

Distributional Implications of Tax Relief on Voluntary Private Pensions in Spain*

JOSÉ-IGNACIO ANTÓN†

†*Universidad de Salamanca*
(*janton@usal.es*)

Abstract

Using taxation statistics, this paper explores the distributional implications of tax relief on private pensions in Spain in 2002. For this purpose, the author suggests a decomposition of the Kakwani index and its generalisations that allows us to distinguish between the regressivity caused by targeting and that due to benefits allocation among recipients. This paper finds that these tax incentives are regressive – mainly for the latter reason – and have negative although small distributional effects. Finally, this work presents several proposals for reform of the current system and simulates their implications for equity.

I. Introduction

According to Agulnik and Le Grand (1998, p. 404), the public sector can support the provision of pension benefits in two ways. One involves direct public spending on state-provided pensions and comprises earnings-related and non-contributory old-age benefits. The other is the use of subsidies to

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encourage workers to contract supplementary private pensions. This second method of state intervention is part of so-called *voluntary welfare* (Barr, 1992, p. 743) and is the main object of analysis in this paper.

Since the publication of the well-known World Bank report *Averting the Old Age Crisis* in 1994, pension reform is in fashion. However, voluntary private schemes, which the World Bank called ‘third-pillar’ pensions, have received very little attention and most works have limited discussion on the advisability of totally or partially privatising earnings-related public systems. Most studies on tax support for third-pillar pensions have focused on its fiscal cost or its effects on national saving.¹

However, the distributional impact of tax relief on private pensions has been a much less frequent issue in the pension literature. There are only a few relevant works focused on Anglo-Saxon countries. Agulnik and Le Grand (1998) on the UK, Hughes (2001 and 2002) on Ireland and Burman et al. (2004), who studied the American case, are probably some of the more important studies on this topic. All of them found that tax incentives for private pensions are regressive.

The main aim of this paper is to analyse the distributional implications of tax relief for voluntary private pensions in Spain and, in addition, to explore alternative proposals. In Spain, these types of schemes have grown in a big way since the mid-1990s, thanks to tax deductions. Although there are several instruments of state support for supplementary pension schemes in Spain, this work is only concerned with tax relief related to personal income tax, the main source of financing of the Spanish public sector.

The relevance of this issue is clear for several reasons:

- As mentioned above, third-pillar pensions are probably the ‘missing piece’ in the debate on pension reform. Many developed and developing countries have promoted these kinds of private pension schemes without taking into account their distributional implications. Spanish policy-makers – especially since 1995 – have promoted these sorts of pensions without paying enough attention to their implications for inequality and public finances. If we agree that progressivity of social policy is important, it is relevant to study this issue.
- Tax relief involves revenue losses for the state and, hence, a fiscal cost. Economists usually refer to these costs as tax expenditures. In Anglo-Saxon countries, the estimated cost of tax relief on private pensions amounted to between 1.1 and 2 per cent of GDP in 2000 (Hughes and Sinfield, 2004, p. 171). According to Yoo and De Serres (2004, p. 38), in

¹See, for example, Dilnot and Johnson (1993) and Yoo and De Serres (2004) on the cost of tax incentives and Engen, Gale and Scholz (1996), Poterba, Venti and Wise (1996) and López Murphy and Musalem (2004) on the effects of voluntary pension funds on national saving.

Spain, where these kinds of schemes were far less widespread, the cost was around 0.22 per cent of GDP in the same year. Hence, as is common with other public programmes, it seems important to evaluate the distributional impact of tax relief.

- Although contributions to private pensions have risen considerably since the last decade, there has been particularly little empirical research on this issue in Spain. In contrast to other countries, there is no specific work on this topic and only some more general works on social spending or pensions systems refer to this issue. For example, Calero (2002), in his general study on the distributional effects of public expenditure, used aggregate data sources he imputed – with some assumptions – to the households surveyed in the second wave of the European Community Household Panel. He used data from 1995, a period when voluntary private pensions were in their first stages of development. The work of Serrano, García and Bravo (2004), which focused on the mandatory public system, pointed out that tax relief was likely to be regressive. They used the same sort of data as Calero (2002) but corresponding to 2002. This paper is an attempt to go into tax relief on private pensions in Spain, offering a consistent picture of the cost and distributional effects of these subsidies using a much more detailed database than previous works.
- As is exposed in the next section, arguments for tax-favouring voluntary private pensions are not very convincing, especially regarding myopia and moral hazard and the impact of this policy on national saving.

The main hypothesis of this paper is that tax incentives for voluntary pensions make income distribution more unequal because of both the reduced participation in pension plans of low-income people and the specific design of tax expenditures. In order to explore the impact of tax incentives on equity, the paper relies on 2002 micro-data from tax sources. The methodology followed comprises two approaches. The first one consists of an analysis of the distributional incidence of the tax expenditures and involves the calculation of the usual measures of distributional incidence and redistribution. In addition, the paper presents a decomposition of the redistributive effect of the tax expenditures into a component related to targeting and another one that deals with the allocation of benefits. This second part goes a step further than previous papers, which found that tax expenditures on private pensions were clearly regressive. Finally, the paper simulates some alternatives to current policy through accounting micro-simulations.

In order to achieve the proposed objectives, the rest of the paper is organised in five sections. The next one deals with theoretical efficiency

reasons for tax relief on private pensions, offers a general perspective of these tax incentives in Spain and points out the main reasons for thinking that this policy is regressive in that country. The database used in the analysis is described in detail in Section III, while Section IV presents the methodology used to calculate the cost of the tax incentives and to test the hypothesis of regressivity. Section V presents our results and Section VI discusses possible alternatives to the current policy and their distributional implications. Section VII concludes and sums up the main findings of this paper.

II. A framework to analyse tax relief on third-pillar pensions in Spain

1. Examining theoretical efficiency reasons for tax relief

As mentioned above, the main aim of the paper is to measure and discuss the distributional effects of tax relief on supplementary pensions in Spain. However, it is appropriate to provide a brief survey of the main efficiency reasons – and criticisms of them – presented in the literature for this sort of state intervention. The most frequently cited arguments are the following:

- *Boosting national saving.* Voluntary private pensions may boost national saving, which constitutes the main argument in favour of these types of tax incentives. Some authors have pointed out that tax-preferred funded pensions allow a country to raise its saving rate (World Bank, 1994; López García, 2000). However, others have suggested that voluntary pension saving can essentially substitute other types of saving, which can mean that the net impact of tax incentives on saving is negligible (Engen and Gale, 1997; Bosworth and Burtless, 2004). Empirics are largely inconclusive. For instance, the impact on saving of tax relief to personal funded pensions in the US is far from clear: while Engen, Gale and Scholz (1996) find that the effects were negligible, the work of Poterba, Venti and Wise (1996) suggests the opposite. A recent World Bank cross-country study (López Murphy and Musalem, 2004) supports the thesis that voluntary pension saving substitutes other types of saving and does not raise the national saving rate. Moreover, the current position of the World Bank on this issue is that these types of pensions may not affect aggregate saving (World Bank, 2005). In short, the impact of voluntary pensions on saving is not clear.
- *Funding as a solution to demographic risks.* Many works assume that funded pensions are a solution to problems derived from population ageing, i.e. the financial problems faced by pay-as-you-go systems

because of the increase in old-dependency ratios (World Bank, 1994; Börsch-Supan and Lührmann, 2003; Holzmann, 2000). From this point of view, tax relief on private pensions may be understood as a way of reinforcing the sustainability of pension systems. Nevertheless, this issue is a subject of discussion: many authors state that private pensions are not immune to demographic ageing, mainly because the relevant point regarding pensions sustainability is total national output and, from a macroeconomic perspective, pension systems are only mechanisms for dividing output between workers and retirees (Barr, 1979, 2000 and 2004; Hemming, 1998; MacKellar and Reisen, 1998; Thompson, 1998; Eatwell, 1999; Abel, 2001; Geanakoplos, Magill and Quinzii, 2002; Cesaratto, 2005). In addition, this criticism is part of the ILO approach to pension reform (International Labour Organisation, 2000) and has recently been acknowledged as a valid argument by the World Bank (2005).

- *Myopia of workers.* Among other authors, Börsch-Supan and Lührmann (2003) suggest people's short-sightedness as an argument for promoting supplementary retirement plans. However, if the main worry is the myopic behaviour of workers, there is no need for tax incentives: it would be more effective to make pension plans mandatory (World Bank, 1999).
- *Moral hazard.* According to this reasoning, by establishing these types of tax incentives, the state could ensure adequate old-age provision and avoid elderly people with inadequate incomes applying for social assistance in the future (Börsch-Supan and Lührmann, 2003). Again, to make participation in pension funds mandatory overcomes the problem. Moreover, the tax system may not be the best way of avoiding the fiscal impact of moral hazard, because the tax incentive cuts revenues (World Bank, 1999), the amount of aid received is determined by the parameters of tax systems and this policy is not usually subject to control procedures applied to direct social spending (Agulnik and Le Grand, 1998). In particular, there has been a relatively quite large mandatory earnings-related programme in Spain since the late 1970s, which also undermines the previous argument.
- *Political economy reasons.* Braña (1982), in a pioneering work for Spain, suggested that the main aim of tax expenditures was to benefit the most well-off. According to this author, the existence of these sorts of incentives would be a kind of 'toll' a society has to pay for maintaining a Welfare State. In other words, for example, one may tolerate regressivity in a part of the tax system in order to achieve progressivity in the whole tax system or in social spending.

In sum, efficiency reasons for establishing tax relief on private pensions are not solidly grounded in theory or empirics, which justifies worrying about its distributional incidence. Although important, the political economy of this policy – perhaps the most interesting reason for tax relief – is out of the scope of this paper.

In addition, Burman et al. (2004), whose work is centred on the US, point out that worrying about who receives this subsidy is not only an issue of fairness. First, high-income households are more likely to accumulate private wealth to maintain their living standards in retirement than low- and moderate-income ones, which face more problems concerning this type of accumulation. Second, the former are more likely than the latter to finance tax-relieved contributions by shifting assets from other sources, which, in the case of tax deductions being concentrated on top incomes, would make these tax incentives fail to raise saving rates.

2. Income tax and tax relief on private pensions in Spain

Spanish pension policy comprises three types of state interventions:²

- an earnings-related public scheme, administered on a pay-as-you-go (PAYG) basis;
- a non-contributory system, consisting of means-tested benefits;
- tax incentives for voluntary private plans.

This paper centres on the third component – the tax incentives for private pensions.

Nowadays, there are three types of tax instruments to promote voluntary pension plans in Spain (Serrano, García and Bravo, 2004):

- *Corporate tax deductions.* Employers can deduct from the payment of Spanish corporate tax up to 10 per cent of the contributions made on behalf of their employees.
- *Exemption from payroll taxes.* Payroll taxes are not applicable to employers' and employees' contributions to private pension plans.
- *Income tax relief.* This includes three types of incentives. First, money contributed to a pension scheme up to a ceiling is not taxable. This limit amounts to €7,212 for both contributions made by employers and contributions made by individuals. Each of these ceilings can increase up

²See OECD (2005) and European Commission (2006) for a detailed description of the Spanish pension system.

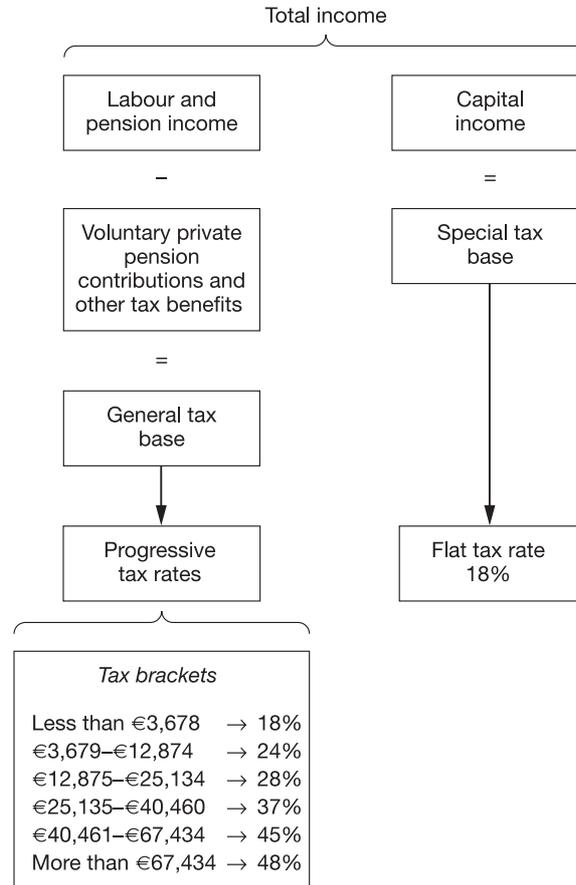
to almost €23,000 with the age of participants. Furthermore, individuals can make additional contributions on behalf of their spouses and handicapped people, and professional sportsmen and disabled individuals are also entitled to make additional tax-free contributions, so, in practice, the ceiling for individuals is higher. Second, investment income is tax-free as well. Third, the fiscal authorities only partially tax pension benefits, because lump-sum payments receive an exemption from income tax of 40 per cent of their value and the rest of the pension fund is taxed at the marginal tax rate. There is no restriction on how much of the pension fund can be taken as a lump sum. In sum, income tax relief on private pensions follows an ‘Exempted, Exempted, partially taxed’ (EET) regime.³ Unlike other countries, there is no matching contribution from the state and no additional money from the public budget is put into pension funds in Spain.

Unfortunately, the Spanish government provides very scanty data on tax relief on private pensions. In particular, there is no information available on a regular basis on lost revenues due to corporate tax relief or exemption from payroll taxes.⁴ Therefore, the rest of the paper centres on income tax relief. In order to understand the functioning of this policy better, it is appropriate to describe briefly the 2002 Spanish income tax system (Figure 1). Roughly, while a progressive scale – from 18 to 48 per cent – was applied to labour and pension income, capital income was taxed at a flat rate of 18 per cent. Therefore the taxation of an alternative investment in a benchmark non-retirement saving vehicle follows a ‘Taxed, Taxed, Exempted’ (TTE) scheme – that is, money saved is taxed at the corresponding marginal tax rate on labour income and accrued investment income faces the flat tax rate on capital gains. More detailed descriptions of the Spanish income tax can be found in Ministry of the Treasury (2002) and Picos et al. (2005).

³Most countries in the world follow the ‘Exempted, Exempted, Taxed’ (EET) tax system. The EET regime does not tax either contributions to pension funds or fund income, but it taxes the pension in payment. However, the ‘T’ of the EET system usually becomes a ‘t’ (for partial taxation) because in practice the state taxes private pensions in a softer way than it taxes other incomes. For instance, the US government exempts from taxes any payment from Individual Retirement Accounts, and lump-sum benefits – limited to 25 per cent of the fund – are tax-free in the UK. Whitehouse (1999) provides an overview of the different possible tax treatments of private pensions around the world.

⁴There were no data on corporate tax relief on pensions before 2001. They have been available since 2002 but, in order to construct comparable time series of tax expenditure, this section does not consider them. Of course, neither is there any source of micro-data on corporate tax relief or exemption from payroll taxes.

FIGURE 1
The Spanish income tax system in 2002



Note: Tax deductions and tax reductions, as well as other details of the Spanish tax system in 2002, are not included in the figure.

Source: Author's elaboration.

Specifically, the Spanish government only presents data on the cost of income tax relief on pension contributions. In spite of this important drawback, they are useful for knowing the recent trends in pension spending in Spain. According to this information, the cost of these tax incentives has grown since the early 1990s, both in absolute terms (euros) and in relative terms (with respect to GDP and to spending on contributory public pensions and means-tested pensions) (Table 1). Probably because of this policy of promoting supplementary retirement plans, the number of contributors to private pensions has significantly increased in recent years.

TABLE 1

Evolution of the cost and coverage of tax relief on pension contributions in Spain

	1992	1994	1996	1998	2000	2002	2004
<i>Cost of tax relief</i>							
Million euros at 2002 prices	101	192	545	746	1,026	1,169	–
As a % of GDP	0.02	0.04	0.09	0.12	0.15	0.17	–
As a % of spending on non-contributory pensions	20.9	17.4	41.3	49.6	61.7	72.2	–
As a % of spending on public contributory pensions	0.3	0.4	1.1	1.5	1.9	2.1	–
<i>Number of contributors</i>							
Thousands	1,100	1,574	2,155	3,454	4,861	6,495	8,303
As a % of working population	8.7	13.0	16.9	25.0	31.6	39.3	46.5

Notes: Tax expenditure data do not include two regions – the Basque Country and Navarre – which have their own fiscal systems. Data after 2002 are not presented here because the tax authorities changed the methodology for estimating them. Since there are no available micro-data related to this issue, coverage is calculated as $100 \times \text{Number of contributors} \div \text{Number of workers}$.

Source: Author's analysis from BADESPE database (<http://www.estadief.minhac.es/>), the 1992–2002 General Budget, Labour Force Survey and Directorate General for Insurance and Pension Funds (2005).

3. Main theoretical reasons for regressivity of tax relief on voluntary pensions in Spain

According to the most relevant literature (Burman et al., 2004; Yoo and De Serres, 2004), measuring the cost of tax relief in an EEt scheme requires comparison of the taxes collected under this regime with those collected on a benchmark non-retirement investment, which, as mentioned above, is given a TTE treatment. Consequently, the net tax cost of relief on pensions has to consider the sum of revenue losses from contributions and investment income less revenue gains from pension payments. Although we examine this issue in more detail in Section IV, it can be inferred that tax relief on private pensions is not tax-neutral, for three reasons: first, accrued investment income is exempted from capital taxes (18 per cent); second, 40 per cent of lump-sum withdrawals are tax-free; and, last, marginal tax rates at retirement are usually lower than those during working life.

The current tax relief on private pensions is likely to be regressive because of two different effects:

- *A targeting effect.* First, as Ruiz-Huerta (2004) points out, only those who pay income tax can take advantage of the tax relief. This excludes individuals with low earnings, because, in general terms, they do not have to pay income tax. Second, the mean propensity to save – and thus to contribute to private pension plans – increases with income. Therefore, the most well-off people are most likely to belong to a private pension

plan. Thus, in principle, these kinds of tax expenditures tend to benefit the richest individuals most.

- *An allocating effect.* A second source of regressivity refers to the specific design of tax incentives: contributions from high earners tend to be higher because of the different saving propensities. Hence, the tax relief does not provide contributors with a flat-rate benefit, since higher contributions are entitled to larger benefits.

The extent of regressivity in the Spanish system is discussed in more depth in Sections V and VI.

III. Data

This paper uses micro-data from a sample of income tax returns from 2002 (*Muestra IRPF 2002 IEF-AET*). It includes 907,399 cross-section observations of tax units, which, using the weights provided with the database, represent more than 15 million tax returns. The data cover the whole country with the exception of two regions – the Basque Country and Navarre – which have their own tax systems. The body responsible for the data collection was the Instituto de Estudios Fiscales, a Spanish public finance research and training centre. Picos et al. (2005) provide a complete description of the database and a guide to working with the micro-data.

The database contains information about pre-tax income, after-tax income, tax-free contributions to private pension schemes, and enough data to calculate marginal tax rates and to apply the methodology described in the next section. Unfortunately, it does not offer any information about non-deductible contributions made by taxpayers, which limits the scope of the simulation of alternative proposals, or about the amount of tax collected from retired persons.

The main advantage of these kinds of data over data from voluntary surveys is that it is usually possible to obtain larger and more representative samples of population because compulsion makes the non-response bias less important (Cowell, 2000, p. 93). In addition, there are no other sources for finding out the distributional effects of tax incentives for private pensions. The European Community Household Panel (ECHP) includes a few questions about contributions to pension schemes in the original questionnaire, but these questions are not available in the ECHP users' database because of representativeness problems with the sample. Another strength of the data is that the tax information is especially appropriate to analysing issues related to top incomes and, as is shown in Section V, tax relief on private pensions is such a topic.

However, this type of data also has some important drawbacks. The most severe ones are that it does not include any information about non-taxpayers (Atkinson, 2002, p. 14) and that it refers to tax units rather than households. Since individuals below a tax exemption limit do not have to file tax returns, the data do not capture the least well-off. Therefore, as, in principle, low-income people are less prone to contribute to pension plans than high-income individuals, the calculations based on this data-set may offer a picture of income inequality that does not exactly correspond to the true one. Furthermore, there are other minor problems. For example, many components of a comprehensive definition of income may be imperfectly recorded (Cowell, 2000, p. 94). Last, the data do not provide any information that lets us identify social transfers, which are included in taxable income (Picos et al., 2005).

Nevertheless, tax data are extensively used to analyse inequality issues,⁵ mainly in the absence of other information, and especially tax relief on supplementary pensions (Agulnik and Le Grand, 1998; Orszag and Orszag, 2000; Hughes and Sinfield, 2004).

The author has processed the database and performed all the described calculations using Stata 9.

IV. Methodology for evaluating the costs and the distributional effects of tax relief on supplementary pensions

1. Methodology for measuring tax relief

There are two different possible approaches to analysing these kinds of subsidies. On the one hand, one can use a *cash-flow* approach, which measures the cost in a given year considering the tax relief on contributions and investment income and the tax revenues from pensions realised during the same year. In this case, the revenue losses from the exemption of accrued income and contributions correspond to contributions made in the past. In spite of this shortcoming, it is the main methodology followed by national fiscal authorities (Yoo and De Serres, 2004). On the other hand, one can choose a *present-value* approach. This methodology measures the benefit received by each individual by taking the difference over the entire length of the investment between the amount of taxes collected if the money is contributed to a pension fund and the amount collected if the funds are invested in a benchmark non-retirement saving vehicle.

Most literature uniquely focuses on the distribution of tax relief on pension contributions, such as, among others, Agulnik and Le Grand (1998),

⁵See, among others, Björklund and Palme (2000) on Sweden, Atkinson and Salverda (2005) on the Netherlands and the UK, Saez (2005) on Canada and the US, and Alvaredo and Saez (2006) on Spain.

Orszag and Orszag (2000), Hughes (2001 and 2002) and Pensions Policy Institute (2004). Burman et al. (2004) are the only authors who apply the present-value approach to studying the distributional implications of this policy.

The cash-flow methodology may not be useful in a context of growing importance of supplementary pension schemes, because, if pension payments are presently low while contributions are high, the calculated cost using this approach will seem very large and it is necessary to consider that these contributions will also mean more taxes paid in the future. Furthermore, to focus only on pension contributions may give us a misguided picture of the cost of tax relief, since it also depends on tax relief on accrued investment income and taxes paid at retirement. Therefore, this paper adopts the present-value approach in order to avoid these shortcomings. In sum, the procedure followed here consists of calculating the discounted sum of revenue losses from contributions and accrued investment incomes plus revenue gains from benefit withdrawal. A detailed description of the specific procedures adopted is presented below.

(a) Tax relief on pension contributions

Tax relief on contributions refers to income tax deductions that lower the amount of taxable income. Hence, people claim back taxes at their marginal rate and one has to value the money contributed using the marginal tax rate of each individual to obtain the revenues lost by the government as a result of the allowance. Then, the tax expenditure that each tax unit receives because of tax relief on contributions can be calculated as

$$(1) \quad \tau_i C_i$$

where τ_i is the marginal tax rate on labour income faced by unit i and C_i represents tax-free contributions to pension schemes made by unit i . Moreover, the observed marginal tax rate of some individuals is lower than that they would have to pay in the absence of tax relief because they make large exempted contributions to pension schemes. In these cases, it is necessary to value part of the contribution using the observed marginal tax rate and the remainder using the 'hypothetical' marginal tax rate the individual would have to pay without the tax relief. According to the available data, this fact is not very relevant because only roughly 2 per cent of tax units are in this second situation.

(b) Revenue forgone from accrued investment income

The next step is to calculate the revenue forgone assuming that pension contributions are invested in a benchmark non-retirement saving vehicle.

Yoo and De Serres (2004), for example, select a portfolio composed of bank deposits and bonds (60 per cent) and equities (40 per cent), while Burman et al. (2004) use a current account. This choice is not problematic for Spain, because, as mentioned in Section II, capital income is taxed at a flat rate (18 per cent); so, as an alternative to pension funds, we can assume a standard investment paying a real rate of return r , which, in the baseline scenario, equals 5 per cent.⁶ It is also assumed that people withdraw their money at 65 years old. For people aged 65 and over, it is supposed they retire next year. In the case of contributions paid on behalf of spouses and disabled people, it is assumed that funds are always taxed in the same tax unit and are withdrawn when the head of tax unit reaches 65.

The discounted sum of revenue losses calculated according to this procedure may be expressed in the following way:

$$(2) \quad \frac{C_i(1-\tau_i)rt}{1+\delta} + \frac{C_i(1-\tau_i)[1+r(1-t)]rt}{(1+\delta)^2} + \dots + \frac{C_i(1-\tau_i)[1+r(1-t)]^{64-j}rt}{(1+\delta)^{65-j}}$$

where j , t and δ denote the base period, the tax rate on accrued income and the discount rate, respectively. Rearranging this expression and assuming that the interest rate equals the discount rate, we have

$$(3) \quad \frac{C_i(1-\tau_i)rt}{1+r} \left\{ 1 + \sum_{k=1}^{64-j} \left[\frac{1+r(1-t)}{1+r} \right]^k \right\}.$$

Using properties of geometric progressions, this expression can be transformed into

$$(4) \quad \frac{C_i(1-\tau_i)rt}{1+r} \left\{ \frac{\left[\frac{1+r(1-t)}{1+r} \right]^{65-j} - 1}{\frac{1+r(1-t)}{1+r} - 1} \right\}.$$

⁶Burman et al. assume 6 per cent and Yoo and De Serres 6.5 per cent, which seems very high, at least for a baseline scenario.

(c) Taxes paid on withdrawals

As mentioned in Section II, lump-sum withdrawals, not subject to any restriction, are tax-favoured: 40 per cent is exempted and the rest is taxed at the marginal tax rate. Another possibility, without any special tax treatment, is to purchase a life annuity. It is assumed that people always opt for lump-sum payments.⁷ In addition, we suppose that the marginal tax rate on labour and pension income at retirement is the immediately lower tax rate than that faced during working life.⁸ This seems moderately realistic: according to simulations presented by the OECD (2005), the replacement rate of Spanish public pensions ranges from 81 per cent for low-wage workers (earning 50 per cent of the average wage) to 61 per cent for people who earned 2.5 times the average wage. In order to test the importance of this assumption, a sensitivity analysis is also carried out using the same tax rate at the time of original saving and at the time of withdrawal.⁹ A final assumption is required: we consider that all pension plans are defined contribution, as in Yoo and De Serres (2004). Under all these premisses and assuming again that the interest rate equals the discount rate, the present value of taxes paid by private pensions is

$$(5) \quad \frac{C_i (1+r)^{65-j} (1-\theta) \tau_i^R}{(1+r)^{65-j}} = C_i (1-\theta) \tau_i^R$$

where θ is the percentage of benefits withdrawn as a lump sum that are exempted (i.e. 40 per cent) and τ_i^R is the marginal tax rate on labour and pension income at retirement.

(d) Net tax relief on private pensions

According to the expressions presented above, the net tax deduction each individual receives, TE_i , is

⁷Most payments in Spain (roughly two-thirds) were lump-sum benefits in 2005 (Directorate General for Insurance and Pension Funds, 2005). It is unknown why exactly some individuals are withdrawing benefits as annuities. The most probable reason for this is that these individuals started withdrawal several years ago (before 1999), when private pensions were subject to a different tax treatment and lump-sum benefits were not tax-favoured (see Domínguez Barrero and López Laborda (2004) for a survey of the pensions tax regime in Spain since the early 1980s). Other possible motives may be that these people are very risk-averse or that their tax rates at retirement are very low – so they would not pay taxes on pensions anyway – or even that they do not have to pay income tax.

⁸Most literature uses this assumption in order to explain why tax relief on pensions implies a cost for the government (Agulnik and Le Grand, 1998; Whitehouse, 1999; Hughes and Sinfield, 2004).

⁹Other authors also follow similar ad hoc assumptions. For example, Burman et al. (2004) assume the same marginal tax rate during the whole working life.

$$(6) \quad TE_i = \tau_i C_i + \frac{C_i (1 - \tau_i) r t}{1 + r} \left\{ \frac{\left[\frac{1 + r(1 - t)}{1 + r} \right]^{65-j} - 1}{\frac{1 + r(1 - t)}{1 + r} - 1} \right\} - C_i (1 - \theta) \tau_i^R .$$

Several implications can be drawn from this expression, all things equal:

- The tax deduction increases with contributions ($\delta TE_i / \delta C_i > 0$).
- The tax deduction decreases with age, since tax relief on accrued income is lower ($\delta TE_i / \delta j < 0$).
- The tax deduction increases with the interest rate ($\delta TE_i / \delta r > 0$).
- The tax deduction increases or decreases with the marginal tax rate on labour income, depending on the age of contributors, the interest rate and the difference between the marginal tax rate on labour at the time of saving and the marginal tax rate on withdrawals. In other words, it is not clear whether the benefit received by each euro contributed increases or decreases with the marginal tax rate paid when contributing.

2. Measuring progressivity and distributional effects

(a) Defining before- and after-tax expenditure income

In order to apply measures of progressivity and redistribution, it is necessary to define a before-tax expenditure income, y_i , and an after-tax expenditure income, y'_i . In this exercise, the former is income if contributions are invested in a benchmark saving vehicle and the latter is income if money is put in a pension fund, according to the analysis presented above.

As mentioned, the exercise uses tax data, which include incomes before and after taxes. Since after-tax income already includes the effect of tax relief on contributions, to be coherent with the analysis presented in the previous subsection, the pre-tax expenditure income of each individual can be estimated by subtracting from after-tax income the discounted value of taxes that would be paid on an alternative investment at the time of original saving minus the discounted sum of the revenue forgone from accrued income. The after-tax expenditure, y'_i , is calculated by subtracting from after-tax income the discounted taxes paid on withdrawal. The difference between y'_i and y_i is exactly the subsidy calculated according to the methodology described above.¹⁰

¹⁰In order to determine who benefits from the tax relief, Agulnik and Le Grand (1998) use aggregate income of taxpayers, while Burman et al. (2004) choose a concept of income (which they call 'cash' income) that includes pension contributions. Neither of these methodological options is completely

(b) *Tools to analyse the distributional effects of tax relief*

The following tools of analysis are used:

1. *Concentration indices* (also called pseudo-Ginis) of contributors, $C(Cont, Y)$, of contributed amounts, $C(C, Y)$, and of tax expenditure on private pensions, $C(TE, Y)$. They show the relationship between the cumulative percentage of a variable and the cumulative percentage of tax units, ranked by before-tax-relief income. If this specific variable is precisely pre-subsidy income, we have the Gini index (defined in equation (9)). Technically, the concept of a concentration index – for instance, of contributors – can be expressed as follows:

$$(7) \quad C(Cont, Y) = 1 - 2 \int_0^1 L_{Cont}(p) dp$$

where $Cont$ denotes the number of contributors, $L_{Cont}(p)$ is the concentration curve of $Cont$,¹¹ Y is the before-tax-expenditure income and p represents the poorest p share of the population. The other concentration indices, of contributions and tax relief, can be defined analogously.

2. *The Kakwani index* of tax expenditure on private pensions, which is calculated according to the following expression:

$$(8) \quad K(TE) = G(Y) - C(TE, Y) = 2 \int_0^1 [L_Y(p) - L_{TE}(p)] dp$$

where K denotes the Kakwani index and $G(Y)$ is the Gini index of pre-tax-expenditure income, which one can calculate using the expression

appropriate, because they are not equivalent to a pre-tax-instrument income and are not coherent with the present-value approach these authors use to estimate the tax relief. Anyway, the impact of these methodological options is negligible and does not affect the results obtained, mainly because the value of tax relief in relation to total income is very small, as we will see in Section V. In other situations, this type of decision can seriously affect results. For example, when studying the incidence of a large public pension scheme, taking as reference total income including pensions provides very different results from carrying out the analysis excluding pensions from the reference income. In a distributional analysis, pensions are much more progressive under the former approach than under the latter, since a large share of elderly income comes from old-age pensions and, without pensions, elderly people would be – in a non-behavioural scenario – in the bottom deciles.

¹¹The concentration curve provides a means of assessing the degree of income-related inequality in the distribution of a variable. It plots the cumulative percentage of the variable (y-axis) against the cumulative percentage of the sample, ranked by income, beginning with the poorest and ending with the richest (x-axis). See, for example, Lambert (1993) for details.

$$(9) \quad G(Y) = 1 - 2 \int_0^1 L_Y(p) dp .$$

$L_Y(p)$ simply represents the concentration curve of pre-tax-expenditure income. The Gini index is the standard measure of inequality, and it takes values between 0 (everyone has the same) and 1 (one tax unit has everything).

The Kakwani index compares how a variable is distributed regarding pre-tax-relief income. If K is above (below) 0, the transfer is progressive (regressive). Intuitively, if a transfer – in this case, the tax relief – is more (less) equally distributed than the pre-transfer income, the specific transfer is progressive (regressive).

In addition, it is possible to generalise the Gini index in the following way (Yitzhaki, 1983; Lambert, 1993; Duclos, 2000):

$$(10) \quad G(Y, \nu) = 1 - \nu(\nu - 1) \int_0^1 (1 - p)^{\nu-2} L_Y(p) dp$$

where $\nu > 1$ is a parameter that captures a distributive value judgement. The higher is ν , the more emphasis is placed on the bottom part of the distribution. When $\nu = 2$, we have the Gini index. It is also possible to generalise the concentration index and analogously the Kakwani index to obtain the following (Lambert, 1993; Duclos, 2000):

$$(11) \quad \begin{aligned} KE(TE, \nu) &= \nu(\nu - 1) \int_0^1 (1 - p)^{\nu-2} [L_Y(p) - L_{TE}(p)] dp \\ &= G(Y, \nu) - C(TE, Y, \nu). \end{aligned}$$

When $\nu = 2$, $K(TE, \nu)$ represents the Kakwani index.

3. *Decomposition of Kakwani index.* It has often been argued in the Spanish media that tax relief on supplementary pensions may not be regressive because there are participants in private pension schemes across the whole income distribution.¹² It is interesting to know, first, whether this statement is true and, second, whether the main cause of the estimated progressivity or regressivity is the targeting of tax incentives or the allocation of the benefits among recipients. In order to examine these issues, a decomposition of generalised Kakwani indices is proposed,

¹²For instance, when the Spanish government was studying reforms to the current system last year, a union leader suggested that tax relief was widely used across all income levels (*El Mundo*, 3 March 2006), and the chief of the association of pension funds made a similar statement downplaying its possible regressivity (*El Mundo*, 2 February 2005).

inspired by the decomposition of the Gini income elasticity proposed by Wodon and Yitzhaki (2002). For this purpose, we define a new variable, TE^* :

$$(12) \quad TE^* = \begin{cases} TE_m & \text{if } TE_i > 0; \\ 0 & \text{if } TE_i = 0. \end{cases}$$

That is, this variable is equal to the mean benefit among recipients, TE_m , for individuals who receive some tax relief and it is 0 for individuals who do not participate in the programme. The concentration index of TE^* , $C(TE^*, Y)$, can be calculated. Adding and subtracting $C(TE^*, Y)$ to and from the Kakwani index, we obtain

$$(13) \quad K(TE) = \underbrace{[G(Y) - C(TE^*, Y)]}_{\text{Effect T (targeting)}} + \underbrace{[C(TE^*, Y) - C(TE, Y)]}_{\text{Effect A (allocation or internal progressivity)}} .$$

This expression allows us to decompose the progressivity – or regressivity – of the tax expenditure on private pensions into a targeting effect, T, and an allocating effect, A. Effect T is simply the Kakwani index of TE^* – that is, the eventual progressivity there would be if the tax expenditure were equally distributed among recipients. One can attribute the remaining part of progressivity to the distribution of the benefit among programme participants – that is, to the allocating effect. If effect T is above (below) 0, the transfer is ‘well’ (‘badly’) targeted. If effect A is above (below) 0, it is progressive (regressive) among the recipients.

If a social programme targets high-income individuals and if, among recipients, benefits are concentrated mainly on the extremely well-off, both effects have a negative sign and reinforce each other. The opposite can also occur, for example, with a targeted social assistance programme that pays more to the poorest recipients. In this second case, both effects are positive.

However, the two effects can have different signs. For instance, it is possible that a programme is ‘well-targeted’ but recipients with the highest incomes receive more transfers than the poorest participants. This situation is possible, for example, in contributory unemployment insurance: unemployed workers are not usually among the richest individuals of society and unemployment benefits are proportional to previous wages. The opposite can happen with a system of university scholarships in a country where poor people rarely have access to university. In this case, middle-income individuals could possibly receive more transfers than upper-income ones – that is, internal progressivity would exist – but, at the same time, more than half of the population

receives no money. In the last two examples, the two effects have different signs and one can compensate the other.

As in the case of the Kakwani index, one can generalise the previous expression in the following way:

$$(14) \quad K(TE, v) = [G(Y, v) - C(TE^*, Y, v)] + [C(TE^*, Y, v) - C(TE, Y, v)].$$

4. *Decomposition of modified Reynolds-Smolensky index.* Finally, the paper calculates the classical decomposition of the modified Reynolds-Smolensky index according to the following expression:

$$(15) \quad RS(TE) = G(Y) - G(Y') = \frac{t}{1-t} K(TE) - R$$

where $R = G(Y') - C(Y', Y)$ is the reranking effect¹³ and $t/(1-t)$ is the relative size of the transfer in question (t is the value of the transfer as a proportion of the pre-transfer income – that is, the average rate of the transfer). If this index is above 0, the transfer is redistributive.

This measure can also be generalised (Duclos, 2000):

$$(16) \quad RS(TE, v) = G(Y, v) - G(Y', v) = \frac{t}{1-t} K(TE, v) - R(v).$$

All these indices allow one to measure the degree of progressivity (or regressivity) and redistribution of tax relief on private pensions in Spain.

V. Results

1. Cost of the tax relief

Using the data and procedures described in Sections III and IV, the gross cost of tax relief on pension contributions amounted to roughly €1,660 million in 2002 (Table 2). This estimate is considerably higher than the government forecast for the same year (€1,169 million; see Table 1). The reason for this discrepancy may be that the government figure is a prediction made the previous year in a context of growing pension contributions, using income bands and not revised later. However, the difference is quite large anyway, so we should bear this in mind in interpreting the results presented in this paper.

¹³The reranking effect is the difference between the concentration index of after-tax-expenditure income and the Gini index of the same variable. These indices are not equivalent if the transfer (the tax relief in this paper) alters the relative position of tax units in the income distribution.

TABLE 2
Cost of tax relief on private pensions in Spain, 2002

	<i>Cost (million euros)</i>
Relief on contributions	1,659.7
Relief on accrued income	369.1
Taxes paid on withdrawals	772.0
Tax relief on pensions	1,256.8

Source: Author's analysis from *Muestra IRPF 2002*.

The tax relief on supplementary pensions in 2002 using the present-value approach amounts to €1,257 million (0.19 per cent of Spanish GDP).¹⁴

2. Descriptive statistics of contributors, contributions and tax relief

Table 3 provides an overview of the distributional patterns of the tax relief on private pensions according to different characteristics of tax units. Roughly 17 per cent of them make contributions to voluntary pension funds. Tax units headed by middle-aged, male and married individuals are the most likely to participate in pension schemes, make the highest contributions and also receive most of the subsidies.¹⁵

Regarding distributional issues (Table 4), several stylised facts arise. First, the probability of contributing to a supplementary pension scheme significantly increases with income. Second, the distribution of contributors is quite similar to the distribution of pre-tax-deduction income. In the third place, money contributed to pension plans is concentrated among the most well-off 20 per cent of tax units, whose contributions amount to more than two-thirds of the total money devoted to encouraging private pensions. It is worth mentioning that in the top 5 per cent of taxpayers, contributions and

¹⁴The two regions not present in the database have been excluded from Spanish GDP. The result obtained is very similar to the one reported by Yoo and De Serres (2004) using a representative individual approach (0.22 per cent of GDP).

¹⁵The proportion of tax units receiving tax relief (17 per cent) is substantially lower than the ratio between total contributors and workers presented in Table 1 (39 per cent in 2002). These figures are very different but are making reference to different facts. The figure presented in Table 1 is a ratio between the total number of contributors (according to administrative data provided by pension funds) and the total number of workers (according to the Spanish Labour Force Survey), whose aim is to offer a rough picture of the increasing importance of supplementary pensions rather than an accurate picture of coverage. The figure presented in Table 3 refers to the proportion of tax units receiving the subsidy (17 per cent). Apart from the discrepancy that exists between number of tax units and total population, it is clear that the numerator and denominator are both different in these expressions. In the first one, the denominator is smaller (it only contains workers) and the numerator is larger (it includes all kind of contributors, both recipients and non-recipients of the tax relief) than in the second one. The contributions of contributors not entitled to tax relief (because they have low labour incomes on which they do not pay income tax) do not appear in the tax database.

TABLE 3
Contributors, contributions and tax deductions per year by age, sex and civil state of heads of tax units

	% of total	% of contributors in each group	Average contribution (€)	Contribution as % of pre-tax- deduction income	Share of contributions (%)	Average tax deduction (€)	Tax deduction as % of pre-tax- deduction income	Share of tax deductions (%)
<i>Age</i>								
Under 25	5.2	2.9	15	0.2	0.3	6	0.1	0.4
25–34	23.9	11.6	91	0.7	7.1	31	0.2	9.3
35–44	23.7	21.8	276	1.6	21.3	85	0.5	24.9
45–54	18.2	30.7	565	2.9	33.4	150	0.8	33.6
55–64	12.6	27.1	805	4.5	33.1	181	1.0	28.1
65 and over	16.4	2.3	90	0.6	4.8	19	0.1	3.7
<i>Sex</i>								
Male	62.3	19.4	367	2.1	74.3	97	0.6	74.1
Female	33.1	15.7	229	1.7	24.7	61	0.4	24.9
Unknown ^a	4.6	4.8	62	0.6	0.9	17	0.2	1.0
<i>Civil state</i>								
Single	26.6	12.5	153	1.2	13.2	44	0.3	18.4
Married	63.5	20.1	381	2.2	78.9	100	0.6	73.4
Other	9.8	14.0	247	1.6	7.9	63	0.4	8.1
<i>All</i>	100.0	17.5	307	1.9	100.0	81	0.5	100.0

^aNo sex of head of tax unit is recorded for some observations.

Note: Average contributions and benefits by subgroups are computed including 'zero' contributions and benefits.

Source: Author's analysis from *Muestra IRPF 2002*.

TABLE 4
Income, contributors, contributions and tax deductions per year by level of pre-tax-expenditure income

	Share of income (%)	% of contributors in each group	Average contribution (€)	Contribution as % of pre-tax-deduction income	Share of contributions (%)	Average tax deduction (€)	Tax deduction as % of pre-tax-deduction income	Share of tax deductions (%)
Lowest quintile	5.8	2.6	23	0.5	1.5	7	0.1	1.7
Second quintile	12.2	9.1	67	0.7	4.3	19	0.2	4.6
Middle quintile	16.6	14.9	131	1.0	8.5	33	0.3	8.1
Fourth quintile	22.8	20.8	229	1.3	14.9	56	0.3	13.8
Top quintile	42.6	40.0	1,085	3.2	70.7	292	0.9	71.9
All	100.0	17.5	307	1.9	100.0	81	0.5	100.0
Top 10%	27.4	49.7	1,714	3.9	55.8	475	1.1	58.5
Top 5%	17.8	55.4	2,485	4.4	40.5	695	1.2	42.8
Top 1%	7.0	61.3	4,400	4.0	14.3	1,156	1.0	14.2

Note: Average contributions and benefits by subgroups are computed including 'zero' contributions and benefits.
Source: Author's analysis from *Muestra IRPF 2002*.

tax subsidies fall as a proportion of income as income rises because, as mentioned earlier, exempted contributions (the only ones recorded in the database) are subject to a ceiling. Finally, tax expenditure on private pensions is allocated in a similar way to contributions: while the share of total tax relief absorbed by the top income quintile also amounts to more than 70 per cent, the first four quintiles roughly concentrate 30 per cent of total tax incentives.

This picture is not very different from that observed in other countries with more ‘tradition’ in this type of pension provision. For instance, the top income quintile receives roughly 70 per cent of tax relief on pensions in the UK and the US. In Ireland, the same group absorbs 62 per cent of tax expenditure. Conversely, in Australia, these kinds of subsidies are much more equally distributed, since the richest 20 per cent of individuals barely receive 20 per cent of tax relief and the group with the largest receipt is the second quintile (Hughes and Sinfield, 2004, p. 182).¹⁶

3. Regressivity and distributional effects

A more technical distributional analysis is shown in Table 5, which presents the calculation of concentration indices, according to the methodology described in Section IV. The results confirm the previous analysis. For all values of ν (the parameter that measures the focus of the index towards the bottom part of the distribution of income), the concentrations of beneficiaries, contributed amounts and tax expenditures are higher than the concentration of income. While contributions are more unequally distributed than income and contributors, contributions and tax expenditures are

TABLE 5

Concentration indices for income, contributions, contributors and tax expenditures in Spain, 2002

	$\nu = 1.5$	$\nu = 2$	$\nu = 4$	$\nu = 6$
Income before tax expenditure	0.250	0.366	0.571	0.666
Contributors	0.272	0.420	0.668	0.767
Contributions	0.493	0.662	0.837	0.880
Tax expenditures	0.503	0.670	0.832	0.873

Source: Author’s analysis from *Muestra IRPF 2002*.

¹⁶It should be mentioned that these figures only include tax relief on pension contributions. In the case of Australia, the limited concentration of tax deductions is probably because coverage is almost universal, since contributions to pension funds are mandatory for all workers except low-paid employees and the self-employed (Rein and Turner, 2004), and because Australia taxes funded pensions at all three possible points (contributions, fund income and withdrawal) (Yoo and De Serres, 2004), which can raise some questions regarding efficiency – for example, issues related to triple taxation – that are not analysed here.

TABLE 6
Analysis of the regressivity of tax relief on private pensions in Spain, 2002

	$v = 1.5$	$v = 2$	$v = 4$	$v = 6$
$G(Y,v)$	0.250	0.366	0.571	0.666
$C(TE,Y,v)$	0.503	0.670	0.832	0.873
$K(TE,v)$	-0.253	-0.304	-0.262	-0.207
$C(TE^*,Y,v)$	0.272	0.420	0.668	0.767

Source: Author's analysis from *Muestra IRPF 2002*.

similarly concentrated, since differences between their indices are negligible and depend on the exact value of the parameter v .¹⁷

Table 6 presents the Kakwani index and its generalisations in order to illustrate the progressivity or regressivity of tax relief on private pensions. All the indices show that these tax expenditures are regressive.¹⁸

As the Reynolds-Smolensky index and its generalisations show in Table 7, tax incentives for promoting private pensions raise inequality. However, the distributional effect of tax relief is not large for any of the values of v because, although the regressivity is remarkable, the value of the transfer as a proportion of the pre-transfer income, t , is very low. In turn, the reranking effect is negligible. In other words, tax relief is regressive but the relatively small size of the total tax expenditure means that distributional changes caused by the tax expenditures are minimal.

Table 8 shows an application of the decomposition of progressivity proposed in the previous section. This exercise suggests that the programme is not targeted at low incomes – as contributors are concentrated in the top quintile of the income distribution – and it is internally regressive. The

TABLE 7
Analysis of the distributional effects of tax relief on private pensions in Spain, 2002

	$v = 1.5$	$v = 2$	$v = 4$	$v = 6$
$G(Y,v)$	0.250	0.366	0.571	0.666
$G(Y',v)$	0.252	0.367	0.572	0.667
$RS(TE,v)$	-0.001	-0.002	-0.001	-0.001
t	0.005	0.005	0.005	0.005
$K(TE,v)$	-0.253	-0.304	-0.262	-0.207
$R(v)$	0.000	0.000	0.000	0.000

Source: Author's analysis from *Muestra IRPF 2002*.

¹⁷The values for the parameter v usually chosen in the literature have been used in the analysis presented in this section, though it is possible to select any value above unity. See, as examples, Lerman and Yitzhaki (1985), Wodon and Yitzhaki (2002) and Angel-Urdinola and Wodon (2004).

¹⁸In order to put these figures into context, it can be mentioned that the least progressive social transfer in Spain in the mid-1990s – public spending on higher education – showed a Kakwani index of 0.009 (Calonge and Manresa, 2001).

TABLE 8
Decomposition of the regressivity of tax relief on private pensions in Spain, 2002

	$v = 1.5$	$v = 2$	$v = 4$	$v = 6$
Total	-0.253	-0.304	-0.262	-0.207
%	100	100	100	100
Targeting	-0.022	-0.054	-0.098	-0.101
%	9	18	37	49
Allocation	-0.230	-0.250	-0.164	-0.106
%	91	82	63	51

Source: Author's analysis from *Muestra IRPF 2002*.

allocation is the main cause of the regressivity in all cases, although its relevance diminishes with increasing v (i.e. increasing emphasis placed on the lowest percentiles of income).

One should remember that non-taxpayers are not being considered. If it were possible to include these units, the results obtained could be slightly different, although the changes would probably not be significant, since non-taxpayers cannot benefit from tax relief.

In sum, all the calculations presented in this section reveal that the current system of tax relief on private pensions in Spain turns out to be regressive and non-redistributive, confirming the main hypothesis of this paper. The cause of this situation is not only the targeting of the benefits but also – and mainly – their distribution among recipients.

4. Sensitivity analysis

In order to assess the influence of the assumptions about the interest rate and marginal tax rates made above, a sensitivity analysis is carried out (Table 9).

TABLE 9
Sensitivity analysis

	<i>Baseline scenario</i>	<i>Interest rate = 3%</i>	<i>Interest rate = 7%</i>	<i>Same tax rate when contributing and when withdrawing</i>
Cost (million €)	1,256.8	1,120.9	1,379.4	1,059.9
$K(TE,1.5)$	-0.253	-0.265	-0.244	-0.267
$K(TE,2)$	-0.304	-0.316	-0.295	-0.322
$K(TE,4)$	-0.262	-0.269	-0.256	-0.280
$K(TE,6)$	-0.207	-0.212	-0.203	-0.221
$RS(TE,1.5)$	-0.001	-0.001	-0.001	-0.001
$RS(TE,2)$	-0.002	-0.001	-0.002	-0.001
$RS(TE,4)$	-0.001	-0.001	-0.001	-0.001
$RS(TE,6)$	-0.001	-0.001	-0.001	-0.001

Source: Author's analysis from *Muestra IRPF 2002*.

In general, the impact of alternative assumptions is small. The effect of considering higher (lower) values for the interest rate is a higher (lower) cost of tax relief and slightly less (more) regressive subsidies, while to assume the same marginal tax rates at the time of saving and at the time of retirement reduces the total amount of tax expenditures and makes them more regressive. In sum, it can be claimed that the main results of the baseline analysis hold under alternative scenarios.

VI. Discussion and proposals for reform

Is tax relief on private pensions in Spain fair? Is there any trade-off (for instance, regarding political economy reasons) between the existence of this kind of benefit, focused on top incomes, and other features of the Spanish system of taxes and transfers? One can argue, for example, that it is reasonable that tax deductions are distributed roughly the same as contributions. These issues, which are undoubtedly interesting, are out of the scope of this paper.

Anyway, if the present approach to voluntary pensions is judged by policy-makers to be inappropriate, or if progressivity – a usual criterion for evaluating direct public spending – is considered to be a relevant issue regarding these types of state interventions, then it is interesting to think about designing other, less regressive systems.

First, this section explores the distributional implications of two alternative cost-neutral policies for promoting voluntary pension coverage. They are based on a proposal made by Orszag and Orszag (2000), who suggested establishing a system of tax incentives for pensions with different levels of benefits depending on the amount of contributions and income of taxpayers.¹⁹ It is assumed, first, that pension contributions are taxed just like other types of saving (i.e. according to a TTE scheme) and, then, a refundable tax credit is established, which allows non-taxpayers to receive benefits. It is likely that this kind of tax scheme will be better understood by people than the current regime because, for example, they do not need to calculate how much tax they would pay in the future. Since the point of departure for tax deductions is a TTE regime, according to the present-value approach applied in this paper, the benefit received by each individual when contributing equals the net benefit of this policy for each recipient. Specifically, the following two policies are simulated here:

¹⁹A programme of direct subsidies quite similar to the one suggested here is used in the Czech Republic (Tomes, Koldinska and Nemeč, 2003, p. 44).

- *Proposal I.* Annual contributions up to €1,000 are entitled to a benefit of €0.40 for every euro put into pension funds; additional money receives only €0.18 for every euro contributed.
- *Proposal II.* A state subsidy is implemented that decreases as pre-tax income rises in the following way:
 - €0.60 for every euro contributed for tax units whose yearly income is below €10,700;
 - €0.40 for every euro contributed for tax units whose yearly income is between €10,700 and €19,000;
 - €0.23 for every euro contributed for tax units whose yearly income is above €19,000.

Second, in addition to these balanced-budget reforms, it is interesting to study the distributional consequences of lowering the ceiling for exempted contributions to supplementary pension schemes while keeping the rest of the conditions in the current tax regime unchanged. In particular, we simulate the consequences of establishing a threshold of €6,000 per year per tax unit (instead of the current variable ceiling described in Section II), to which we will refer as *Proposal III*.

In order to explore the distributional effects of these proposals, we have used accounting micro-simulations. These exercises do not consider the existence of behavioural responses to any of the proposed changes, which is a limitation one should bear in mind. There are two main difficulties with implementing a behavioural approach. First, the database used in this paper does not provide many variables for modelling a behavioural model, such as education, activity status, type of contract or job tenure, revealed as important in other works.²⁰ Second, this sort of exercise has never been carried out in the previous literature, which has been limited to simulating policy changes without considering any behavioural response (Agulnik and Le Grand, 1998; Burman et al., 2004). In fact, it is not easy to know how a particular tax regime affects pension contributions and how exactly it is perceived by people. For example, it is unclear whether individuals focus their attention on the tax regime for contributions or on the whole tax system, or how they discount taxes and benefits.²¹ In many cases, contributions to voluntary pension schemes do not seem to be related to rational choices by individuals. For example, several studies have stated that

²⁰See Munnell, Sundén and Taylor (2001) for a survey of determinants of contributions to pension funds.

²¹In the case of people considering the whole tax system when making pension contributions, it would be necessary to assume that they would guess how much tax they would pay in the future on withdrawals and to adopt a functional form for discounting and a specific discount rate. This would not be exempt from problems. For instance, according to Rubinstein (2003), both standard discounting and hyperbolic discounting are rejected by experimental evidence.

‘default’ options in occupational pension schemes, such as automatic enrolment or a default contribution rate if a worker does not decide anything, are important determinants of pension contributions (Madrian and Shea, 2001; Utkus and Young, 2004; Kahneman, Odean and Barber, 2005; Gale and Dworsky, 2006). Other authors emphasise the importance of previous contributions (Domínguez Barrero and López Laborda, 2004) and the existence of employer contribution matches (Basset, Fleming and Rodrigues, 1998; Munnell, Sundén and Taylor, 2001). In sum, many factors influence participation and the amount of contributions apart from the benefit received by each euro put into voluntary pension schemes. Therefore, non-behavioural micro-simulations can be considered a reasonable first-order approach to estimating the effects of the policies proposed above.

Table 10 shows the cost, the progressivity and the distributional effects of the above proposals for reform. The cost of tax incentives – which is, by definition, the same under the first three scenarios (the current system and the two balanced-budget reforms) – is reduced by nearly €200 million by establishing a lower threshold for exempted contributions (Proposal III). Regarding progressivity and redistribution, which for simplicity are only measured by the Kakwani and Reynolds-Smolensky indices, the table shows that all the analysed alternative policies reduce the regressivity of the tax relief and that the redistributional effects are slightly lower under the three proposed reforms.²² Since the micro-simulations do not consider behavioural changes, the targeting effect, which depends on who contributes, remains constant in all cases and only regressivity related to allocation diminishes.

In order to achieve larger improvements in the distributional incidence of tax incentives for supplementary pensions, other types of reforms that encourage increased coverage of private pension schemes and higher contributions from low-income earners would be required. It is not the purpose of this paper to go into these types of changes, but it is worth

TABLE 10
Distributional effects of the proposed reforms

	<i>Current system</i>	<i>Proposal I</i>	<i>Proposal II</i>	<i>Proposal III</i>
Cost (million €)	1,256.8	1,256.8	1,256.8	1,086.9
Kakwani index	-0.304	-0.244	-0.224	-0.273
Reynolds-Smolensky index	-0.002	-0.001	-0.001	-0.001

Source: Author’s analysis from *Muestra IRPF 2002*.

²²Regarding redistribution, one has to bear in mind that under Proposal III, the amount of the tax relief (i.e. the size of the transfer) is smaller, so its comparability to the first two proposals is limited.

mentioning some of the proposals made in the literature. On the one hand, Rein and Turner (2004) and Ebbinghaus (2006) suggest relying on collective bargaining in order to increase supplementary coverage. On the other hand, Munnell, Sundén and Taylor (2001), centred on the US, recommend promoting employer matching contributions, one of the most important determinants of participation according to these authors, and Altmann (2003) proposes government matching.

VII. Conclusions

The aim of this paper has been to explore the distributional effects of tax relief on private pensions in Spain. The analysis performed has shown that these tax incentives, which amount to roughly 0.2 per cent of Spanish GDP in 2002, are regressive, with the top quintile absorbing more than 70 per cent of total spending on this measure. This regressivity has two main causes: the distribution of contributors, which is more concentrated than the distribution of income, and the design of tax relief, which grows approximately in proportion to contributions, the distribution of which is much more concentrated than that of income. It is important to keep this picture in mind when trying to expand supplementary pension coverage using this particular version of tax relief.

In case these results are judged by policy-makers to be undesirable or inappropriate, several alternative policies that correct part of the regressivity of the present system have been suggested. However, in order to achieve larger distributional improvements, it is necessary to increase the coverage of supplementary pension schemes, especially among people with low incomes, by other means.

The analysis presented in this paper has two major shortcomings. First, the database used does not contain any information on non-taxpayers. The Instituto de Estudios Fiscales is currently preparing a sample that includes individuals who do not file tax returns, so it will soon be possible to overcome this drawback. Second, the micro-simulations of the proposed reforms do not take account of possible behavioural responses of individuals. The development of new databases may help to solve this problem.

Moreover, because of the observed distribution of tax incentives for voluntary pensions, it would be very interesting to carry out empirical research on the efficiency reasons for this state intervention in Spain, such as the political economy of tax relief or its effect on national saving.

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