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POLICY PAPER

An Analysis of Taxation Supports for Private Pension Provision in Ireland

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Abstract: The size and distribution of the taxation supports for private pension provision has been a contentious issue. Research produced or commissioned by representative groups of the pensions industry in Ireland maintains that the tax supports are merely tax deferment, and the effective tax relief is lower than the 'headline' relief on pension contributions. Research by the OECD, on the other hand, suggests that pension savings are essentially tax free to the majority of pension savers. This paper estimates the value of the favourable tax treatment to private pensions provision, expressed as a percentage of the original amount invested, and analyses how it varies with income level, gender, saving period, and other factors. The net effective tax relief on pension savings on each Euro invested in a private pension is estimated by comparing the increase in the present value of pension savings over the lifetime of the individual when compared to other savings. We report that the net effective relief is considerably higher than estimated by the widely cited industry research, and depends on the value of the pension fund at retirement. We identify three distinct groups of individuals in the current regime of incentivising pension savings: those on low incomes who are offered no incentive, the standard rate tax-payers where the net effective tax relief is about 25-30 per cent, and the higher rate tax-payers where the net effective relief is about 31-51 per cent. We argue that current regressive taxation supports for pension savings should be reformed, and reformed before the proposed imminent introduction of an auto-enrolment retirement saving scheme.

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I INTRODUCTION

No rational agent would voluntarily lock their savings away until retirement unless there is a significant incentive to do so. This incentive is provided by the tax advantages given to pension savings and, accordingly, the developed private pensions industry in Ireland can be seen as dependent on tax supports.

Similar to most OECD countries, Ireland encourages private pension provision by granting tax relief to private pension savings. The Department of Finance estimates that the annual cost of tax reliefs on pension savings is €2.4 billion, and it represents the single biggest component of tax expenditures, accounting for about 45 per cent of total tax expenditures of €5.3 billion in 2014 (Department of Finance, 2017, p.7). According to the OECD, the overall budgetary cost in terms of tax relief on contribution ranks Ireland the highest of 16 countries studied, with an estimated cost in 2003 of 1.9 per cent of GDP (Yoo and de Serres, 2005, p.94). By 2050 taxation supports to private pensions in Ireland are expected to be the highest of all countries in the OECD (OECD, 2009).

The OECD (2009) has called for reform of taxation supports for private pension in Ireland and reforms were included as part of the agreement with the Troika of the European Commission, the ECB and the IMF in 2010 (European Commission, ECB and IMF, 2010). There is also a growing body of academic literature to suggest that Ireland could achieve a considerably better pension system for the considerable tax expenditure by a better weighing of the public interest against the interests of the pension industry (Doorley *et al.,* 2018; Whelan, 2018; Collins and Hughes, 2017; OECD, 2016; Hughes, 2005; 2002; 2001).

On the other hand, the pension industry in Ireland contends that the tax advantages on pensions are not tax relief but a tax deferment. Life Strategies (2008), in a research report commissioned by the Irish Association of Pension Funds (IAPF), contends that the value of the tax advantages is lower than the 'headline' marginal relief on contributions, and its value falls with increasing income above a salary level of about €45,000. The Life Strategies (2008) report cites academic literature to support their representation of their figures as the 'true cost of tax reliefs'. The Society of Actuaries in Ireland (2011) updates these figures in a *Position Paper on the Taxation of Private Pension Provision*, using a more recent tax code and somewhat different assumptions, and comes to the same broad conclusions with their updated 'true' rates of tax reliefs. In particular, the Society of Actuaries in Ireland reported in 2011 that tax relief is lower than the 'headline' marginal relief on contributions and falls rapidly for higher earners. This paper disagrees with these findings and, after correspondence with one of the authors, the Society of Actuaries in Ireland issued a supplementary note that amended their original figures and findings (Society of Actuaries in Ireland, 2017).

A five-year roadmap for pension reform in Ireland was published in February 2018 (Government of Ireland, 2018a). Amongst other things, the roadmap commits

to considering an auto-enrolment pension saving scheme for private sector workers, with a consultation process in-progress, starting in August 2018 and expected to be completed in early November 2018 (Government of Ireland, 2018b), with implementation of the finalised scheme targeted for 2022. Part of the action and commitment plan outlined in the Roadmap is to:

> *Review the cost of funded supplementary pensions to the Exchequer. To inform decisions relating to financial incentives for retirement savings and underpin the development of the automatic enrolment system, this will include an assessment of the economic and social benefits delivered and an evaluation of equity in the distribution of tax expenditure on pensions.* Government of Ireland (2018a, p.27).

This paper values the taxation supports to private pension provision in Ireland, and provides an analysis of how the value of the tax advantages varies with the savers' income level, saving period, gender, retirement age, and other factors that might be significant. The layout of the paper is as follows. First, we set out the background of policy formation in this area, concentrating on the last decade. Second, we outline how the amount of the tax subsidy can be valued, and contrast the widely adopted present value approach using the revenue-foregone method with other approaches. Third, the model and its parameters are described and the key results are summarised in tabular and graphic forms. The results are particularly sensitive to the size of the pension fund at the point of retirement, so we survey the size of individual pension savings in Ireland. We then compare the results of our analysis with those of four other studies. We outline the sensitivity of the results to model parameters. Finally, we investigate the effective subsidy to different pension savers if they opted in to the proposed auto-enrolment pension scheme, assuming no change in the current tax incentives. We report that the current system is regressive, with those on lower incomes being given a lower percentage subsidy. We conclude by summarising our findings and calling for reform of the current regressive taxation supports for pension savings.

II CONTEXT

The OECD has persistently recommended reform of the tax expenditures on private pension provision in Ireland since 1994. They cite four reasons: it is too generous, it is not effective, it is inequitous, and it is unsustainable.

> *Tax relief given against private pension contributions is a very significant tax expenditure. As noted in the 2008 Survey, many pensions are unlikely to be fully taxed at any point in the life cycle.* [This is equivalent to an EEE

> (exempt-exempt-exempt) model of taxing income that goes towards pensions, at the saving, accrual and payment stages (OECD, 2008)]. *But the current system of tax incentives does not provide an effective way of achieving adequate private provision, despite the generous level of support. They tend to act to divert funds from other investment, rather than to increase overall pension saving, as they are poorly targeted at marginal savers. The system performs badly in terms of equality since marginal tax relief on pension contributions is worth more than twice as much to the minority of high-income households paying the higher-rate of income tax than for those paying the standard rate. The overall level of tax subsidy for pension savings is projected to rise very sharply as the population ages and people build up retirement savings. Indeed, Ireland is projected to have the largest share of income committed to these schemes in 2050 of any OECD country. Reducing the level should be accompanied by a better targeting of subsidies.*
>
> OECD (2009, p.61).

Tax incentives, their overall cost and distribution, are obviously a sensitive issue to the private pensions industry. The pension industry achieved considerable influence over policy formulation from 1990 until 2014 through formal representation on the Pensions Board, the industry regulatory body and the statutory authority to provide ongoing advice on pension matters to the Minister for Social Protection (Maher, 2016; Whelan, 2018). Maher (2016), through a detailed analysis of the reports and consultations of the Pensions Board and interviews with key policymakers, makes the case that the Pensions Board "implied that pension taxation has been thoroughly analysed, although this was not the case" and by suppressing international findings and recommendations for reform in taxation supports demonstrated "an even more overt example of power is the complete absence of reference to the findings and recommendations of the OECD's 1994 report" (Maher, 2016, p.189). She concludes that

> *...the OECD's report was dismissed by removing a full examination of the [tax] expenditure from the agenda, whilst simultaneously implying such a review has already been completed* (ibid., p.200).

The Life Strategies (2008) report was influential in forming policy. In November 2010, the Government of Ireland published the *National Recovery Plan 2011-2014* which focussed on the urgent need to get the public finances back in order with "No person, group or sector can be absolved from making a fair contribution to the resolution of our economic difficulties" (p.8). It set a target of a total contribution of €700 million from the pension sector over the period of the plan. It proposed a phased reduction on income tax relief on contributions from the 41 per cent

marginal rate to the 20 per cent standard rate over the following three years. It referenced that Life Strategies (2008) report "the current tax arrangements are most beneficial to those on earnings of about €45,000 per annum" and stated that the Government "is willing to engage with the industry to examine alternatives to deliver this outcome" (Government of Ireland, 2010, p.94).

A reduction in private pension tax relief was incorporated into the formal agreement to ensure financing from the Troika of the IMF, European Commission, and ECB in early December 2010, with the commitment to raise tax revenues "by reducing various pension-related tax reliefs" (European Commission, ECB and IMF (2010), paragraph 23, p.8 of the Memorandum of Economic and Financial Policies). However, the then Fianna Fáil and Green Party coalition government was replaced by a Fine Gael and Labour coalition following a general election in February 2011. In practice, the new Minister of Finance, Michael Noonan, was equally open to engage with the pensions industry to find an alternative solution to raise revenue other than the standardisation of tax reliefs. When a small deputation from the life assurance and brokerage community suggested to him that a temporary levy on pension funds was preferable (as had been imposed in the past), he agreed (Maher, 2016, p.226) and the reform of the incentives for pension savings was deferred. A levy of 0.6 per cent of the value of pension assets in the accumulation phase was put in place, over each of the four tax years ending 2014. This was expected to raise about €470 million each year. In his 2012 Budget Speech on 6 December 2011, Minister Noonan stated that the reform of the tax reliefs was merely postponed:

> *Although the EU/IMF Programme commits us to move to standard rate relief on pension contributions, I do not propose to do this or make changes to the existing marginal rate relief at this time. However, the incentive regime for supplementary pension provision will have to be reformed to make the system sustainable and more equitable over the long term. My Department and the Revenue Commissioners will work with the various stakeholders in the next year to develop workable solutions.*
>
> Minister Noonan, 6 December 2011. Quoted from Department of Finance (2012), Strategy Group, Pension Taxation Issues 12/21 October 2012, p.6.

Maher (2016, pp.226-227) records that shortly after adopting the pensions levy, Minister Noonan met with another group from the industry protesting its introduction, where matters got heated and he accused the deputation of treason. Later, in developing workable alternatives to the proposed standardisation of tax reliefs, the Minister found the revenues raised by the alternative initiatives proposed and costed by a pension industry representative group did not materialise and so

he increased the levy to 0.75 per cent in 2014 and extended the levy into 2015 at the reduced rate of 0.15 per cent (see Maher (2016), pp.229-231).[1] From 2014 the influence of the pensions industry over pensions policy was weakened when the Pensions Act 1990, the statutory regulation of the industry, was amended to "obviate any perception of 'regulatory capture' by the industry" (Government of Ireland (2013a, p.47).

Now that public finances are in better order it is timely to revisit the total cost of tax incentives to private pension savings, its distribution and sustainability. Indeed, the first research project identified by the Pensions Council formed in 2015 to advise the Minister of Social Protection was to examine this issue[2] and this paper has been prepared to help their deliberations. It is all the more timely as proposals for a universal retirement savings system are already advanced and will shortly be announced (Government of Ireland, 2018a).

OECD (2013) lists tax expenditure reforms on pensions in Ireland as part of its key recommendations to "address the long-term spending pressures in the pension system" (p.17), arguing that "reducing on tax expenditures would both lower distortions to growth and improve equity" (p.15). This chimes with Government's commitment to

> *... support economic growth by ensuring any tax increases be effected in the first instance by base broadening through the elimination or curtailment of*

[1] As the Department of Finance (2013) observes "there are issues around the scale and timing of the Exchequer savings estimated by TPPG/Milliman" (p.4). TPPG was that Taxation Policy (Pensions) Group, an alliance between the Society of Actuaries in Ireland, the Irish Insurance Federation and the Irish Association of Pension Funds who engaged the actuarial consultancy Milliman and submitted alternative proposals to the standard rating of pension tax relief that would raise similar revenues. The TPPG had several meetings with the Department of Finance and the Revenue Commissioners over 2011 and 2012 and, with the aid of Milliman, produced a number of reports with costings that: "claimed savings to the Exchequer of close to €400 million in a full year which would not, in their view, be significantly different from the saving to the Exchequer from standard rating tax relief" (Department of Finance, 2013, p.3). In the event, a modified version of the TPPG proposals was put in place and the revenue savings were estimated by the Department of Finance to be of the order of just €120 million (see Noonan, Michael, 16 April 2014, Written Answer to question posed by Pearse Doherty, Department of Finance: Consultancy Contracts Expenditure, 18123/14). See also Maher (2016, pp.229-231), who provides a detailed analysis of how the TPPG's estimates of the additional Exchequer income could not be verified by the Department of Finance and argues that "the lack of clarity around the TPPG's figures completed the delegitimisation of the industry and led to an extension of the third pension fund levy". One of the authors of this paper asked the Society of Actuaries in Ireland for sight of these TPPG/Milliman reports but was refused being told: "Milliman advised that they cannot agree to you seeing these reports as they were prepared for the Society of Actuaries in Ireland and the other members of the Taxation Policy Group and may have included additional content if they had been intended for a wider audience; thus, they could be misinterpreted if considered out of context". Minutes of the Taxation Strategy Group 12/21 that also discussed the standardisation of tax reliefs is partly redacted (Department of Finance (2012), see paragraphs 17, 24-27, where it is not possible to follow their reasoning).

[2] See Minutes of the Pension Council Meeting on 19 January 2017 and 21 September 2017, available here: http://www.pensionscouncil.ie/en/Meeting-documents.

> *overly-generous, poorly targeted or otherwise unaffordable tax reliefs.* Government of Ireland (2013, p.23).

In particular, there have been proposals to decouple the incentives for pension savings from the tax system and instead simply incentivise such savings by an explicit subsidy or matching contribution of, say 38 per cent or 33 per cent of the amount saved (e.g., Commission on Taxation, 2009; Government of Ireland, 2010). Our analysis, presented later, estimates the current tax expenditure on each contribution, so the cost-neutral subsidy can be estimated if such a scheme were to replace the current one.

Ireland is not unique in encouraging pension savings through the tax scheme, with similar tax-based incentives in many EU and OECD countries (OECD, 2015a; OECD, 2015b). The OECD is currently engaged in a study of financial incentives for retirement saving to evaluate their cost effectiveness and their distribution and to contrast them against alternative financial incentives such as government matching contributions, government flat-rate contributions, or providing tax credits rather than relief (OECD, 2014a). The project is also examining the efficiency of abolishing incentives altogether and applying the cost of incentives to increase the state pension instead. Our analysis in this paper fits into this broader international project by providing a detailed study of the costs to the State of providing the tax supports to pension savings in Ireland, by analysing who benefits from it and to what extent, and how this might change with the introduction of the proposed auto-enrolment supplementary scheme (see later).

III STATE SUBSIDY THROUGH TAX RELIEFS TO PRIVATE PENSION PROVISION

Tax relief for pension savings in Ireland is granted at the individual's full marginal income tax rate on contributions made, investment returns, and the lump sum at retirement or earlier death, and then tax is payable as earned income on pension draw-down (see Appendix 1). This system is known as the 'Exempt-Exempt-Partial-Taxed system as opposed to the 'Taxed-Taxed-Exempt' system that applies to other savings (that is income tax must be paid before saving, the investment returns are taxed, but no tax is paid on withdrawals). Hence, when it comes to pension saving, the State gives upfront tax relief over the entire savings phase, with some measure of payback with pension drawdown which could be in several decades' time. This financial incentive to encourage pension provision is often referred to as 'tax expenditure' by state agencies and as 'deferred taxation' by the pension industry in Ireland.

The questions naturally arise as to what this favourable tax treatment or subsidy costs the State, who benefits from it, and to what extent. To answer these questions,

it is necessary to compare the proceeds of an amount invested in a private pension as compared to the same amount invested in another savings vehicle and estimate the present value of each. Saving via a private pension leads to a higher present value because of the differing tax treatment and the increase in the present value over ordinary savings gives a measure of the value of the State subsidy to pensions. If we express the increase in value as a percentage of the original amount invested then the result is often termed the 'net effective tax relief' granted to pension savings or, alternatively, the 'true rate of tax relief' or the 'net tax cost per unit of contribution'. In short, the net effective tax relief is the subsidy granted by the State on each €1 invested in a private pension, as compared to other savings.

An illustrative example will help in understanding how the net effective tax relief on pension saving is calculated. In Table 1, we estimate the net effective tax relief under the simplifying assumptions that the pension saver is subject to income tax at the marginal rate of 40 per cent when working, at the standard rate of 20 per cent when pension is being drawn down, and that investment returns on ordinary savings are subject to an average rate of tax of 30 per cent. The example further assumes that the saving period (that is the period between when the contribution is made and its ultimate value is drawn-down) is 20 years, that investment returns are 5 per cent per annum gross, and the appropriate discount rate to estimate present values is also 5 per cent per annum.

Table 1 works through the calculations under these simplifying assumptions. It shows that pension savings of €600 net to the individual grow to €2,653.3 over the 20 years before tax on drawdown (due to the €400 tax refund when the contribution is made and no tax on investment returns) while ordinary saving would only grow to €1,176.6. Paying the assumed 20 per cent income tax when the pension is eventually drawn down gives a net pension of €2,122.6, considerably higher than the €1,176.6 from ordinary savings. The extra amount of €946.0 in 20 years' time (that is €2,122.6 less €1,176.6) is discounted to the present day at a discount rate of 5 per cent per annum and divided by the original €1,000 gross invested to give the net effective tax rate of 35.7 per cent.

The simplified model above leads to some insights. There are three distinct components in calculating the net effective tax relief: the present value of the (1) tax relief on pension contributions plus (2) the tax relief on investment returns on the pension fund less (3) the tax on pensions when paid. In the illustrative example, the net effective tax relief of 35.7 per cent is made up of (1) 40 per cent tax relief on pension contributions, (2) 15.7 per cent tax relief on investment returns less (3) 20 per cent tax on the eventual pension. This insight allows us to conclude that if no tax is paid on the eventual pension then the net effective tax relief goes up to 55.7 per cent, keeping everything else the same in the simple model. Also, it is clear that the longer the period between initial saving and eventual drawdown, the bigger the net effective tax relief as the value of the second component increases (that is,

Table 1: Illustrative Example: Estimating the Net Effective Tax Relief on Pension Savings in Ireland

Pension Saving	€	*Ordinary Saving*	€
Individual's Post-Tax Contribution	600.0	Individual's Post-Tax Contribution	600.0
Tax Refund	400.0	Tax Refund	0.0
Initial Value of Fund	1,000.0	Initial Value of Fund	600.0
Gross Value of Fund End Year 1	1,050.0	Gross Value of Fund End Year 1	630.0
Tax Due	0.0	Tax Due (i.e. 30 per cent of €30)	9.0
Net Value of Fund End Year 1	1,050.0	Net Value of Fund End Year 1	621.0
Gross Value of Fund End Year 2	1,102.5	Gross Value of Fund End Year 2	652.1
Tax Due	0.0	Tax Due	9.3
Net Value of Fund End Year 2	1,102.5	Net Value of Fund End Year 2	642.7
…		…	
Gross Value of Fund End Year 20	2,653.3	Gross Value of Fund End Year 20	1,193.9
Tax Due	0.0	Tax Due	17.3
Net Value of Fund End Year 20	2,653.3	Net Value of Fund End Year 20	1,176.6
Tax Payable on Drawdown (20 per cent of €2,653.3)	530.7	Tax Payable on Drawdown	0.0
Net Value at Drawdown	2,122.6	Net Value at Drawdown	1,176.6
Present Value of Drawdown	800.0	Present Value of Drawdown	443.4
Net Effective Tax Relief on Original Contribution	35.7%		

Source: Authors' own calculations.

the value of the tax relief on investment returns on the pension fund). So if we assume a savings period longer than 20 years then the net effective tax relief is greater.

However, a more sophisticated model must be developed to estimate more accurately the net effective tax relief on pension saving. An amount put aside for a pension now gets tax relief now, and on the investment income in each future year, but tax and other deductions on earned income (e.g., USC, PRSI) is eventually paid on the pension over the future period it is paid. The more sophisticated model must forecast cashflows over this future period until the last pension drawdown, a projection period that depends on the longevity of the pension saver and possibly his or her spouse. Allowance must be made for how income taxation now and over the future period depends on the then income level of the person – so, for instance,

the model must allow for the State contributory pension (including perhaps adult dependent additions) during pension payment. The model must allow for taxation on savings (both income and capital gains) now and over the projection period, which again could depend on the then income of the person and the type of investments made. Allowance must be made for inflation, for salary escalation, and the rate of increase in the State pension over the long projection period. The model must assume rates of return on investments and appropriate discount rates to estimate the present value of future cashflows. This invariably leads to a complicated model but, as we shall see, the results are similar to the simple illustrative model.

IV OTHER APPROACHES TO EVALUATING THE STATE SUBSIDY TO PRIVATE PENSION PROVISION

The estimates of the net effective rate of tax relief on private pension arrangements presented in this paper are based on the present value approach using the revenue-foregone method to measure tax expenditures. The revenue-foregone method measures the amount by which tax revenues are reduced by a particular tax concession under the assumption of unchanged behaviour. To do so we estimate, over the future lifetime of the individual, the present value of the future flows of tax revenues foregone on contributions and investment growth, and offset these forgone tax revenues against the present value of tax revenues collected on pension payments. We express the cost using the outlay-equivalent method, which expresses the cost of providing the same monetary benefit to the individual through direct spending, assuming that behaviour is unchanged as a result of the tax concession. This approach is common in the literature (see, for instance, Munnell, 1991; Yoo and de Serres, 2004; 2005; OECD, 2016). Pensions experts in Ireland, along with the academic literature, favour the present value approach of revenue foregone (see, for instance, Society of Actuaries in Ireland, 2011; Life Strategies, 2008; Pensions Board, 2005, pp.60-61).

The present-value approach to estimate the revenue forgone above can be contrasted with the cash-flow approach to estimate the revenue forgone, used by the Department of Finance (2017), the Revenue Commissioners (2016), and the Department of Social and Family Affairs (2007). They estimate, using this approach, the current annual cost of the subsidy to pension saving is about €2.4 billion (Department of Finance, 2017). The cash-flow approach looks at a calendar year or other stated period and estimates the cost of tax concessions in that year or period. It is done by estimating the total cost of tax relief on contributions in the period (including the benefit-in-kind on employer's contributions), the total cost of tax relief on income and gains of pension funds in the period, and offsets these with the estimated tax yield during the period on top-up pensions in payment. The

problem with the cash-flow approach is that it mixes the cashflows of different generations of pension savers in a single calendar year or other period. In short, the cash-flow approach answers a different question, namely the cost to the State of maintaining the tax reliefs in a year or other period, assuming no change to behaviour if the tax incentives cease. The present value approach, on the other hand, relates future additional tax flows from future additional pensions to current and future tax expenditure that generates those tax flows, and thus computes the net effective rate of tax relief.

V DESCRIPTION OF THE MODEL TO ESTIMATE THE EFFECTIVE TAX RELIEF ON PENSIONS

We developed a cashflow model to estimate the effective tax relief on pension savings. We outline the key assumptions in our model and outline the results in this section. Later we analyse the sensitivity of the results to the assumptions underlying the model. The current tax reliefs on pension contributions, pension benefits, and investment returns are summarised in Appendices 1, 2, and 3 respectively.

Collins and Hughes (2017, Table 4) report from their analysis of the Central Statistics Office Survey of Income and Living Conditions from 2014 that the average contribution per contributor to private pensions is 9.3 per cent of earnings or €5,058 (including employer's contribution if there is one) and the median contribution is 8 per cent of earnings or €3,340. It seems reasonable therefore to assume for the purposes of our modelling exercise that the average individual contribution level (including the employer's contribution) is of the order of 10 per cent of earnings.

There are fewer data on the average period of pension savings in Ireland. Cooper (2002) shows, in the context of the similar British system, that it is more financially advantageous for the pension saver to begin to save later in their working life, after the high expense of child rearing and after mortgage is repaid – in short, it is not optimum to have outstanding borrowings when pension saving due to the higher risk-adjusted cost of borrowing:

> *The author concludes that the usual message, to save a fixed proportion of income throughout a working lifetime, is at best not helpful and at worst could lead to a lower standard of living over the household's lifetime. People can and should manage the timing of their saving and borrowing in order to achieve optimum incomes.* Cooper (2002), Quote from Abstract, p.851.

This suggests that the average saving period is less than the average working career. We have assumed that the average saving period of those that save for a pension is 25 years. Evidence based on the size of individual pension retirement accounts and

the value of individual pension entitlements considered in a later section are not inconsistent with this assumption but suggest, if anything, this input to our modelling probably errs on being too high an estimate, (maybe especially so for women whose career earnings are reduced during periods of unpaid caring duties). Later we discuss the sensitivity of our results when the saving period is longer or shorter than the assumed 25 years.

At retirement, we assume the retiree will take one-quarter of the fund as a tax-free lump sum (see Appendix 1), as this is the more financially valuable option. The remainder of the fund is assumed to be drawn down evenly over 20 years. The results of our analysis are not especially sensitive to the draw-down period (that is, the period in retirement) as we discuss later. We further assume that the pensioner qualifies for full contributory State pension at retirement, with full dependant's pension if there is an adult dependant.

Employer contributions are treated as a benefit-in-kind to the employee so are treated in the same manner as employee contributions. That is, employer contributions are considered as if they are paid to the employee as part of their salary who then saves them in a pension arrangement. This is the standard approach in treating employer contributions in these modelling exercises.

Income tax bands and reliefs depend on the marital status of the individual. Accordingly, we have provided figures on the alternative bases that the individual is (1) a married person in a single income household, and (2) a single person.

The economic and investment assumptions employed are consistent with widely adopted bases in the industry for reasonable projections of pension values, and similar to those used in OECD (2016).[3] In short, we assume that future inflation is 1½ per cent per annum over the projection period and wage growth is 2½ per cent per annum (so wage growth is assumed to be, on average, 1 per cent per annum higher than inflation over the projected period). Investment returns are assumed to average 4½ per cent per annum after investment charges. At retirement and after taking the tax-fee lump sum, the retirement fund is assumed to be invested in less risky investments, providing a net real return of ½ per cent per annum. Consistent with these assumptions, we further assume that

- The State contributory pension (and the adult dependant's allowance) increase in line with general salary escalation.
- Tax on future earned income is payable at the same percentage rate as it is at current salary levels. So, say, the proportion of a current salary paid in tax or other deductions is x per cent, then the proportion of the future salary payable as tax or other deduction is also x per cent, when the salary is escalating at the assumed wage growth rate.

[3] See, for instance, the Society of Actuaries in Ireland, *Actuarial Standard of Practice PEN-12, Statement of Reasonable Projection – Occupational Pension Schemes and Trust RACs*. [Version 1.6, effective from 1 October 2017].

A key assumption in our model is the tax rate assumed on investment income, as the result is particularly sensitive to the rate assumed. Appendix 3 briefly treats the taxation of investment income and gains on pension savings and compares it with the taxation of other savings vehicles. It shows that non-pension savings are typically subject to a capital gains tax at a rate of 33 per cent (above a low threshold) and that income generated from investments (by way of dividends, rents, or interest) are typically charged at the marginal rate of income tax of the individual saver (so 20 per cent for standard rate tax-payers and 40 per cent for higher rate tax-payers). This suggests that standard rate tax-payers pay tax on investment returns (from income or capital gains) at somewhere in the range 20 per cent to 33 per cent while higher rate tax-payers pay tax on investment returns at somewhere in the range 33 per cent to 40 per cent. In our modelling, we provided figures based on the assumption that the effective rate of tax on investment returns is 20 per cent and, alternatively, 30 per cent. The lower 20 per cent rate is more suitable to use for those whose income level has them paying income tax at the standard rate, while the 30 per cent rate is more suitable for those paying income tax at the higher level. In both cases, we believe our estimate of the value of the tax relief granted on investment returns from pension saving is, if anything, slightly understated.

VI RESULTS: THE NET EFFECTIVE RATE OF TAX RELIEF ON PENSION SAVING IN IRELAND

An individual that saves 10 per cent of salary over the 25 years prior to retirement, and does not take a lump sum but draws down the retirement fund evenly over 20 years in retirement can expect a pension of about one-fifth of salary, additional to any State contributory pension, according to our earlier modelling assumptions. If a tax-free lump sum of one-quarter the fund is taken at retirement, the remaining fund would provide a pension of about the one-seventh of salary. The net effective rate of tax relief granted by the State to such an individual depends on their level of income and marital status. In Table 2 and Figure 1 we set out the results from our modelling exercise of the net effective rate of tax relief at different income levels, for both married and single individuals and with tax on investment returns assumed to be at either 20 per cent or 30 per cent. Please note that due allowance has been made for PRSI and USC deductions (see Appendix 1 for details of rates and bands).

Table 2 and Figure 1 show that there are three distinct income levels that benefit from the tax advantages of pensions savings to different degrees. First, the higher rate tax-payers benefit the most. Next is the standard rate tax-payers where the tax advantages per unit invested are about 20 per cent less than the higher rate tax-payers. Finally, the group who are exempt from income tax because of low income

Table 2: Net Effective Rate of Tax Relief, Estimated Assuming Individual Saves 10% of Salary over the 25 Years Prior to Retirement, Takes 25% of Total Fund at Retirement as a Lump Sum and Draws Down the Remainder Evenly Over 20 Years. Tax on Investment Income Assumed to be Either 0% (For Income Levels Below the Income Tax Threshold), 20% or 30%.

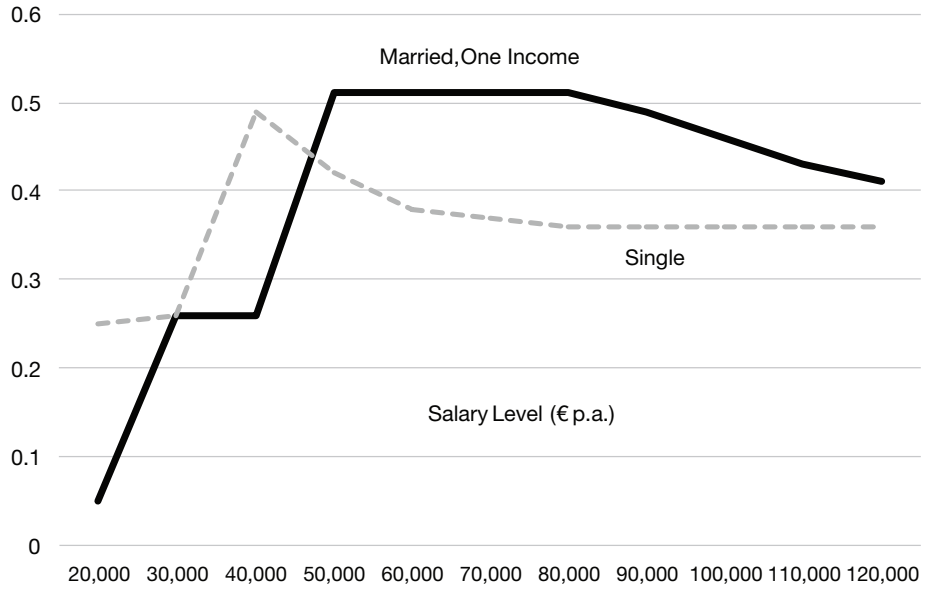
	Married Person, one income household			*Single Person*		
Salary (€)	*Tax on Investment Income assumed at*			*Tax on Investment Income p.a. assumed at*		
	0%	20%	30%	0%	20%	30%
5,000	**–5%**	–	–	**–1%**	–	–
10,000	**–1%**	–	–	**1%**	–	–
20,000	**–3%**	–	–	–	**25%**	30%
30,000	–	**26%**	30%	–	**26%**	30%
40,000	–	**26%**	31%	–	44%	**49%**
50,000	–	46%	**51%**	–	38%	**42%**
60,000	–	46%	**51%**	–	33%	**38%**
70,000	–	46%	**51%**	–	32%	**37%**
80,000	–	46%	**51%**	–	32%	**36%**
90,000	–	44%	**49%**	–	31%	**36%**
100,000	–	42%	**46%**	–	31%	**36%**
110,000	–	39%	**43%**	–	31%	**36%**
120,000	–	36%	**41%**	–	31%	**36%**

Source: Authors' own calculations.
Note: Figures in **bold** represent best estimates.

to which the current system offers no incentive to save for a pension. In fact, often this low income group is disincentivised from saving for pensions with a negative expected return under our model as USC is levied on eventual pension drawdown. These three distinct groups are blurred around the edges, as individuals transition between them.

A key insight from our model is that the net effective rate of tax relief depends significantly on the value of the fund at the point of retirement. As a rule of thumb, a married couple can accrue a fund of up to nine times the average national salary level in Ireland (or one-third of a million Euros in present day terms) at the point of retirement without paying tax at any point on the savings – tax is not paid on contributions, on investment returns, or on the pension. Effectively, the tax system is an exempt-exempt-exempt (EEE) for savings up to this amount. Single people can save up to about four times the average national salary level (or €150,000 in present day terms) without being subject to tax at any point in the savings cycle.

Figure 1: Best Estimate of Net Effective Rate of Tax Relief on Pension Savings



Source: Authors' own calculations. See Table 2.

Box 1: Summary of the Model Outcomes, for Pension Savings up certain limits

Low Income (so do not pay income tax)
Current system offers no incentive to save for a pension (sometimes disincentivises)
Net Effective Tax Relief Rate c. 0 per cent

Standard Rate Tax-Payers
EEE system applies up to a retirement fund of nine times average national salary level or €0.33 million for married couple with one income household.
Or to a retirement fund of four times average national salary level or €150,000 [Single]
Net Effective Tax Relief Rate c. 25-30 per cent

Higher Rate Tax-Payers
EEE system applies up to a retirement fund of nine times the average national salary or €0.33 million [Married, one income household]
Or to a retirement fund of four times average national salary level or €150,000 [Single]
Net Effective Tax Relief Rate c. 31-51 per cent.

We varied the investment and economic assumptions underlying our model to examine the sensitivity of the results to these assumptions. We found our conclusions above robust to reasonable changes in these parameters – that is, the results of this additional modelling replicated the overall distribution and magnitude of the results of the central model assumptions above.

One limitation of our modelling should be borne in mind: the model only analyses the interaction between supplementary pension savings, the tax system, and the contributory pension system. The wider interaction of supplementary pension savings with the social welfare system has not been treated. This limitation of our modelling exercise could impact the effective rate of return on additional pension saving for the lower paid. So, for instance, it is a possibility that those on low pay, or with a limited career in paid employment, who might not be eligible for the full State contributory pension come retirement, might have any pension savings means-tested to reduce the non-contributory pension payable – hence the individual might not benefit, or benefit to only a limited degree, from extra pension saving. This would effectively be a negative tax relief on this supplemental pension saving.

Table 3: Expected Top-Up Pension and Total Pension for a Married Person, with one Income in the Household Assuming the Individual Saves 10% of Salary over the 25 Years Prior to Retirement, Does Not Take a Lump Sum but Draws Down the Pension Evenly Over 20 Years.

Salary	*State Pension (monetary value)*	*State Pension (% of salary)*	*Top up Pension (monetary value)*	*Top up Pension (% of salary)*	*Total Pension (monetary value)*	*Total Pension (% of salary)*
€5,000	€23,575	471%	€972	19%	€24,547	491%
€10,000	€23,575	236%	€1,944	19%	€25,519	255%
€20,000	€23,575	118%	€3,888	19%	€27,463	137%
€30,000	€23,575	79%	€5,832	19%	€29,407	98%
€40,000	€23,575	59%	€7,776	19%	€31,351	78%
€50,000	€23,575	47%	€9,720	19%	€33,294	67%
€60,000	€23,575	39%	€11,663	19%	€35,238	59%
€70,000	€23,575	34%	€13,607	19%	€37,182	53%
€80,000	€23,575	29%	€15,551	19%	€39,126	49%
€90,000	€23,575	26%	€17,495	19%	€41,070	46%
€100,000	€23,575	24%	€19,439	19%	€43,014	43%
€110,000	€23,575	21%	€21,383	19%	€44,958	41%
€120,000	€23,575	20%	€23,327	19%	€46,902	39%
€130,000	€23,575	18%	€25,271	19%	€48,846	38%
€140,000	€23,575	17%	€27,215	19%	€50,790	36%
€150,000	€23,575	16%	€29,159	19%	€52,734	35%

Source: Authors' own calculations.

For completeness, we set out in Table 3 the expected additional pension and total pension for a married person, with one income in the household assuming the individual saves 10 per cent of salary over the 25 years prior to retirement, does not take a lump sum but draws down the remainder evenly over 20 years. Note that such a savings plan achieves or exceeds the original National Pensions Policy Initiative target of a 50 per cent replacement income after retirement for those on salaries up to c.€80,000 per annum (see Pensions Board, 2005).

VII SIZE OF INDIVIDUAL PENSION SAVINGS

Data are not readily available on the value of pension funds attributed to individuals in Ireland. However what information there is suggests that the average pension pot is below the thresholds identified above. Accordingly, the majority of pension savers will pay no tax on their pension savings at any point in their lifecycle.

Consider the average value of pension pots in the accumulation phase. The Pensions Authority Annual Report and Accounts 2016, reports that the number of Personal Retirement Savings Accounts (PRSA) is 250,719 at the end of 2016 with total assets of €5.6 billion (p.33). This gives an average PRSA account of €22,336. Of course, these accounts can still grow before retirement and individuals could have more than one account but there is considerable scope to save more before any tax liability will be incurred. There are other personal pension arrangements available in Ireland, such as Retirement Annuity Contracts or Buy Out Bonds, but there is no register of their number or size (Department of Social Protection, 2012, p.25).

There is more information available on the number and size of occupational pensions. The Pensions Board (2014) reported 886,405 active members of occupational defined contribution schemes in 2013 with total assets as at the end of 2011 of €26.5 billion (pp.2-3). This gives an average pension pot of €30,586. The Pensions Authority (2017b), estimates that there are 415,300 deferred members in defined benefit pension funds with an average liability of €12.0 billion, giving an average liability per deferred member of €28,895. There are 111,397 active members of such schemes with a liability value of €11.9 billion, giving an average liability value of €106,825.

The average size of the pension pot at retirement is even more difficult to estimate from the available data. The Society of Actuaries in Ireland (2015) estimates that at the end of 2013 there were 56,000 retirees with Approved Retirement Funds with a total value of €6 billion (see pp.13-14). This is an average retirement pot of €107,143 each. The Pension Authority (2017b) estimates that the pensioners in funded defined benefit schemes number 102,015 in 2016, with a total liability value of €34.0 billion. This gives an average liability value of €333,284.

Accordingly, a review of the available statistics on the number and value of pension entitlements suggests that the majority are too small to ever incur a tax liability. Our analysis agrees with the earlier conclusion of the OECD (2008) that in Ireland "many pensions are unlikely to be fully taxed at any point in the life cycle". The tax incentive as applied in practice amounts to tax-free saving for pension for most, rather than tax deferred saving. Given its importance for policy development, we recommend that data on the pension assets of current workers and pensioners be collected and published in a more systematic manner than currently.

Collins and Hughes (2017, Table 5, p.503) estimate that in 2014, 70.6 per cent of pension savers are in the higher rate tax bracket, so that pension savers are enjoying tax relief of 31-51 per cent, according to Table 2. Indeed, they report that more than half of the total tax relief on contributions in 2014 went to those in the top income decile in Ireland, and more than 80 per cent went to the top three income deciles (Collins and Hughes, 2017, Table 6, p.504)

Yoo and de Serres (2004) note that Ireland is an outlier amongst OECD countries as the actual cost to the State of tax relief on contributions made is 1.9 per cent of GDP, the highest of all countries studied (Figure 4, p.38) and implies a very high average contribution expressed as a percentage of the average wage (Figure 5, p.38). In fact, the average contribution as a percentage of the average wage in Ireland (at 37.6 per cent) is more than twice that of the next nearest country in the calendar year 2000. This suggests that pension saving in Ireland is skewed in terms of amounts saved to very high earners.

There have been two official reviews of the taxation supports to pensions since 1985: Commission on Taxation (2009), already alluded to, and Department of Finance (2005). The Department of Finance (2005) review reported, among other things, that in many cases the tax reliefs were very generous and the relief was sometimes used for wealth and estate planning rather than for pension purposes. It highlighted a couple of cases where the pension fund was about €100 million and, in bold, states:

> *the analysis does suggest, however, that for those who have the capacity to survive in retirement without the need to rely on funds invested in an ARF, our "EET" system of pension taxation is much closer to an "EEE" system where effectively no tax is paid, or if it is, it is at a low rate and far into the future* (p. G22).

Indeed, the publication notes that the only tax paid could be limited to taxation on transfer on death. These findings prompted some amendments to the taxation code, placing limits on fund size (now €2 million) amongst other things, although those in breach were allowed to apply for exemption. This report makes the following key point in the first paragraph of the executive summary:

> *Current tax reliefs appear to be very generous in relation to individuals whose employers are in a position to make substantial tax deductible contributions to their schemes effectively without limit, particularly in circumstances where they can influence the level of employer contributions and their remuneration level.*
>
> Department of Finance (2005), p.G2.

In this regard, it is of interest to note that, outside of frozen schemes (that is, where benefits no longer increase with service) where the number of members is not known, over 80 per cent of funded pension schemes in Ireland are single member schemes (Pensions Authority, 2016b). So, of the 84,519 total (non-frozen) funded schemes in Ireland, some 68,602 are single member pension schemes (ibid., p.6). Indeed, as the Pensions Authority remarks, despite Ireland's small size: "Ireland has more small and single member schemes than any other country in Europe" (p.9) and there are "over 180,000 individual and corporate trustees listed in the Authority's records" (p.9). In fact, considering all pension schemes, with "just 1 per cent of the EU population, Ireland is home to about 50 per cent of all pension schemes in the EU" (Government of Ireland, 2018a, p.14). Perhaps further study is warranted to ascertain the proportion of these single member schemes where the member can influence the employer's contribution level or their own remuneration level.

VIII SENSITIVITY OF RESULTS TO MODEL ASSUMPTIONS

The results of the model are dependent on the assumptions used. There are two distinct categories of assumptions required in the modelling exercise: assumptions relating to the individual saver and broader economic and investment assumptions. The results are not particularly sensitive to the latter, as discussed earlier. In this section we analyse the sensitivity of the results to the saving and drawdown pattern of the individual pension saver.

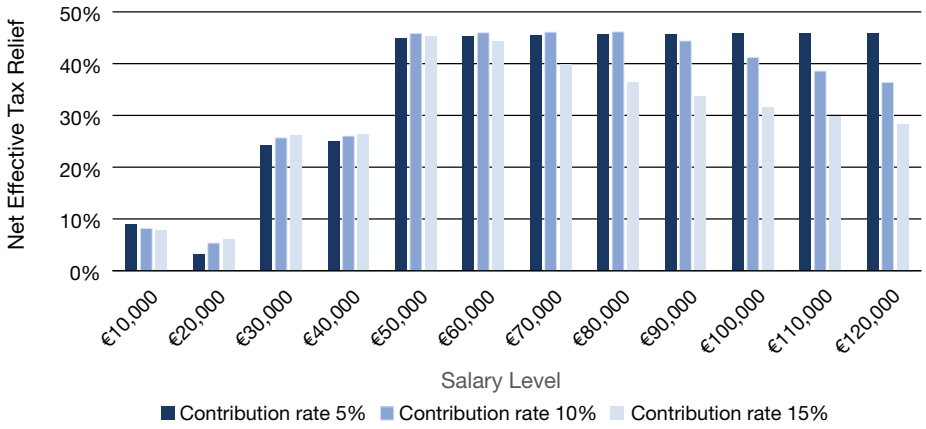
The assumptions regarding the individual pension saver relate to: the level of the contributions towards their pension; the period the individual will save for their pension; and the length of time the individual will draw down their pension. The overall pattern of the net effective tax relief is not fundamentally changed by altering these factors. We treat each of these in turn below.

8.1 Contribution Level

Employee pension contributions are tax free, subject to certain limits which are age related. This tax relief is granted at an individual's marginal rate of tax, but there is no relief from PRSI deductions and the Universal Social Charge. Appendix 1 sets out the available tax relief on employee and employer contributions in more detail.

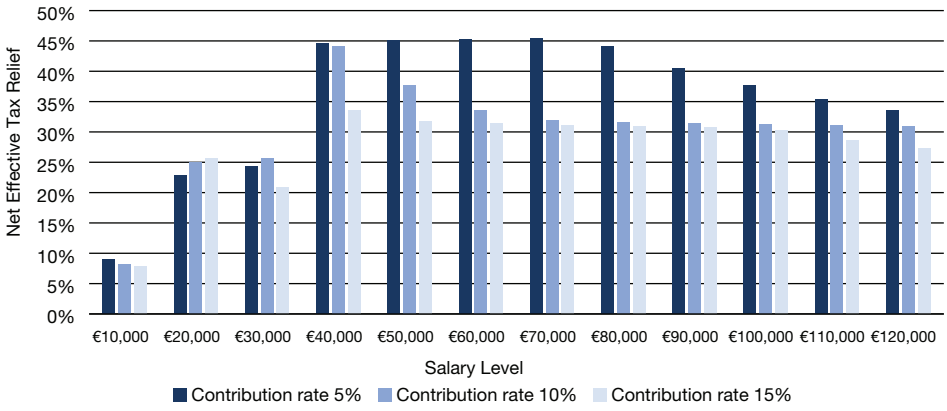
We investigated the sensitivity of the results of our modelling earlier to the level of the contribution rate. Keeping all other assumptions unchanged, we considered the impact on the net effective rate of tax relief if contribution rates were 5 per cent or 15 per cent over the complete saving period. As before, we modelled the results for both single and married persons with tax on investment income assumed at both 20 per cent and, alternatively, 30 per cent. Below are the results assuming a tax rate of 20 per cent on investment income. The pattern of the distribution of the net effective tax relief granted assuming a tax rate of 30 per cent on investment income developed in a similar, but higher, pattern.

Figure 2: Sensitivity to Contribution Rate, Married Person, 20 Per Cent Tax on Investment Income



Source: Authors' own calculations.

Figure 3: Sensitivity to Contribution Rate, Single Person, 20 Per Cent Tax on Investment Income



Source: Authors' own calculations.

There is very little difference in the net effective rate of tax relief for a married individual earning less than €60,000, as the contribution rate varies from 5 per cent to 15 per cent of income. Above a salary level of about €60,000, an increase in contribution rate results in a gradual reduction in the net effective tax relief available.

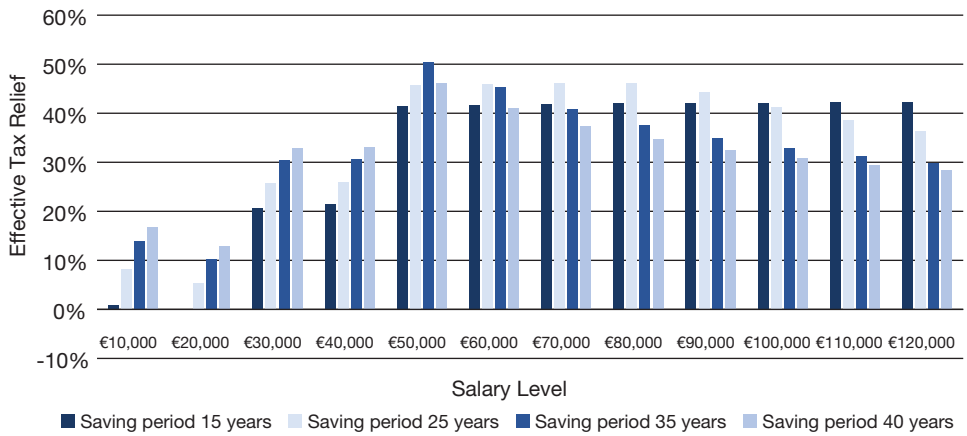
For single person, the pattern is similar but now the peak in net effective rate of tax relief occurs at a lower salary level as the contribution rate increases.

8.2 Saving Period

The saving period assumed earlier was 25 years. As previously noted this may be considered too long, particularly for women whose employment pattern tends to be more fragmented. We explore the sensitivity of the results of our modelling to this assumption by considering the impact on the results if the contribution period was 15 years, 35 years or 40 years, and set the results alongside the results from our central assumption of 25 years. In undertaking this analysis, all the other core assumptions remain unchanged, i.e. we have assumed a contribution rate of 10 per cent, a drawdown period of 20 years, and we provide results for both single and married persons. We only set out the results of the analysis assuming a 20 per cent rate of tax on investment returns, but a similar pattern emerges but with a higher rate of net effective tax relief if a higher rate on investment returns is assumed.

For a married person earning up to €40,000 p.a., an increase in the savings period results in an increase in the net effective tax relief. For those earning between €60,000-€90,000 p.a., the optimum period of saving to maximise the net effective tax relief is in the region of 25 years, whereas for those earning above €90,000 the optimum savings period to maximise tax relief received reduces to 15 years.

Figure 4: Sensitivity to Saving Period, Married Person, 20 Per Cent Tax on Investment Income



Source: Authors' own calculations.

As illustrated below, for a single person on an income of €20,000 or less, an increase in the savings period will result in a significant increase in the net effective tax relief. For those earning between €50,000-€100,000 p.a. increasing their saving period beyond 15 years results in a net reduction in the effective tax relief, and for those earning above €110,000 the impact of an increase in their savings period is negligible.

Figure 5: Sensitivity to Saving Period, Single Person, 20 Per Cent Tax on Investment Income

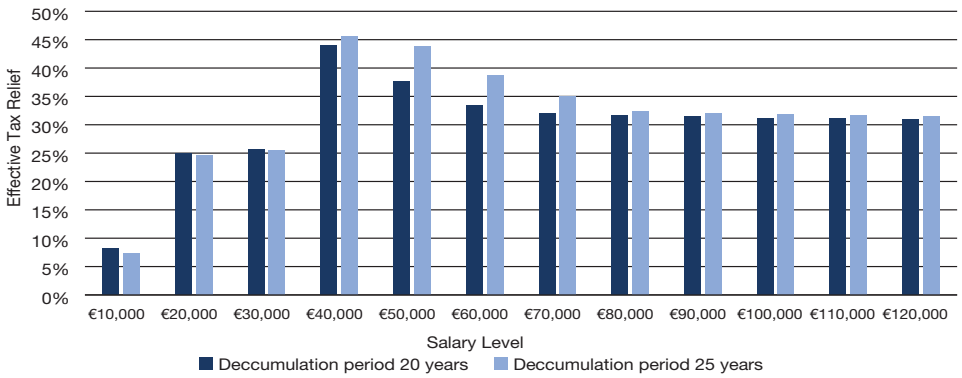
Source: Authors' own calculations.

This analysis highlights an interesting anomaly in the current system of tax relief for pension saving. A single person on a salary of €10,000 gets net effective tax relief of less than 1 per cent to save for their pension for a period of up to 15 years, whereas a single person earning a salary of between €40,000-€80,000 p.a. would receive net effective tax relief in the region of 40 per cent (Figure 5). Likewise Figure 4 highlights, under the current system of tax relief, a married person earning a salary of €20,000 p.a. who currently makes pension contributions for a period of 15 years will receive tax relief in the region of -0.20 per cent (i.e., it will effectively cost them to save for their pension).

8.3 Longevity (Period in Retirement)

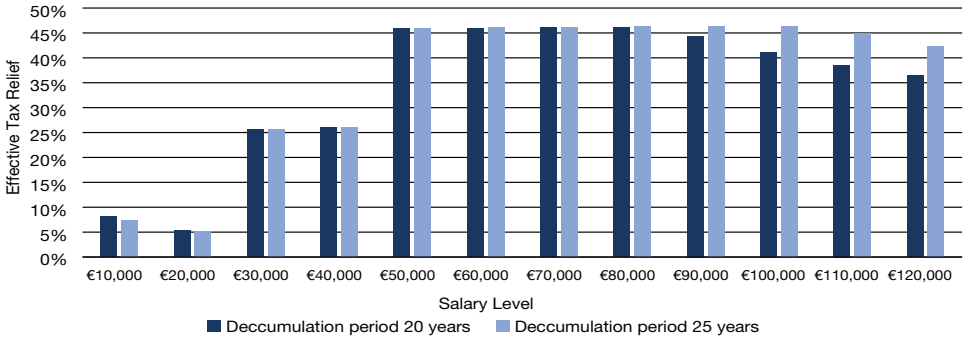
Women live longer than men, on average, and wealthier people live longer than the less wealthy on average. We investigated the sensitivity of the effective tax subsidy to the longevity assumption to determine which groups are better incentivised. To do so we compare the results of our modelling if the post-retirement period of 20 years (as originally assumed) was increased to 25 years, assuming all other parameters remained the same and assuming tax rate of 20 per cent on investment returns. The results of this analysis are shown graphically in Figures 6 and 7.

Figure 6: Sensitivity to Longevity, Single Person, 20 Per Cent Tax on Investment Income



Source: Authors' own calculations.

Figure 7: Sensitivity to Longevity, Married Person, 20 Per Cent Tax on Investment Income



Source: Authors' own calculations.

The results are not particularly sensitive to longevity. Extended longevity tends to increase the effective tax relief for higher earners.

We conclude this section by summarising the results in Box 2.

Box 2: Summary Results of Our Sensitivity Analysis

The results of our modelling, summarised in Box 1, are not particularly sensitive to the economic and investment assumptions used. The results are reasonably robust to individual savings patterns, such as the level of contributions, the saving period, and the period in retirement.

The net effective rate of tax relief varies primarily by income level, with those earning more enjoying a higher net effective rate of tax relief on pension savings. Accordingly, women as a group are less incentivised to save for a pension than men as a group due primarily to their lower earnings.

IX COMPARISON OF OUR RESULTS WITH THOSE OF OTHER STUDIES

Yoo and de Serres (2004) provide a comparative international evaluation of the tax incentive schemes for pension savings in all OECD countries. The pension saver in Ireland is assumed to be subject to tax at the standard rate (p.10 and Figure 1 on p.44 and Table 3 on p.29). Using a similar present value methodology to us (but with different assumptions, especially on tax on pension income, and using the tax code in force in 2003), they estimate the net cost per unit of contribution for a pension saver in Ireland is about 29 per cent (Table 3, p.29). This compares well with our estimate of 25-26 per cent in Table 2 for standard rate tax-payers.

Chapter 2 in OECD (2016) provides a more up-to-date and detailed analysis of the tax advantages on pension savings in many countries, including Ireland. It reports that the overall net effective rate of relief for the average wage earner in Ireland in 2015 was 35 per cent, comprising 40 per cent tax relief on contributions, 24 per cent as the present value of tax relief on investment returns, less 29 per cent as the present value of tax paid on pensions (Table 2.5, p.64). The average annual earnings in Ireland in 2016 was €36,919, while the average annual earnings for full-time workers in Ireland was €45,611 (CSO, 2017). Their model assumed a 10 per cent contribution rate of salary over the entire future working life (from 20 years of age to 68 years of age), assumed inflation at 2 per cent, salary escalation at 1.5 per cent above inflation, and a 3 per cent real rate of return on investments (and, accordingly, a 3 per cent real discount rate). The 35 per cent net effective relief reported by the OECD (2016) is consistent with the figures presented in Table 2 earlier for higher rate tax-payers.

There have been two other reports analysing the value of the tax incentive scheme for pension saving in Ireland and showing how it varies by income level: Life Strategies (2008) and the Society of Actuaries in Ireland (2011). The net effective tax relief reported in these studies is materially different from our earlier figures and those of the OECD. Both reports, using the same present value methodology, suggest that 'true' rate of tax relief is lower than the headline rate of tax relief on contributions, peaks for those earning around €40,000 to €45,000 per annum, and then declines. The report of the Society of Actuaries suggests that the net effective tax relief declines to be close to 0 per cent for higher earners. As noted earlier, these industry reports have been influential in forming policy in this area. Our figures show that, under our central assumptions, the 'true' rate of tax relief is higher than the headline rate of tax relief on contributions for the vast majority of pension savers. The tax relief granted for higher rate tax-payers does not decline to be close to zero but remains in excess of 25 per cent in all cases modelled, including in the sensitivity modelling. In fact, our analysis points to anomalies with the current tax-based incentive system for lower earners, which were not identified in these industry studies.

We believe that the figures for the 'true' or net effective tax relief presented in these reports are incorrect and misleading. The Society of Actuaries in Ireland in its 2011 report states that it estimates the "'true' rate of tax relief" by "offsetting the stream of projected future tax revenues against the stream of projected future reliefs and taking the present value of the projected net relief/revenue in each future year" (p.5). However, like the earlier Life Strategies (2008), it assumes that the tax on fund growth is 0 per cent. In short, it ignores the value of the tax relief on investment income and capital gains. Further, the financial assumptions used state that they assume fund growth at 5 per cent per annum but discount the proceeds from this growth at, they state, 3 per cent per annum. This also appears inconsistent to us. Overall both reports did not compare the tax differences between an EET system and TTE, despite the commentary stating that is what is being done, but compared an EET system and a TEE system. The main conclusion of the Society of Actuaries in Ireland report that the "effective rate of tax relief is lower than the headline rate" (Society of Actuaries in Ireland, 2011, p.6) is a straightforward consequence of the approach adopted and did not require any calculations to arrive at that conclusion.

One of the authors raised these issues with the Society of Actuaries in Ireland and has been in ongoing contact since November 2016, pointing out the two possible errors and the belief that the figures in their position statement are misleading and should be corrected. The Society agreed in April 2017 to review the methodology. The review concluded: "In summary, we [the Society of Actuaries in Ireland] are satisfied that the paper was prepared on a basis which was appropriate at that time and which was clearly explained in the paper". When the Society was made aware that we intended to publish our results which materially differs from theirs, it prompted the Society to undertake a "fresh review", which identified the two errors.

The Society issued a supplementary note at the end of November 2017 to correct the two errors. The supplementary note states, in bold, that

> *all references in the paper to 'the value of tax relief' were intended to mean 'the value of tax relief on contributions' and likewise all references to 'the effective rate of relief' were intended to mean 'the effective rate of relief on contributions'.* (Society of Actuaries in Ireland, 2017, paragraph 3.8).

The supplementary note also agrees that the discount rate assumption originally used was not correct:

> *The Society now considers that it would have been more appropriate to have used an approach where future contributions, the tax relief granted on them and the tax and USC payable on the pension were discounted to 2011 at an appropriate discount rate* (ibid., paragraph 4.4).

The Society provided corrected figures caused by this error but did not estimate the value of the tax exemption on investment returns, simply noting in the conclusion that

> *In considering any change... policymakers may have regard to the total value of tax incentives and the Society agrees that the value of tax exemption on investment returns forms part of that value.* (ibid., paragraph 5.2).

The results of our analysis are consistent with those of the OECD and provide more information on how the value of the tax reliefs on pension saving vary with income level and other factors. The Society of Actuaries in Ireland (2011) position paper on this topic has been amended, in both the drafting and in the figures, so it is no longer inconsistent with the results presented here. Perhaps the main point to take from these industry reports is that there is little understanding of the value of the tax incentives in Ireland to encourage pension savings by those advising pension plans, so the State might be better in incentivising pension savings in another, more straightforward and perhaps less costly, manner.

X AUTOMATIC ENROLMENT SUPPLEMENTARY RETIREMENT SAVINGS SYSTEM

A five-year roadmap for pension reform in Ireland was published in February 2018 (Government of Ireland, 2018a). Amongst other things, the roadmap commits to setting "a formal benchmark of 34 per cent of average earnings for State pension contributory payments by the end of 2018" (Government of Ireland, 2018a, p.5). There is also a plan to introduce an auto-enrolment pension saving scheme for private sector workers (Government of Ireland, 2018b), currently open for public consultation, with implementation of the finalised scheme to commence from 2022. The targeted group of the population, the default contribution rate, and the financial incentives to save, are yet to be decided (ibid, p.17). Part of the action and commitment plan outlined in the roadmap "will include an assessment of the economic and social benefits delivered and an evaluation of equity in the distribution of tax expenditure on pensions" (ibid., p.27).

The cost of incentivising pension savings by tax expenditures is measured in billions per annum but the value of such incentives to pension savers is little understood even by pension experts in Ireland, as outlined earlier. There are other methods to incentivise pension savings which might be more successful and less costly and complex than the current system. So, for instance, the current tax incentivised encouragement could be replaced, on a cost neutral basis, by an explicit state subsidy per €1 invested by an individual (perhaps up to some overall limits). A version of this latter manner of incentivising saving was available in Ireland for

the year ending April 2002, known as the Special Saving Incentive Account (SSIA), where the State provided a top-up of €0.25 per €1 invested by the individual. This savings scheme was generally regarded as successful, with total savings amounting to €14 billion and 45 per cent of the accounts held by individuals earning less than €20,000.[4]

It is a straightforward exercise to express the present value of tax reliefs for pension savings as an explicit state subsidy of equal value. Table 4 expresses the best estimate of the net effective rate of tax relief on pension savings as an explicit state subsidy per €1 invested (after tax) on a cost neutral basis under our modelling assumptions earlier.

Table 4: Expressing the Net Effective Rate of Tax Relief as an Explicit State Subsidy per €1 Invested

Salary p.a. (€)	*Married Person, one income household*		*Single Person*	
	Best Estimate of Net Effective Rate	*Equivalent Government Subsidy per €1 invested*	*Best Estimate of Net Effective Rate*	*Equivalent Government Subsidy per €1 invested*
5,000	–5%	-€ 0.05	-1%	–€ 0.01
10,000	-1%	-€ 0.01	1%	€ 0.01
20,000	-3%	-€ 0.03	25%	€ 0.33
30,000	26%	€ 0.35	26%	€ 0.35
40,000	26%	€ 0.35	49%	€ 0.96
50,000	51%	€ 1.04	42%	€ 0.72
60,000	51%	€ 1.04	38%	€ 0.61
70,000	51%	€ 1.04	37%	€ 0.59
80,000	51%	€ 1.04	36%	€ 0.56
90,000	49%	€ 0.96	36%	€ 0.56
100,000	46%	€ 0.85	36%	€ 0.56
110,000	43%	€ 0.75	36%	€ 0.56
120,000	41%	€ 0.69	36%	€ 0.56

Source: Authors' own calculations.
Note: Figures for the best estimate of the net effective rate of tax relief are from Table 2 earlier.

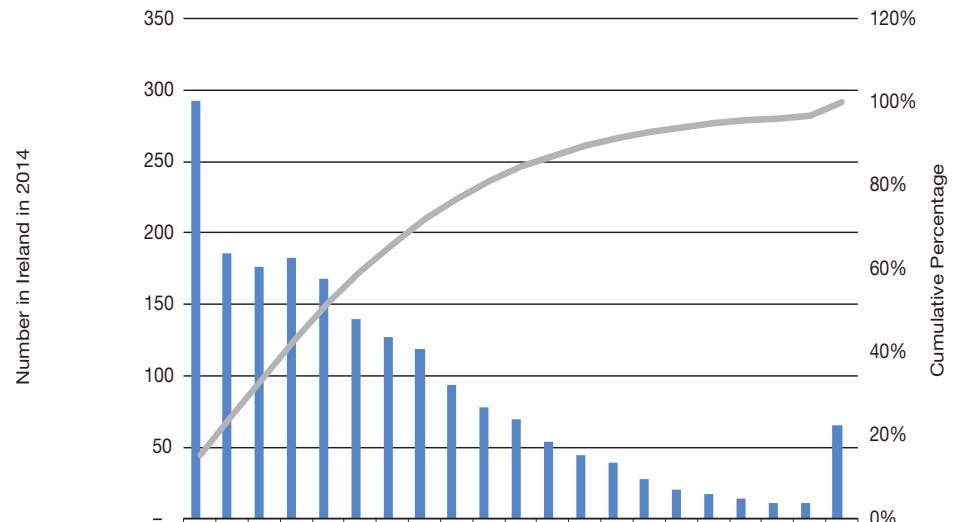
Table 4 shows that the current manner of incentivising pension savings differs in value depending on the earnings of the saver. A married person in a single income household earning between €40,000 and €80,000 is effectively subsidised by €1.04 from the State for every €1 invested. However, a person in the same

[4] https://www.rte.ie/news/business/2004/0826/53731-ssia.

circumstance but earning less than €20,000 per annum is disincentivised from pension saving – the State will take a small amount of money from such an individual should they save for a pension. Setting aside considerations of equity, it might be regarded as less than efficient to subsidise savers by over 100 per cent when the SSIA scheme was so successful at a much lower subsidy from the State.

Let us briefly consider how an auto-enrolment scheme might work in practice in Ireland, assuming the stated commitment to maintain the State pension at 34 per cent of average earnings. To do so requires us to consider the distribution of earnings in Ireland, the assumed period of pension saving, the contribution rate and the ultimate pension. The distribution of gross direct earnings after social insurance payments in Ireland is studied in Collins (2016) and outlined in graphic and tabular form below.

Figure 8: Distribution of Annual Direct Income in Ireland in 2014 (Gross Income from All Sources before Social Welfare Payments but after Social Insurance Contributions)



	<€5k	€5k–10k	€15k	€20k	€25k	€30k	€35k	€40k	€45k	€50k	€55k	€60k	€65k	€70k	€75k	€80k	€85k	€90k	€95k	€100k	>€100k
Number (000s)	292	186	176	183	168	140	127	119	94	78	69	54	44	39	28	20	17	14	11	11	65
% with Earnings	15%	10%	9%	9%	9%	7%	7%	6%	5%	4%	4%	3%	2%	2%	1%	1%	1%	1%	1%	1%	3%
Cumulative Percentage	15%	25%	34%	43%	52%	59%	66%	72%	77%	81%	84%	87%	89%	91%	93%	94%	95%	96%	96%	97%	100%

Annual Earnings

Source: From data relating to the year 2014, kindly provided by Dr M. Collins. See Collins (2016) for further information. The average annual earnings increase in Ireland was 1.5 per cent in 2015 and 1.1 per cent in 2016 (CSO, 2017), so the current distribution of income is unlikely to differ significantly from that shown above.

Box 3: Case Study: Married person, one income family, with a contribution rate of 5% of salary over a 40-year career, with pension drawdown over 20 years after taking a tax-free lump sum of one-quarter the fund value. Model assumptions are outlined earlier, allows for assumed rate of tax on investment income of 20%.

Income	*Direct Income % of All*	*Cumulative % of Earners*	*Mean Income*	*State Pension (monetary value)*	*State Pension (% of salary)*	*Top up Pension (monetary value)*	*Top up Pension (% of salary)*	*Total Pension (monetary value)*	*Total Pension (% of salary)*	*Net Effective Tax Relief*
< €10,000	24.7%		€4,161	€23,575	567%	€836	20%	€24,411	587%	12.73%
€10,000- €20,000	18.6%	43.3%	€14,475	€23,575	163%	€2,910	20%	€26,485	183%	10.46%
€20,000- €30,000	15.9%	59.2%	€24,059	€23,575	98%	€4,836	20%	€28,411	118%	11.68%
€30,000- €40,000	12.7%	71.9%	€34,260	€23,575	69%	€6,887	20%	€30,462	89%	31.84%
€40,000- €50,000	8.9%	80.8%	€44,191	€23,575	53%	€8,883	20%	€32,458	73%	44.48%
€50,000- €60,000	6.4%	87.1%	€54,084	€23,575	44%	€10,871	20%	€34,446	64%	51.94%
€60,000- €70,000	4.3%	91.4%	€64,003	€23,575	37%	€12,865	20%	€36,440	57%	50.35%
€70,000- €80,000	2.5%	93.9%	€74,033	€23,575	32%	€14,881	20%	€38,456	52%	43.87%
€80,000- €90,000	1.6%	95.5%	€84,269	€23,575	28%	€16,939	20%	€40,514	48%	38.86%
€90,000- €100,000	1.2%	96.6%	€94,554	€23,575	25%	€19,006	20%	€42,581	45%	34.91%
> €100,000	3.4%	100.0%	€159,740	€23,575	15%	€32,109	20%	€55,684	35%	21.71%

Source: Authors' own calculations.

The NEST scheme, recently established by the Government in the UK, is an auto-enrolment pension plan. Under the NEST scheme, the minimum contributions are 8 per cent of relevant earnings[5] from April 2019. Table 3 earlier shows that a 10 per cent contribution rate of total earnings in Ireland, even over a 25-year period, is sufficient to provide a married person, one-income household, with a total pension of over 50 per cent of pre-retirement pay on salaries of up to about €75,000 when the State pension is included. This represents the vast majority of married households, accordingly to Figure 8. In fact, the 10 per cent contribution rate for those on the average wage in Ireland will tend to over-provide for a pension even with a 25-year saving period, as the replacement rate is over about 80 per cent. Accordingly, a 10 per cent contribution rate even over a 25-year period must be considered too high a contribution rate for the majority of earners in Ireland.

We estimate the expected pension from an auto-enrolment scheme if contributions were made at a rate of 5 per cent over a complete career of 40 years. The results, shown in Box 3, sets out the expected pension of all persons in Ireland with some direct income and the best estimate of the net effective tax relief granted on their pension savings under the current tax code assuming they are married. Alternative figures assuming the individuals are taxed as single individuals are shown in Appendix 4. Again, Box 3 and Appendix 4 highlight that, for the vast majority of earners in Ireland, a 5 per cent contribution rate over a 40-year career would provide a total pension, when combined with the State pension that exceeds the usual replacement rates of 50 per cent or even 67 per cent of salary. The net effective rate of tax relief under the current system, if not reformed, is shown to be regressive.

XI CONCLUSION

Our analysis shows that tax relief granted on pension savings is, in the majority of cases, not deferred taxation but no taxation. As such, the cost to the State of incentivising pension savings in this manner is greater than previously estimated. No tax is paid at any stage for pension funds at retirement less than nine times the average salary for a married couple (about €0.33 million) or four times the average salary for a single person (about €0.15 million). The cost of the tax expenditure depends primarily on the marginal tax rate of the pension saver and the size of the pension fund at the point of retirement. The cost of the tax subsidy for pension saving varies from zero for those on low incomes, to 25-30 per cent for standard rate tax-payers, and to 31 per cent to 51 per cent for higher rate tax-payers per (before-tax) Euro saved. This converts to a subsidy of €0 per €1 invested after tax for lower earners, a subsidy of €0.33-€0.43 per €1 invested after tax for standard rate tax-payers, and a subsidy of €0.45-€1.04 per €1 invested after tax for higher rate tax-payers.

[5] https://www.nestpensions.org.uk/schemeweb/nest/aboutnest/pensions-are-changing/auto-enrolment.html.

The results of our modelling explain the finding in Collins and Hughes (2017) that, although a minority in overall numbers, higher rate tax-payers represent the vast majority of pension savers. In short, under the current incentive regime the tax advantages from saving for a pension are significantly higher to higher rate tax-payers than those paying at the standard rate. The structure of the incentive, tied to the tax system, discourages regular pension savings from those on low pay, or with irregular work patterns, where the value of the reliefs offered can be zero or even negative over periods. This helps explain the pension gap by gender, as women are more likely to fall into these lower income categories (see Collins (2016), especially Table 5a).

The Government has long been concerned with the low supplementary pension provision and the low replacement rate of income after retirement for the majority of workers, and especially lower paid workers. The tax-based incentive system for pension saving, in disproportionately favouring higher rate tax-payers, must take part responsibility for the lower pension provision amongst the lower paid. A better outcome for the considerable tax expenditures, in terms of numbers of pension savers, could be achieved by abolishing tax incentives and replaced them by a matching contribution of, say, €1 State contribution for each €1.6 saved (which is an effective subsidy of 38 per cent) as recommended by the Commission on Taxation (2009).

Any reform in the tax-based incentive for private pension saving would need to be reflected in a similar reform of public sector pensions and the division of their cost between the worker and the State. The Commission on Taxation (2009) highlighted this when it recommended that

> *... the regime for non-funded pensions should be examined to identify the implicit tax cost to the Exchequer in the context of an equitable distribution of the tax expenditure on pensions*. (p.374).

The current tax-based incentive system for pension savings is regressive. The value of tax incentives appears to be little understood even by pension experts in Ireland, including the Society of Actuaries in Ireland. A more straightforward incentive to save for retirement is required. The existing coupling of incentives to save for additional pension to the tax system is unnecessarily complex and results in many workers not understanding, engaging or benefiting from the tax reliefs available. The State could achieve a more comprehensive pension system by a better targeting of the considerable tax expenditure. In any event, on the grounds of equity alone, consideration should be given to reforming the current incentive system before the proposed imminent introduction of an auto-enrolment pension scheme for private sector workers.

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APPENDIX 1: TAX RELIEF ON PENSION CONTRIBUTIONS AND TAXATION RATES

Tax Relief on Pension Contributions

Tax relief on an employee's contributions is granted at the individual's marginal rate of tax, subject to certain contribution limits which are age related. There is no relief with respect to PRSI and the Universal Social Charge. The maximum tax relief available is expressed as a percentage of remuneration:

Age	*Limit as % of remuneration*	*Maximum Tax Relief Available*
Under 30 years	15% of net relevant earnings	€17,250
30 to 39 years	20%	€23,000
40 to 49 years	25%	€28,750
50 to 54 years:	30%	€34,500
55 to 59 years	35%	€40,250
60 and over	40%	€46,000

The maximum level of remuneration that is currently allowable for tax relief for pension contributions is €115,000 per annum.

Employer contributions to pension arrangements are fully deductible for corporation tax purposes up to certain limits. Contributions paid by employers to occupational pension schemes are not treated as a benefit-in-kind to the employee (and can be paid in addition to the contribution limits for employee contributions). Contributions paid by employers to PRSAs are treated as a benefit-in-kind but income tax relief is provided, subject to the overall contribution limits for employee contributions. Employer contributions to PRSAs are not subject to PRSI or the Universal Social Charge.

A fuller outline of tax reliefs on pension savings is available on The Pensions Authority website: http://www.pensionsauthority.ie/en/LifeCycle/Tax. OECD (2015a) gives an overview and international comparison of tax reliefs available in other EU and OECD countries.

Taxation Rates

In undertaking our calculations, we used the 2017 Irish Tax Code, rates and reliefs as summarised below.

Pre-Retirement:

Married, Single Income Household		
Standard Rate Tax Band	€42,800	
Tax Rates	20% & 40%	
PRSI	4%	
USC	0.50%	Up to €12,012.00
	2.50%	From €12,012.01 to €18,772
	5%	From €18,772 to €70,044.00
	8%	From €70,044.01
Personal Tax Credit	€3,300	
Employee PAYE Tax Credit	€1,650	
Single		
Standard Rate Tax Band	€33,800	
Tax Rates	20% & 40%	
PRSI	4%	
USC	0.50%	Up to €12,012.00
	2.50%	From €12,012.01 to €18,772
	5%	From €18,772 to €70,044.00
	8%	From €70,044.01
Personal Tax Credit	€1,650	
Employee PAYE Tax Credit	€1,650	

Post Retirement:

Married, with qualifying dependant		
Standard Rate Tax Band	€42,800	
Tax Rates	20% & 40%	
*PRSI	0%	
**USC – Aggregate income <€60,000	0.50%	Up to €12,012.00
	2.50%	From €12,012.01
**USC – Aggregate income >€60,000	0.50%	Up to €12,012.00
	2.50%	From €12,012.01 to €18,772
	5%	From €18,772 to €70,044.00
	8%	From €70,044.01
Personal Tax Credit	€3,300	
Earned income tax credit	€950	
Age Tax Credit	€490	
State Pension	€23,575	
Tax exemption limit for people aged 65 and over	€36,000	

*Assume over age 66 ** Assume over age 70

Post Retirement: (contd.)

Single		
Standard Rate Tax Band	€33,800	
Tax Rates	20% & 40%	
PRSI	0%*	
USC – Aggregate income <€60,000		
	0.50%	Up to €12,012.00
	2.50%	From €12,012.01
USC – Aggregate income >€60,000	0.50%	Up to €12,012.00
	2.50%	From €12,012.01 to €18,772
	5%	From €18,772 to €70,044.00
	8%	From €70,044.01
Personal Tax Credit	€1,650	
Earned income tax credit	€950	
Age Tax Credit	€245	
State Pension	€12,434	
Tax exemption limit for people aged 65 and over	€18,000	

*Assume over age 66 ** Assume over age 70

APPENDIX 2: TAX RELIEF ON PENSION BENEFITS

Tax relief on pension benefits is subject to an upper limit. The limit (known as the Standard Fund Threshold (SFT)) is a limit or ceiling on the total capital value of pension benefits that an individual can draw from tax-relieved pension arrangements. From 1 January 2014, the absolute value of the SFT is €2 million.

Pension benefits can generally be taken in two forms: regular annual pension amounts and a lump sum payment.

An individual's annual pension is subject to income taxation at their marginal rate of tax.

Subject to a certain limit, currently €200,000, an individual may receive a tax-free lump sum. Lump sum payments valued between €200,000–€500,000 will be subject to taxation at a rate of 20 per cent. Lump sum payments in excess of €500,000 will be subject to taxation at the individual's marginal rate of tax (and also USC).

APPENDIX 3: TAXATION OF INVESTMENT INCOME OR GAIN

Pension fund investments are generally exempt from tax on any investment income and capital gains. However, other savings are subject to tax on investment income or capital gains as described in brief below.

In determining an appropriate tax rate for the investment assets held within a pension fund, we have considered the tax applicable to the various investment classes generally held within Irish pension funds: cash, equities, bonds and property. We have also considered the tax payable on funds held by Life and Pension Companies.

Investment in cash is currently subject to Deposit Interest Retention Tax (DIRT). For 2017, DIRT is charged at 39 per cent on all interest payments. It was announced in Budget 2017 that the DIRT rate would decrease by 2 per cent each year from 2018 to 2020 until it reaches 33 per cent.

Income from investment in equities is subject to income tax at an individual's marginal rate and capital gains are taxed at a rate of 33 per cent on any gains in excess of €1,270 per person per annum. PRSI and USC may also be due on any dividends received.

Property investments are subject to income tax at an individual's marginal rate on rent received and capital gains tax at a rate of 33 per cent on any gains made in excess of €1,270 per person per annum. PRSI and USC may also be due on any income received.

Irish government bonds are subject to income tax at an individual's marginal rate on any income received but are exempt from capital gains tax. Other non-government bonds are subject to both capital gains tax at 33 per cent (above the threshold) and income tax.

Investments in life assurance policies or unit-linked funds are taxed on a gross roll up basis, i.e. the income and gains are allowed to build up tax free in the funds and are taxed on exit or deemed exit. If there is no exit in the meantime, then there is a deemed exit every eight years and tax is paid at this point. The tax paid on the eight-year deemed exit is available as a credit against the tax due on the ultimate exit. The current rate of exit tax for most plans is 41 per cent (with effect from 1 January 2014).

Our modelling assumes a total investment return during the accumulation phase of 4.5 per cent per annum before tax. Rolling this return up over an eight-year period and then subjecting the overall increase to a 41 per cent tax rate at the end of the period produces the same result as an annual rate of tax on the investment return of 37 per cent.

For Personal Portfolio Life Plans or "wrapper" products the rate is no longer linked to the standard rate of tax and is now a rate of 60 per cent. Where the life plan is owned by a company the rate of exit tax was reduced to 25 per cent with effect from 1 January 2012.

Further general information on the Irish taxation code as it currently applies to savings can be found, amongst other places, here: http://www.citizens information.ie/en/money_and_tax/tax.

The brief overview of the tax code and rates on non-pension savings highlights a complex issue. We can see that those not subject to income tax due to income level being too low can skew their savings portfolio towards income generating assets, and hence reduce the overall tax they must pay on savings. This entails that the tax advantages offered on the investment returns from pension saving is of little value to this group. However, those with so low an income as to be exempt from income tax are unlikely pension savers. Of more significance are the groups of pension savers subject to income tax at the standard rate (20 per cent) or the higher rate (40 per cent). Collins and Hughes (2017), as mentioned earlier, estimate that 29.4 per cent of pension savers in Ireland in 2014 pay income tax at the standard rate and 70.6 per cent pay tax at the higher rate. Those on the standard rate might invest more in income generating assets, which are taxed at 20 per cent as opposed to the 33 per cent on capital gains. This suggests that the effective tax relief on investment income (income and capital gains) on pension savings for the standard rate tax-payer would be in the range 20 per cent to 33 per cent, and probably closer to 20 per cent. Higher rate tax-payers are subject to income tax at 40 per cent and capital gains tax at 33 per cent, so might favour assets that generate capital gains over those that produce income to reduce the overall tax liability. This suggests that the effective tax relief on investment income (income and capital gains) on pension savings for the higher rate tax-payer would be in the range 33 per cent to 40 per cent, and probably closer to 33 per cent.

APPENDIX 4: CASE STUDY 2

Box 2: Case Study: Single person, with a contribution rate of 5% of salary over a 40-year career, with pension drawdown over 20 years after taking a tax-free lump sum of one-quarter the fund value. 20% tax on investment income, other model assumptions as outlined earlier.

Income	*Direct Income %*	*Cumulative*	*Mean Income*	*State Pension (monetary value)*	*State Pension (% of salary)*	*Top up Pension monetary value)*	*Top up Pension (% of salary)*	*Total Pension (monetary value)*	*Total Pension (% of salary)*	*Net Effective Tax Relief*
< €10,000	24.7%		€4,161	€12,434	299%	€627	15%	€13,062	314%	13%
€10,000- €20,000	18.6%	43.3%	€14,475	€12,434	86%	€2,182	15%	€14,617	101%	11%
€20,000- €30,000	15.9%	59.2%	€24,059	€12,434	52%	€3,627	15%	€16,062	67%	32%
€30,000- €40,000	12.7%	71.9%	€34,260	€12,434	36%	€5,165	15%	€17,599	51%	38%
€40,000- €50,000	8.9%	80.8%	€44,191	€12,434	28%	€6,662	15%	€19,097	43%	46%
€50,000- €60,000	6.4%	87.1%	€54,084	€12,434	23%	€8,154	15%	€20,588	38%	40%
€60,000- €70,000	4.3%	91.4%	€64,003	€12,434	19%	€9,649	15%	€22,083	35%	37%
€70,000- €80,000	2.5%	93.9%	€74,033	€12,434	17%	€11,161	15%	€23,596	32%	37%
€80,000- €90,000	1.6%	95.5%	€84,269	€12,434	15%	€12,704	15%	€25,139	30%	37%
€90,000- €100,000	1.2%	96.6%	€94,554	€12,434	13%	€14,255	15%	€26,689	28%	36%
> €100,000	3.4%	100.0%	€159,740	€12,434	8%	€24,082	15%	€36,517	23%	33%

Source: Authors' own calculations.