner, J.S. (1996). "Assessing the Effectiveness of Saving Incentives", *Journal of Economic Perspective*, vol. 10, 4, pp.73-90.

Laibson, D., (1997). "Golden Eggs and Hyperbolic Discounting," *The Quarterly Journal of Economics*, vol. 112, 2, pp. 443-77.

Messori, M., (2006). (ed.), *La previdenza complementare in Italia*, Il Mulino, Bologna.

Paiella, M., Tiseno, A. (2009). "Saving for Retirement and Retirement Investment Choices", *DES Discussion Papers*, n°1.

Poterba, J.M., Venti, S.F., Wise, D.A. (1996). "How Retirement Saving Programs Increase Savings", *Journal of Economic Perspective*, vol. 10, 4, pp.91-112.

Thaler, R.H. (1994). "Psychology and Savings Policies", *American Economic Review*, vol. 84, 2, pp.186-192.

Ventura, L., (2007). "The Italian insurance sector between macro and micro facts: salient features, recent trends, and an econometric analysis." In: J. David Cummins and Bertrand Venard eds. *Handbook of International Insurance. Between Global Dynamics and Local Contingencies*. (pp. 347-399). Springer Science, New York.

Yoo, K.Y., de Serres, A. (2004). "Tax Treatment of Private Pension Savings in OECD Countries and the Net Tax Cost Per Unit of Contribution to Tax-Favoured Schemes", *OECD Economics Department Working Papers,* n° 406.

TABLE 1

Demographic, social and economic features of households (whole sample) in the pre and post reform period (mean values).
(monetary values are expressed as yearly euros at constant prices of year 2000)

	1995		1998		2000		2002		2004		2006	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	AF	CPH	AF	CPH	AF	CPH	AF	CPH	AF	CPH	AF	CPH
Age	54	48	54	48	54	48	57	48	57	48	57	48
N. components.	3	3	3	3	3	3	3	3	3	3	3	3
N. earners	2	2	2	2	2	2	2	2	2	2	2	2
Education	8	10	8	11	8	11	9	11	9	12	9	12
% north	44.3	71.2	44.2	61.4	44.2	64.2	45.9	65.4	45.4	56.2	47.8	66.2
% center	20.4	19.0	20.3	27.2	20.3	26.3	20.8	27.2	21.7	30.5	20.3	20.1
% south & isles	35.5	9.7	35.5	11.4	35.5	9.5	33.3	7.4	32.9	13.3	31.9	13.7
% life insurance	22.0	25.3	21.0	28.4	21.0	37.4	17.0	29.1	12.5	23.0	13.7	31.4
% loss insurance	28.0	52.2	20.0	44.2	20.0	39.4	16.2	37.8	20.2	37.6	20	42.0
% health insurance	11.0	24.4	8.9	22.6	8.9	24.1	6.6	17.0	6.3	19.2	5.5	16.2
Net wealth	161740	255921	164605	240132	172457	236907	169070	252471	189389	289521	214688	288476
% homeowners	63.9	72.4	67.2	72.8	69.1	75.4	69.2	78.3	69.7	74.5	70.0	75.2
Annual net income	25864	37788	27099	37084	27179	37073	26264	38874	26454	38987	27147	37707
Consumption	19733	26811	19340	26182	19603	25947	19009	27115	19832	27586	20129	26770
Savings	6131	10977	7759	10902	7577	11578	7685	11709	6622	11401	7072	10936

Note: This table illustrates the main features, along the demographic, social and economic dimension, of all families (AF) and complementary pension holding (CPH) families

TABLE 2

Mean percentages of complementary pension funds holding before (panel A) and after (panel B) the 2000 reform, and mean annual contribution, for households holding just one such fund.
(monetary values are expressed as yearly euros at constant prices of year 2000)

(A)	1995	1998	2000
% households with complementary pensions	7.4	8.2	11.4
% households with ONE complementary pension	5.3	6.2	7.5
Amount of contribution of households in the second group	1273.47	1152.42	1157.82

(B)	2002	2004	2006
% households with complementary pensions	8.0	8.5	7.9
% households with ONE complementary pension	5.8	6.4	5.8
Amount of contribution of households in the second group	1185.79	1443.52	1306.45

TABLE 3

Test of differences between average "first" contributions.
(P-values with pooled variances in brackets)

	1998	2000	2002	2004
1998	-	0.342 (0.356)	0.749 (0.758)	0.185 (0.258)
2000	0.342 (0.356)	-	0.620 (0.600)	0.031 (0.022)
2002	0.749 (0.758)	0.620 (0.600)	-	0.129 (0.149)
2004	0.185 (0.258)	0.031 (0.022)	0.129 (0.149)	-

TABLE 4

Effects of the fiscal incentives of the 2000 reform on complementary pension savings

Variable	Estimate	Robust Standard Error	T-Statistic	Probability value
D^{tr}	1726.60	226.77	7.61	0.000
$D^{tr}D^{post}$	**-1908.20**	**262.24**	**-7.28**	**0.000**
D^{post}	972.44	124.83	7.79	0.000
No. of income earners	-120.65	63.47	-1.90	0.058
Income	.01	.004	2.89	0.004
Sample size	488			
R^2	0.61			

Note: the dependent variable is the contribution to complementary pension funds. D^{tr} is a dummy variable that is equal to 0 for individuals belonging to the treatment group and is equal to 1 otherwise, i.e. for individuals belonging to the control group. D^{post} is a dummy variable which is equal to 0 before the fiscal reform, i.e. in year 2000, and is equal to 1 after the fiscal reform, i.e. in year 2002.

TABLE 5

Effects of the fiscal incentives of the 2000 reform on complementary pension savings (sample restricted to individuals with positive savings in year 2000)

Variable	Estimate	Robust Standard Error	T-Statistic	Probability value
D^{tra}	1425.42	215.96	6.60	0.000
$D^{tr}D^{post}$	**-1293.24**	**263.18**	**-4.91**	**0.000**
D^{post}	346.28	166.91	2.07	0.039
Income	.01	.003	4.47	0.000
Sample size	236			
R^2	0.63			

Note: the dependent variable is the contribution to complementary pension funds. D^{tr} is a dummy variable that is equal to 0 for individuals belonging to the treatment group and is equal to 1 otherwise, i.e. for individuals belonging to the control group. D^{post} is a dummy variable which is equal to 0 before the fiscal reform, i.e. in year 2000, and is equal to 1 after the fiscal reform, i.e. in year 2002.

TABLE 6

Logit Analysis - Contributing to a complementary retirement plan

	YEAR 2000			
Variable	Estimate	Standard Error	T-Statistic	Probability value
Dependent worker	.1417044	.110664	1.28	0.200
Autonomous worker	.3279414	.1251776	2.62	0.009
North	.520865	.093532	5.57	0.000
South	-1.426975	.1650293	-8.65	0.000
No. of income earners	.270842	.0524089	5.17	0.000
Real Assets	.0260251	.015753	1.65	0.099
Financial Assets	.1845512	.0210681	8.76	0.000
Age	.0765421	.0216139	3.54	0.000
Squared Age	-.0011768	.0002206	-5.33	0.000
Income	.4107208	.0940333	4.37	0.000
Constant	-9.405405	.9136088	-10.29	0.000
Sample size	7958			
Pseudo R^2	0.22			

	YEAR 2002			
Variable	Estimate	Standard Error	T-Statistic	Probability value
Dependent worker	.5333665	.1324588	4.03	0.000
Autonomous worker	.4567655	.1477595	3.09	0.002
North	.0474776	.0990474	0.48	0.632
South	-1.784864	.1928181	-9.26	0.000
No. of income earners	.043372	.0620885	0.70	0.485
Real Assets	.0643519	.0209883	3.07	0.002
Financial Assets	.1490079	.0269811	5.52	0.000
Age	.1235908	.0279822	4.42	0.000
Squared Age	-.0015807	.000287	-5.51	0.000
Income	.5455361	.1055487	5.17	0.000
Constant	-12.06573	1.051003	-11.48	0.000
Sample size	7990			
Pseudo R^2	0.20			

Note: the dependent variable is a dummy variable which is equal to 1 if the individual contributes to a complementary retirement plan and is equal to 0 otherwise.

TABLE 7

Probabilities of contributing to supplemental retirement funds, before and after the reform

	North	South
Dependent	0.572319 (0.579509)	0.160229 (0.1807042)
Autonomous	0.61717 (0.5607378)	0.045499 (0.024656)

Note: probabilities are computed by the logistic model of table 6, at the mean value of all continuous variables (number of income earners, real assets, financial assets, income, age and age squared. Numbers out of the parentheses refer to probabilities computed at year 2000, i.e. before the fiscal reform, while the numbers in parentheses refer to probabilities computed at year 2002, i.e. after the fiscal reform.