Original Article

Taxation and the saver's choice between a life annuity and a lump sum pension plan payout: The case of Spain

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ABSTRACT On the basis of the Bank of Spain's Survey of Household Finances for 2005, this article uses probit techniques to estimate how far the personal income tax marginal rate influences the decision of pension plan beneficiaries to opt for payout in the form of a lump sum or a life annuity. In the first place, the article concludes that it is probable savers will not become aware of the effects of taxation on the form of payouts until the contingency covered by the pension plan (retirement) arises. Second, our results suggest that savers' decisions may be short-sighted, as they are often more concerned to defer the payment of income tax than they are to choose the alternative that will optimise their tax liabilities.

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INTRODUCTION

Upon reaching retirement age, individuals who have been saving through a pension plan are faced with the problem of choosing between taking pension payouts in the form of a lump sum, a life annuity or a combination of both.

This disjunctive has been studied from various different angles. Mitchell *et al*¹ estimate the present

value of life annuities and the increase in utility gained from this payout option. These scholars consider that the present value of the annuity hardly varies if taxes are taken into account.

A number of recent papers^{2–7} have documented how retirees and savers opting to cash in pension plan benefits on changing job choose to take their payouts. In general, this literature suggests that the lump sum option is inversely related with accumulated savings and age, and is directly linked to gender (men). The signs taken by other variables, such as education and the amount of income, vary in the different studies.

Bütler and Teppa⁸ analyse the determining factors behind choices in Switzerland, where

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more than two-thirds of the population opt for annuities. They find that one relevant variable is the present value of annuity (measured in terms of utility, in line with the studies by Brown and Poterba),⁹ which they compare with the value of the lump sum the investor can cash out, whereas other relevant variables are gender, marital status, wealth and the number of dependent children.

Mottola and Utkus¹⁰ study how the participants in two defined benefits pension schemes in United States choose between both types of payout, finding that a lump sum is the majority choice, while the annuity option is directly related with age, accumulated savings, unmarried status and gender (women).

In Spain, savers do not have to choose just one kind of benefit payout but may opt for a combination of both. The objective of the present study is to determine whether tax conditions, measured in terms of the beneficiary's marginal rate of personal income tax, influence the decision taken. As far as we are aware, this approach has not been taken in any previous studies.

The structure of the article is as follows. Section 'Taxation of pension plan benefits in Spain: Theoretical model of choices' analyses the tax regime applicable to pension plan benefits, depending whether the payout is taken in the form of an annuity or a lump sum, and presents a model to measure the influence of taxation on the cost of the life annuity option. On the basis of the information contained in the Bank of Spain's Survey of Household Finances (EFF) for 2005, we estimate two probit models in section 'Application', the first of which covers all pension

plan investors and the second only beneficiaries aged over 65. The tax variable is in fact significant only in the second model, although not with the expected sign. Section 'Conclusions' describes our conclusions from the study.

TAXATION OF PENSION PLAN BENEFITS IN SPAIN: THEORETICAL MODEL OF CHOICES

Taxation of pension plan benefits in Spain varies depending how payouts are materialised. Income from life annuities is included in the general taxable base of the Spanish Personal Income Tax (IRPF) without any kind of deduction and is taxed at the marginal rate. In 2005, the year of the applied study, the IRPF marginal rates were 15, 24, 28, 37 and 45 per cent.

Meanwhile, lump sum payouts qualify for a 40 per cent deduction in the taxable base, provided the ownership of the pension plan has lasted at least 2 years. The remaining sum is included in the general taxable base and taxed at the relevant marginal rates.

Table 1 shows the structure of payouts made to the beneficiaries of pension plans between 2005 and 2010. As may be observed, the number of beneficiaries opting for life annuities and lump sum payments is very similar, but the accumulated capital taken in a lump sum is significantly higher than that received through annuities, up to 2010. Lump sum payouts began to decline in 2007, when the 40 per cent allowance for benefits generated over more than 2 years was abolished. Mixed payouts

Table 1: Benefit payout options (%)

Year	Beneficiaries			Amount		
	Lump sum	Annuity	Mixed and others	Lump sum	Annuity	Mixed and others
2005	47.1	51.2	1.7	69.1	27.5	3.4
2006	46.7	48.0	5.3	70.8	22.7	6.5
2007	45.0	50.7	4.3	66.9	28.5	4.6
2008	42.4	51.3	6.3	66.7	27.4	5.9
2009	45.7	45.9	8.4	66.1	27.1	6.8
2010	38.5	40.3	21.2	42.6	47.9	9.5

Source: Dirección General de Seguros y Fondos de Pensiones – Spanish Directorate General of Insurance and Pension Funds.¹¹

are negligible, although their importance is growing.

The literature is not unanimous in its assessment of the expected effect of taxation on the choice between lump sum and annuity payouts. In view of the 40 per cent deduction in the lump sum taxable base, González-Páramo and Badenes,¹² and Domínguez-Martínez and Carrasco¹³ argue that the tax treatment of this option is more beneficial than the annuity alternative. However, they fail to consider any other relationships between the marginal tax rate and incentives, which might lead savers to favour one alternative over the other.

On the basis of the work of Domínguez-Barrero,¹⁴ we may model the relationship between the marginal tax rate and the incentives to choose the annuity payout option. The value of a life annuity, A , at the moment the right to receive the income vests, PV_A , may be expressed as follows:

$$PV_A = A \cdot \left(\frac{1 - (1+i)^{-l}}{i} \right) \quad (1)$$

where i is the interest rate and l is the life expectancy of the plan's investor (who is also the beneficiary).

The present value of the annuity will equal the value of the capital accumulated at this time, Q :

$$PV_A = Q \quad (2)$$

Hence, the present value of the annuity, net of taxes, PV_{NA} , will be as follows:

$$\begin{aligned} PV_{NA} &= A \cdot \left(\frac{1 - (1+i)^{-l}}{i} \right) \cdot (1 - t_p^A) \\ &= Q \cdot (1 - t_p^A) \end{aligned} \quad (3)$$

where t_p^A is the marginal tax rate applicable to the life annuity received by the beneficiary, which we shall assume does not vary over time.

The opportunity cost of opting to receive the payout in the form of a life annuity will be equal

to the value of the accumulated capital under the plan, net of taxes, Q_N . Taking into account the 40 per cent deduction in the tax base:

$$Q_N = Q \cdot (1 - 0.6t_p^Q) \quad (4)$$

where $t_p^Q \geq t_p^A$ is the marginal tax rate applicable to the accumulated capital in the pension plan.

The relative cost of the life annuity, C , will be equal to the ratio of net available capital, Q_N , to the net present value of the life annuity, PV_{NA} . Dividing (4) by (3):

$$C = \frac{1 - 0.6t_p^Q}{1 - t_p^A} \quad (5)$$

On the basis of this expression, and taking into account the IRPF tax schedule in force in 2005, two results can be obtained. In the first place, the cost of the life annuity rises in step with increases in the marginal tax rate t_p^A . Second, the cost of the life annuity falls as the gap between the marginal rates applicable to capital and annuity widens, $\Delta t_p = t_p^Q - t_p^A$.

In light of these results, we may hypothesise that *savers will be more likely to opt to take the payout from their pension plans as a life annuity the greater the difference between the marginal tax rates applicable to the lump sum and the annuity, and they will be less likely to opt for an annuity the higher the marginal tax rate charged to it.*

APPLICATION

The applied study was performed using data drawn from the EFF published by the Bank of Spain. This survey has been performed every 3 years since 2002. It is a survey stratified by wealth brackets, selected on the basis of tax returns for the IRPF and for the Wealth Tax. We shall work with the EFF for 2005, the latest available, in which there are data from 5962 families.¹⁵

The EFF contains information concerning households' demographic characteristics, family wealth (property assets, financial assets, debts) and income earned both from work and on assets.^{16,17}

Within financial assets, a section is dedicated to pension arrangements, which contains information on the characteristics of the plans contracted by families. These are broken down into individual plans (contracted independently), occupational schemes (arranged by a company for its employees) and affiliate schemes (arranged by an association for its members) with details of the plan's holder, annual contributions and the capital accumulated. The data also indicates whether the saver *intends to take* the eventual benefits as an annuity, in a lump sum or under a mixed formula.

The main problem in testing the hypotheses proposed at the end of the preceding section is to construct the dependent variable (which we shall call *annuities*). The EFF reflects the amount of savings accumulated in pension plans that *each individual claims* he or she will receive as a life annuity, a lump sum or under a mixed formula, although this need not actually be the way pension benefits are finally taken. According to the 2005 EFF, 34.9 per cent of investors say they intend to take their pension plan payout as a lump sum; 52.3 per cent say they will take a life annuity; and 12.8 per cent opt for a mixed formula. Meanwhile, 27.6 per cent of accumulated savings will foreseeably be withdrawn in the form of a lump sum, compared with 47.9 per cent for life annuities and 24.5 per cent for mixed formulas. The contrast between these data and those given in Table 1 is stark. According to the table, almost 70 per cent of benefits payouts are actually taken in the form of a lump sum.

To get around this difficulty, we adopted two strategies, which take shape in two different estimations. In the first place, we assumed that the benefits savers claim they will take using a mixed formula will in fact be taken as a lump sum, given the very small share represented by mixed benefits in Table 1 (in terms of both the amounts concerned and the number of beneficiaries) and the very large share represented by lump sum payouts. Consequently, we performed a probit estimation in which a value of 1 was assigned to beneficiaries claiming they intend to take benefits in the form of a life

annuity and 0 otherwise (Model 1). We also estimated an ordered probit model, assigning a value of 2 to the beneficiaries of life annuities, 1 to those opting for mixed benefits and 0 to the recipients of lump sum payments. However, the parameters of the cut-off points obtained when this ordered model was estimated were found not to differ significantly from each other in statistical terms, and the classification of individuals into three groups is therefore not appropriate.

The second estimation also consisted of a binary probit with the same construction of the dependent variable as in the previous model, but limited to beneficiaries aged over 65 (Model 2). We assume that the majority of these people are already enjoying the benefits of their pension plans, and the information contained in the EFF will therefore refer to the manner in which they have actually opted to take payouts and not the way they intend to take them, as in the case of the rest of savers.¹⁸

Meanwhile, we constructed two variables to represent the tax rate based on the theoretical considerations described in the preceding section. These are the investor's marginal tax rate (*taxrate*), which measures the tax rate charged on the annuity, t_p^A , and the increment in the marginal rate ($\Delta\text{taxrate}$) as a measure of the increase in the tax rate produced when increasing the tax base in the amount of capital accumulated in the pension plan, $\Delta t_p = t_p^Q - t_p^A$. In order to quantify this increase, we first calculate the quotient between the tax liability on the lump sum and the amount of that lump sum, the liability on the lump sum being the increase in tax burden arising when the accumulated capital in the pension plan is added to taxable base. Subsequently, we determine the value of Δt_p by the difference between the previous quotient – which is equivalent to the marginal rate t_p^Q – and the investor's marginal rate t_p^A .

We used the standard control variables found in the literature revised in section 'Introduction', namely the natural logarithm of family wealth (*lwealth*), the natural logarithm of accumulated capital in pension plans (*lplan*), the natural logarithm of a couple's earnings from work (*learnings*), age (*age*), marital status (*married* = 1),

Table 2: Descriptive statistics for variables (Model 1)

Variable	Mean	Standard deviation	Minimum	Maximum	Skewness	Kurtosis
Annuities 1	0.54	0.50	0	1	-0.15	1.02
taxrate	0.23	0.13	0	0.45	-0.48	2.65
Δ taxrate	0.08	0.07	0	0.43	1.29	5.29
lwealth	11.75	1.91	0	18.59	-4.06	24.99
lplan	8.49	1.52	2.48	14.36	-0.36	3.47
learnings	7.61	4.41	0	13.62	-1.10	2.31
age	47.49	9.9	25	85	0.05	2.37
married	0.74	0.44	0	1	-1.09	2.19
children	0.89	1.03	0	7	1.05	3.93
man	0.55	0.5	0	1	-0.18	1.03
education	0.34	0.47	0	1	0.69	1.48
aversion	3.65	0.63	1	4	-1.99	7.16

Table 3: Descriptive statistics for variables (Model 2)

Variable	Mean	Standard deviation	Minimum	Maximum	Skewness	Kurtosis
Annuities 2	0.59	0.49	0	1	-0.35	1.12
taxrate	0.13	0.14	0	0.45	0.52	1.86
Δ taxrate	0.04	0.06	0	0.25	1.26	3.41
lwealth	12.47	0.79	9.03	16.27	-0.51	6.04
lplan	8.82	1.39	5.66	12.5	-0.08	3.35
learnings	7.76	3.66	0	12.65	-1.49	3.61
age	68.52	3.78	65	85	0.76	2.56
married	0.49	0.5	0	1	0.05	1.00
children	0.06	0.33	0	3	6.65	51.63
man	0.47	0.5	0	1	0.12	1.01
education	0.29	0.46	0	1	0.92	1.85
aversion	3.64	0.75	1	4	-2.24	7.35

number of children (*children*), gender (*man* = 1), education (*education* = 1) and risk aversion (*aversion*). Risk aversion is measured by the value (between 1 and 4) assigned by each family in the survey. We consider an educated person to be one who has obtained a higher educational qualification of some kind. No problems of correlation between variables were observed.

The main descriptive statistics are shown in Tables 2 and 3, and the results of the estimations, robust to heteroscedasticity, are shown in Table 4.

For all the savers, as shown in Table 4 (Model 1), the probability that plan benefits will be taken in the form of life annuities first falls, and then rises with the logarithm of investors' wealth, and also rises for men and risk aversion. The variables related with the marginal tax rate are not significant, most likely because investors might not be able to calculate the differential effects of taxation on each payout alternative until the

Table 4: Results of probit estimations

Variable	Model 1 (all investors)	Model 2 (investors aged over 65)
taxrate	-0.3186	8.0603**
Δ taxrate	-0.2409	12.9126*
lwealth	-0.1908**	7.5777***
lwealth ²	0.0103**	-0.3186***
lplan	0.0473	-0.4739
learnings	0.0032	0.0599
age	-0.0259	-1.7486
age ²	0.0002	0.0131
married	-0.1842	0.2634
children	-0.0786	0.6091
man	0.1672*	0.3041
education	-0.1249	-0.9499**
aversion	0.1565**	0.9655***
intercept	0.972	12.2729
No. of observations	2347	152
Wald χ^2	24.13	29.92
Prob > χ^2	0.012	0.003
Pseudo- R^2	0.02	0.3543
Log Likelihood	-1588.21	-66.59

*Coefficient significant at 10 per cent; **coefficient significant at 5 per cent; ***coefficient significant at 1 per cent.

time of actual perception, when they must make a decision, either on their own account or with third-party advice.

The results change substantially if the exercise is confined to people over 65 years of age (Table 4, Model 2). The $\Delta taxrate$ variable takes the expected sign, so the increase in the marginal tax rate resulting from the inclusion in the tax base of the capital accumulated in the plan has a positive influence on the probability that benefits will be taken in the form of an annuity. However, the $taxrate$ variable takes the opposite sign to that expected, as this variable also has a positive effect on the endogenous variable. An explanation for this sign could be that pension plan beneficiaries underestimate the present value of the taxes levied on annuities. Given this myopic behaviour,^{19–22} the higher the marginal tax rate, the greater the tax liability will be in the lump sum option, and this will increase the incentive to defer the tax by opting for a life annuity. In Domínguez-Barrero and López-Laborda,²³ we already concluded that one of the factors individuals take into account in deciding to invest in pension plans is, precisely, the opportunity to defer income tax. Furthermore, the significance of tax variables to the group of people aged over 65 reinforces the interpretation of the behaviour of all investors that we proposed above.

Among the control variables, risk aversion increases the probability that pension benefits will be taken in the form of a life annuity, whereas the education of the beneficiary reduces it. Finally, the wealth of the beneficiary is also significant, but the signs are the opposite to those obtained in Model 1. The probability that benefits will be taken in the form of a life annuity first rises and then falls with the logarithm of the beneficiary's wealth.

CONCLUSIONS

We may draw three main conclusions in light of the results obtained from the study. In the first place, investors consider tax variables when choosing the type of payout that will materialise the accumulated savings held in the pension plan. Second, it seems that pension plan savers do not

know how the tax issues affect benefits taken in the form of life annuities or lump sum payments until the contingency covered by the plan occurs. Third, our results suggest that beneficiaries may be prey to a kind of financial illusion when they finally decide on their payout formula, leading them to prefer deferral of income tax over the alternative that would actually help them optimise their tax liability.

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