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Long-Term Budgetary
Implications of Tax-
Favoured Retirement Plans

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LONG-TERM BUDGETARY IMPLICATIONS OF TAX-FAVOURED RETIREMENT SAVING PLANS

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ABSTRACT/RÉSUMÉ

Long-term budgetary implications of tax-favoured retirement saving plans

This paper provides estimates of the implicit fiscal assets as well as of the evolution over time of fiscal costs and revenues related to tax-favoured retirement saving regimes in 17 OECD countries, taking into account current and future contributions, asset accumulation and withdrawals, all of which will be strongly influenced by future demographic developments. The main results show that in the case where tax incentives are assumed to lead essentially to saving diversion rather than creation, the net budgetary cost of tax-favoured schemes would remain large, despite the sharp rise in revenues collected from withdrawals as population ages. The paper shows that this cost would significantly be reduced if tax-favoured schemes succeed in promoting additional private savings. It then explores a number of policy options to maximise the amount of additional saving.

Keywords: Ageing; tax-favoured; tax-deferred; private pensions; retirement savings; fiscal revenues; public deficits.
JEL classification: E620, H200, H500, H600, J180

Implications budgétaires à long terme des plans d'épargne retraite à traitement fiscal favorable

Cette étude présente, pour 17 pays de l'OCDE, les résultats d'estimation des avoirs nets budgétaires ainsi que de l'évolution sur le temps des coûts et revenus fiscaux liés aux plans privés d'épargne retraite à traitement fiscal favorable. Les estimations prennent en compte les contributions, l'accumulation d'actifs et les prestations présentes et futures qui seront influencées par les changements démographiques à venir. Les principaux résultats suggèrent que dans l'hypothèse où les incitatifs fiscaux ont peu d'effet sur la création nette d'épargne et conduisent plutôt à une réallocation de l'épargne existante, le coût budgétaire net des plans d'épargne retraite à traitement fiscal favorable demeurera élevé et ce, en dépit de la forte croissance des recettes fiscales anticipée, liée à l'augmentation importante du nombre de retraités par rapport au nombre de contributeurs. L'étude montre en outre que le coût budgétaire est sensiblement réduit dans l'hypothèse où ces plans parviennent à stimuler l'épargne privée de manière significative. Certaines politiques visant à maximiser l'effet sur la création d'épargne nette sont également explorées.

Mots clés: vieillissement; fiscalité favorable; pensions privées; épargne pour la retraite; déficit public.
JEL classification: E620, H200, H500, H600, J180

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TABLE OF CONTENTS

LONG-TERM BUDGETARY IMPLICATIONS OF TAX-FAVOURED RETIREMENT SAVING PLANS..... 5

1. Introduction 5

2. Private pensions in OECD countries 6

 2.1 Tax treatment of private pensions 7

 2.2 Importance of tax-favoured private pension schemes 8

3. Net fiscal revenues and assets from tax-favoured plans: methodology 9

 3.1 Framework 9

 3.2 Key parameters 12

4. Results 14

 4.1 Base case results 14

 4.2 Sensitivity analysis 16

 4.3. The importance of new saving in lowering the cost of tax-favoured schemes 17

5. Policy issues 18

 5.1 The link between distribution across income levels and effectiveness of tax-favoured plans.. 18

 5.2 Factors affecting the distribution of participants across income levels 20

 5.3 Policy options to increase participation of workers at low and middle income levels 21

 5.4 Impact of alternative tax treatment on net fiscal revenues 22

6.0 Conclusions 23

REFERENCES 25

ANNEX 1. NET FISCAL ASSETS IN THE UNITED STATES 28

ANNEX 2. THE EFFECTIVENESS OF TAX-FAVOURED RETIREMENT SAVING PLANS IN PROMOTING PRIVATE SAVINGS..... 30

ANNEX 3. THE FISCAL IMPACT OF TAX-FAVOURED RETIREMENT SAVINGS PLANS WHEN CONSIDERING CORPORATE AND CONSUMPTION TAX REVENUES 34

TABLES AND FIGURES 37

LONG-TERM BUDGETARY IMPLICATIONS OF TAX-FAVOURED RETIREMENT SAVING PLANS

Pablo Antolín, Alain de Serres and Christine de la Maisonneuve²

1. Introduction

1. In most OECD countries, governments promote the development of private pensions by means of tax incentives³. In the most common regime, private pension savings can be deducted from the income tax base, and accrued return on investment is exempt from taxation, but pension benefits arising from these savings are taxed. Apart from providing a tax incentive to pension saving, this tax treatment also creates an implicit fiscal asset. So far, little work has been done to assess such implicit fiscal assets and more generally to examine the budgetary implications of private pension plans.⁴

2. The central purpose of this paper is to provide estimates of the implicit fiscal asset, as well as of the evolution over time of fiscal costs and benefits related to tax-favoured pension regimes in 17 OECD countries. This should help to better assess how private pension schemes affect fiscal sustainability. More specifically, the study provides estimates of the future net tax revenues that government can anticipate as larger cohorts of workers who have benefited from the tax exemption reach retirement age and begin relying on taxable pension benefits to finance consumption.

3. As such large cohorts begin to retire, the amount of withdrawals from private pension plans is expected to exceed the amount of contributions – this has already begun to happen in some countries. Whether or not this will be sufficient to eventually bring about a positive flow of net tax revenues depends on several factors, including the difference between the effective tax rates on contributions and withdrawals, as well as the size of foregone revenues arising from the non-taxation (in most countries) of accrued income on accumulated assets.

² The authors would like to thank Jean-Philippe Cotis, Jorgen Elmeskov, Michael Feiner, Jagadeesh Gokhale, Chris Heady, Peter Jarrett, Vincent Koen, Willi Leibfritz, Giuseppe Nicoletti, Paul O'Brien, Juan Yermo and Kwang-Yeol Yoo for comments on earlier drafts, as well as Irene Sinha for secretarial assistance. They also thank delegates to the Working Party No. 1 of the OECD Economic Policy Committee and from the OECD Tax Experts Committee for useful discussions, and participants at the OECD Workshop on Tax-Favoured Retirement Saving Plans, held in Paris on May 28, 2004; and the 6th Banca d'Italia Workshop on Public Finance: Public Debt, held in Perugia on April 1-3, 2004. The views expressed in the paper are those of the authors and do not necessarily reflect those of the OECD or the governments of its Member countries. The authors are sole responsible of any errors. Correspondence to Pablo.antolin@oecd.org or alain.deserres@oecd.org.

³ Throughout, this paper refers to private pension schemes and retirement saving plans without distinction.

⁴ Studies addressing this issue include CBO (2004), Boskin (2003), Auerbach *et al.* (2003) and Feldstein (1995) for the United States as well as Mérette (2002) and Finance Canada (2003) for Canada.

4. More importantly, the outcome will depend also on how successful such schemes are in boosting private saving. In this regard, the proportion of contributions to tax-favoured retirement schemes that is funded by additional, as opposed to, diverted saving has a crucial impact on the size of the implicit fiscal asset embedded in such plans. Considering that the effectiveness of tax incentives to boost private saving is likely to vary across income groups, the paper also looks at the extent to which tax incentives benefit workers over the whole spectrum of the income distribution.

5. The paper is organised as follows: Section 2 provides an overview of the tax treatment and relative importance (in terms of asset size and participation rates) of private pension arrangements in OECD countries. Section 3 presents the methodology and main assumptions used to conduct this exercise. Section 4 presents projections of net fiscal revenues arising from tax-favoured schemes over the period 2000-2050, based on projections of contributions, asset accumulation and withdrawals, taking into account demographic trends. The results show that in the case where tax incentives are assumed to lead essentially to saving diversion rather than creation, the net budgetary cost of tax-favoured schemes would remain large, despite the sharp rise in revenues collected from withdrawals as population ages. However, by the end of the projection period, this net cost is projected to fall in many countries relative to its current level. Furthermore, countries that tax accrued investment income from private pension assets (*e.g.* Denmark and Sweden) will experience a positive flow of net fiscal revenues by the end of the projection period.

6. Section 4 also examines the extent to which the results are affected by alternative assumptions regarding the proportion of total contributions to tax-favoured pension plans that is funded by a reduction in current consumption (new saving). It suggests that indeed budgetary costs would be significantly reduced if tax incentives were to lead to additional savings.

7. Finally, Section 5 discusses several policy issues with a particular emphasis on the factors potentially affecting the effectiveness of tax-favoured pension arrangements in boosting private saving sufficiently to justify their cost. In countries where participation in private pension plans is largely voluntary, evidence from micro data suggest that the effectiveness of private pension schemes in boosting personal saving may be undermined by the uneven distribution of participation across income levels. Against this background, it is argued that participation of low-and-middle income earners in voluntary occupational or individual retirement plans could be enhanced by rebalancing in their favour the tax incentive. This could be done by replacing the tax deduction with a non-wastable tax credit (or subsidy) set at a flat rate. Compulsory participation -- as is currently done in a number of countries -- could also be envisaged.

2. Private pensions in OECD countries

8. While several forms of long-term saving commitments could be viewed as pension plans, the latter are narrowly defined in this study so as to include all forms of privately-managed pension plans that have accumulated assets specifically for retirement savings, *i.e.* where the retirement objective is formally specified on a contractual and/or legal basis. Hence, certain types of long-term saving instruments that can be seen as close substitutes to formal retirement savings vehicles (*e.g.* life insurance) are not included in the coverage of private pension assets.

9. Furthermore, only pension plans that are privately-managed and, in principle, fully-funded are included in the analysis.⁵ In a number of countries, mandatory pension plans operating on a *pay-as-you-go*

⁵ For the purpose of this study, fully-funded plans are loosely defined as those where the benefits are entirely financed by previously accumulated pension assets, without any implication or requirement in terms of degrees of actuarial fairness. Hence, the study includes plans that operate either on a defined-contribution or defined-benefit basis or any combination of the two.

(PAYG) basis are partly funded, to the extent that they have associated reserves which in some case can be quite large (for instance in the United States, Japan, Canada and Finland). These plans are not covered. On the other hand, the analysis includes funded private plans which may be under-funded with respect to future liabilities. In several countries, large funding gaps in occupational defined-benefit schemes have emerged since 2000, partly as a result of the stock market collapse, but also reflecting the decline in expected future rates of returns.

10. Finally, among the privately-managed and fully-funded pension schemes, the study focuses in each country on those that offer an equally favourable tax treatment, independent of whether they are mandatory or voluntary, occupational or personal.⁶ Nearly all countries have one or several private retirement saving schemes that benefit from a favourable tax treatment, at least relative to common alternative savings vehicles. The tax treatment of the main schemes in place is described in the next subsection.

2.1 Tax treatment of private pensions

11. A savings vehicle is usually considered as being taxed favourably when its tax treatment deviates from a regime that treats all sources of income equally from a fiscal standpoint (the so-called *comprehensive income tax* regime). In a pure comprehensive income tax system, savings are made out of taxed earnings and the accrual return on funds accumulated is also subject to income tax. In return, the withdrawal of assets from such saving vehicles is fully exempted from taxation. Such arrangements are known as “taxed-taxed-exempt” (TTE) schemes.

12. Using this as a benchmark, there are several ways in which tax incentives can be provided. One is a regime which taxes the portion of income that is consumed, but that exempts the portion that is saved for future consumption (the so-called *expenditure tax* regime). In a pure expenditure tax regime, both the funds contributed and the accrual return on accumulated funds are thus exempted from taxation.⁷ In return, the benefits are treated as taxable income upon withdrawals. Such arrangements are commonly referred to as “exempt-exempt-taxed” (EET) schemes.

13. As regards the practice of taxation of private pension plans in OECD countries (Table 1), twelve countries (Canada, Finland, Greece, Iceland, Luxembourg, Netherlands, Norway, Poland, Spain, Switzerland, United Kingdom, and the United States) come close to the pure EET regime in which withdrawals are subject to the progressive income tax rates (Yoo and de Serres, 2004). Another ten countries (Austria, Belgium, France, Germany, Ireland, Japan, Korea, Mexico, Portugal, and the Slovak Republic) also apply an EET regime, but one where withdrawals are taxed more leniently than in the first group or where contributions are granted a tax credit rather than a full deduction. The practice in other OECD countries differs from the EET regime to the extent that contributions and/or accrued income are taxed, albeit partially.

[Table 1. Tax treatment of private pensions in 2003]

⁶ Occupational pension plans are defined as those where access is linked to an employment relationship between the plan member and the sponsor. In contrast, access to personal plans is not linked to an employment relationship. In the latter case, individuals independently purchase and select material aspects of the arrangements without intervention of their employers (ISSA-INPRS, 2003). In both cases, the plans can take the form of individual accounts.

⁷ This is as long as the accrual return is re-invested.

2.2 *Importance of tax-favoured private pension schemes*

14. The significance of tax-favoured private retirement saving schemes in terms of asset size, participation and share of total retirement income varies importantly across countries. With respect to the importance of private pension assets, OECD countries may be separated into two broad groups (with the exception of Japan and Norway): one where assets (as defined in this study) represent at least 40 per cent of GDP (the Netherlands, Denmark, Switzerland, Canada, United States, Iceland, United Kingdom, Australia, Sweden and Ireland) and one where the amount of assets accumulated in funded pension plans remains, at 15 per cent or less, much less significant in relation to the size of the economy (Portugal, Germany, Finland, France, Belgium, Italy, Mexico, Spain, Hungary, Austria, Poland and Slovakia) (Figure 1). With assets amounting to between 20 and 30 per cent of GDP, Japan and Norway occupy an intermediate position.

[Figure 1. Assets in tax-favoured retirement saving plans]

15. The marked distinction between the two main groups of countries in terms of asset size may result to some extent from the fundamental difference in the design of the overall pension system. Countries with a small asset base are generally the ones where the pension system is dominated by one or several mandatory, earnings-related plans usually operated by the public sector on a pay-as-you-go basis, and which are thus largely unfunded. For instance, in the large majority of continental European countries, the bulk of retirement income is supported by a public system that typically ensures relatively high replacement rates, even at upper income levels (Figure 2), leaving a more limited role for supplementary and voluntary private pensions. In Italy, the development of private pension assets has also been hindered by the existence of generous severance-pay provisions (Franco, 2002).

[Figure 2. Replacement rates from public pension plans]

16. Another factor explaining some of the differences observed in the size of assets is the relative degree of maturity and accessibility of the schemes in different countries. In some cases, it is only recently that tax-favoured pension plans have either been introduced or made more broadly accessible, explaining in part the small proportion of accumulated asset. This is for instance the case of most Central European countries which have made the development of fully-funded private pensions a key element of the reforms of their social security systems during the second half of the 1990s. This is also the case in parts of Western Europe. Indeed, life insurance was largely the only means for individuals in Germany to fund long-term saving on a private and voluntary basis until the pension reform of 2001, which saw the introduction of tax relief for both occupational and individual pension schemes.⁸ With tax-favoured pension schemes restricted to specific categories of workers, life insurance has also been the favourite long-term private saving vehicle in France and Austria.⁹ Life insurance often represents a more flexible form of long-term saving and, at least in the case of France, it also benefits from a favourable tax status, albeit not as generous as an EET scheme.

17. Conversely, the large proportion of assets accumulated in the Netherlands, Denmark, Switzerland, Iceland and, to a lesser extent, Australia can be explained to a large extent by the quasi-universal nature of their occupational scheme. In all five countries, the main occupational pension plan is

⁸ According to a recent draft law expected to come into effect in 2005, the five occupational and individual tax-favoured schemes currently in place will all be taxed according to EET treatment, ending the current mixture of EET and TEE regimes.

⁹ In Norway, life insurance is also a popular vehicle among high-income earners to finance pensions in excess of the ceiling on regular occupational schemes. While the tax treatment of life insurance is also favourable, it is less generous than for the EET occupational schemes.

not only mandatory (or quasi-mandatory), but it is also privately managed and fully funded.¹⁰ It should be noted, however, that at least in the case of Switzerland and Australia, the high proportion of assets also reflects the significance of voluntary contributions above the compulsory threshold.¹¹ In Sweden as well, the coverage of the fully-funded occupational plan is extended to a large share of the workforce, owing to the centralised nature of wage contract agreements. However, given that this funded scheme provides coverage that is complementary to the unfunded mandatory plan, contribution rates are lower than in the Netherlands or Switzerland.

18. In all other countries with a large asset base (40 per cent of GDP or more), participation in private pension schemes is essentially voluntary.¹² Even so, participation is relatively high in part because the pension income provided by the public system in those countries is low in proportion to earned income, especially for middle and upper wage groups. In the United States, the United Kingdom, Canada and Ireland participation in private pension plans exceeds 50 per cent of the workforce (Figure 3). Furthermore, relatively strong participation and the large amount of assets accumulated in those countries also reflect the long-time existence of private schemes, pre-dating in most cases the public PAYG regimes. Finally, participation in these schemes is likely to be influenced by the size of the incentive offered, which in these countries happens to be particularly generous (Yoo and de Serres, 2004).

[Figure 3. Participation in tax-favoured retirement saving plans]

3. Net fiscal revenues and assets from tax-favoured plans: methodology

19. This section presents the approach used to project the future profile of net fiscal revenues arising from tax-favoured schemes, taking into account current and future contributions, asset accumulation and withdrawals, all of which will be strongly influenced by future demographic developments. Currently, the cost of tax-favoured retirement saving schemes exceeds the benefits in all countries, owing in large part to the tax-deferral nature of most plans in place. However, as the large cohorts of workers begin to retire, withdrawals from private pensions will exceed contributions by a substantial margin, at least insofar as the coverage of pension plans or average contribution rates do not increase. It is possible, therefore, that government revenues from withdrawals may exceed foregone revenues from contributions and accrued investment incomes. The main purpose of the exercise is to examine the time profiles of withdrawals, contributions and the associated net fiscal effects.

3.1 Framework

20. Generating estimates of future costs and benefits of tax-favoured saving plans requires projecting forward a number of key variables including the number of contributors, total contributions, assets, accrued income from assets, and withdrawals. In each case, the total figure is obtained from aggregation across 13

¹⁰ In the case of Switzerland the plan is compulsory for dependent employees whose income lies between 40 per cent and 120 per cent of average production worker. In the Netherlands and Denmark, while employers are not legally obliged to provide pension coverage, almost all do so by virtue of extended collective agreements, covering over 80 per cent of the workforce. In the case of Denmark, this is complementary to a fully-funded system that is strictly mandatory.

¹¹ In Australia, around 20 per cent of employees make additional voluntary contributions to a Superannuation fund (Bingham, 2003).

¹² In the case of occupational pensions, they are voluntary to the extent that employers are not obliged to offer a plan to their employees. However, when firms do offer such plans, employees may not have the choice whether or not to participate.

heterogeneous 5-year age groups from ages 20 to 85. They are calculated for each of the eleven 5-year periods from 2000 to 2050, given initial conditions in 2000. The projections also require estimates of relevant tax rates associated with each component of net fiscal revenues.

21. Net fiscal revenues at each period t are obtained as the net sum over all age groups g of the revenues collected on withdrawals (RCW), revenues foregone on contributions (RFC) and revenues foregone on accrued income ($RFAI$):

$$NFR_t = \sum_g RCW_{t,g} - \sum_g RFC_{t,g} - \sum_g RFAI_{t,g} \quad [1]$$

22. Revenues collected on withdrawals (RCW) are determined by the tax rate on withdrawals μ_b and total withdrawals ($B_{t,g}$) made by age group g , which generally depend on total assets accumulated in tax-favoured retirement saving plans at the time of retirement:

$$RCW_{t,g} = \mu_b \cdot B_{t,g} \quad [2]$$

Assets for each group ($A_{t,g}$) accumulate according to the (nominal) rate of return on previous period assets i , new contributions ($C_{t,g}$) and withdrawals:

$$A_{t,g} = (1+i)A_{t-1,g} + C_{t,g} - B_{t,g} \quad [3]$$

23. Withdrawals are modelled on the assumption that the total amount of assets accumulated until the age of 65 is run down according to a constant annuity formula until full exhaustion at the age of 85. In the cases where sufficient information was available, early withdrawals between the age of 55 and 65 are allowed, using withdrawal rates per age category observed in recent years.

$$A_{85} = 0, Y_{84} = A_{84}$$

$$\text{Given } Y_t = Y, \forall t \Rightarrow Y = \left(1 / \sum_{j=1}^{85-65} (1+i)^j\right) \cdot A_{65} \cdot (1+i)^{85-65}, \text{ where } Y \text{ is the annuity} \quad [4]$$

24. As contributions can generally be fully deducted from taxable income, revenues foregone on contributions (RFC) made by each age group are the product of the age-specific marginal income tax rate on contributions ($\mu_{c,g}$) and the total amount contributed in age-group g , (C_g):

$$RFC_{t,g} = \mu_{c,g} \cdot C_{g,t} \quad [5]$$

25. Total contributions per age group in a given time period are determined by the average contribution per employee times the number of employees (including self-employed) in the age group. In turn, the average contribution per employee is a function of the contribution per person participating in tax-favoured schemes in each age group as a ratio of the average wage in the age group, the average wage as a percent of the economy-wide average wage (age-income profile), the economy-wide average wage and the number of contributors as a share of employment:

$$C_g = \frac{C_g}{P_g} \times \frac{P_g}{E_g} \times E_g = \left[\frac{C_g/P_g}{W_g/E_g} \right] \times \left[\frac{W_g/E_g}{W/E} \times 100 \right] \times \left(\frac{W}{E} \right) \times \left(\frac{P_g}{E_g} \right) \times E_g \quad [6]$$

where E is the number of employees, P is the number of contributors, and W stands for nominal wages.

26. Employment projections are based on population and labour force participation rate projections from Burniaux *et al.* (2003) combined with assumptions regarding the future evolution of unemployment rates.¹³ Data on the age-income profile (second term) come from national sources and OECD. The simulation exercise assumes that the age-income profile observed in 2000 will remain constant over the projection period. The average (nominal) wage in the total economy (third term) grows at a constant rate of 3.7 per cent per annum, reflecting the assumptions of a productivity growth rate of 1.7 per cent and 2 per cent inflation.

27. The age-specific rates of participation in tax-favoured schemes (fourth term) is based on current rates of participation in tax-favoured schemes per age group. They are assumed to remain constant in the future in all cases except Mexico, Poland and the Slovak Republic where participation raises gradually over time to reach full participation in the cases of the former two countries, consistent with the mandatory nature of their schemes, and to around 50 per cent in the case of Slovak Republic.¹⁴ In most countries where private pension schemes are voluntary, participation rates generally increase with age until mid or late-50s after which participation declines (Figure 4).¹⁵ In the cases where participation in private pension is mandatory or quasi-mandatory (Australia, the Netherlands, Denmark, Sweden, Switzerland and Iceland), the participation rates are the same across both age-groups and time.

[Figure 4. Participation by age group in selected countries with voluntary plans]

28. The model assumes that the share of contributions per contributor over wages per employee (first term) is also constant over time. In the cases where insufficient information on contributors and contributions by age group was available, the ratio was also assumed to be the same across age groups at the economy-wide value. In such a case, the profile of contributions per participants across age groups is implicitly assumed to be as the age-income profile:

$$\left(\frac{C_g/W_g}{P_g/E_g} \right) = \left(\frac{C/P}{W/E} \right), \forall g \Rightarrow \left(\frac{C_g/C}{P_g/P} \right) = \left(\frac{W_g/W}{E_g/E} \right), \forall g \quad [7]$$

¹³ Unemployment rates are assumed to converge to their long-term equilibrium level by 2010 and to remain constant thereafter. In countries with a high estimated equilibrium rate of unemployment (*i.e.* Poland, Slovak Republic and Spain), the latter is assumed to fall by one-third of its current estimate by 2050.

¹⁴ Except for Mexico, Poland and the Slovak Republic, all the countries covered have had their schemes in place for many years. In the case of Poland, the plan was introduced in 1998. Participation is made mandatory for those born after 1968 and voluntary for those born between 1948 and 1968. Workers born before 1948 are not eligible. In the case of Mexico, the plan was approved in 1997 and participation is compulsory for new entrants into the labour market.

¹⁵ In the case of Canada, Spain and, to a lesser extent, the United States, strong participation for age groups above 60 is explained by the large proportion of people who are no longer employed but who continue to make contributions to tax-favoured personal retirement accounts.

29. *Foregone tax revenues on accrued income from investment (RFAI)* measures taxes that would have been collected on investment income if private savings had been invested in a benchmark saving vehicle (see below). It is measured as the net present value of taxes paid on a stream of investment earnings in proportion to pre-tax cumulative investment earnings. It thus depends on the tax rate on accrued income from alternative savings, μ_a , the nominal rate of return on assets, i , and the amount of assets accumulated ($A'_{g,t-1}$). Note that in contrast to the calculation of revenues collected on withdrawals, the relevant stock of assets in this case is not total assets invested in the scheme ($A_{g,t-1}$) but only those accumulated from diverted savings. The reason for including only a subcomponent of total assets in the calculation of revenue losses on investment income is that contributions to tax-favoured retirement saving plans comprise the tax subsidy (foregone tax revenues on contributions), $\mu_c C_t$, and personal saving, $(1 - \mu_c)C_t$. The latter can in turn be split into diverted saving, $(1 - \alpha)(1 - \mu_c)C_t$, and new saving, $\alpha(1 - \mu_c)C_t$, where α is the share of personal saving financed by a decline in consumption (new saving). Since neither the new saving nor the tax subsidy components would have generated investment income in absence of the scheme, they need to be excluded from the calculation of tax revenue losses. Hence, the model requires a second asset accumulation equation based on diverted savings alone to determine foregone tax revenues on accrued income from investments:

$$A'_{g,t} = (1 + i)A'_{g,t-1} + [(1 - \alpha) \cdot (1 - \mu_{g,c}) \cdot C_{g,t}] - B'_{g,t} \quad [8]$$

30. Withdrawals $B'_{g,t}$ (which also differ from withdrawals used in equation [3]) are calculated as a constant annuity on accumulated assets from diverted savings, A' , at the age of 65 and fully exhausted by the age of 85. Foregone revenues on accrued investment income are thus determined by the implicit tax rate on investment income multiplied by the return on assets accumulated from diverted savings:

$$RFAI_{g,t} = \mu_a \cdot i \cdot A'_{g,t-1} \quad [9]$$

31. Substituting equations [2], [5] and [9] into [1] leads to the following relation for net fiscal revenues, where μ_c is the weighted average of marginal income tax rates on contributions across age groups:

$$NFR_t = \sum_g \mu_b \cdot B_{t,g} - \sum_g \mu_{c,g} \cdot C_{g,t} - \sum_g \mu_a \cdot i \cdot A'_{g,t-1} = \mu_b \cdot B_t - \mu_c \cdot C_t - \mu_a \cdot i \cdot A'_{t-1} \quad [10]$$

32. For those countries that tax accrued income in tax-favoured retirement saving plans (e.g. Denmark and Sweden), albeit at a usually favourable rate, $\mu'_a < \mu_a$, equation [10] includes one extra term which captures tax revenues collected on the return to total asset invested in pension schemes:

$$\begin{aligned} NFR_t &= \sum_g \mu_b \cdot B_{t,g} - \sum_g \mu_{c,g} \cdot C_{g,t} - \sum_g \mu_a \cdot i \cdot A'_{g,t-1} + \sum_g \mu'_a \cdot i \cdot A_{g,t-1} = \\ &= \mu_b \cdot B_t - \mu_c \cdot C_t - \mu_a \cdot i \cdot A'_{t-1} + \mu'_a \cdot i \cdot A_{t-1} \end{aligned} \quad [11]$$

3.2 Key parameters

33. The relevant tax rates used to estimate revenues foregone on contributions and accrued investment income, as well as revenues collected on withdrawals are calculated based on a number of

assumptions.¹⁶ First, the current tax treatment of standard savings vehicles in each country is taken as the benchmark tax system. In all cases, this is some version of the comprehensive income tax regime (TTE). Second, marginal tax rates corresponding to different levels of income and family status are derived from a tax model reflecting the current tax code in each country (OECD, 2002). In all countries where contributions to private pension plans can be used to lower taxable income, these effective marginal tax rates measure the fiscal revenue foregone on a unit of contribution.

34. Third, as concerns taxation of investment income, detailed information on the tax treatment of specific non-pension savings vehicles included in the benchmark portfolio (*i.e.* a mix of interest-bearing instruments and shares, see below) is used to derive implicit tax rates on the return to investment. Following the approach taken in Yoo and de Serres (2004), the implicit tax rate is obtained by taking the difference over the entire length of the investment between the amount of taxes collected in the case where money is saved in a private pension plan and the amount collected when funds are invested in a benchmark non-retirement saving vehicle, under the following assumptions concerning the allocation of assets in either private pension or benchmark saving:

- The portfolio is composed of 60 per cent interest-bearing assets (bank deposits or bonds) and 40 per cent equities. Hence, the benchmark considers only financial assets and excludes real estate or housing.
- For tax purposes, the return on equity is assumed to be one-third dividends and two-thirds capital gains. Shares are assumed to be held 6.7 years on average and to be subject to capital gains tax.¹⁷ The time horizon is allowed to vary from 1 to 40 years, depending on the age of investor at the time the contribution is made.

35. Fourth, given the lack of sufficient information about the overall income of private pension beneficiaries, the general rule has been to set the tax rate applied on benefit withdrawal from private pension at 5 percentage points below the average tax rate (across age-groups) used to calculate revenues foregone on contributions.¹⁸ A proper calculation would require adequate information about the level and the various sources of *taxable* income of pensioners who have participated in a tax-favoured scheme. And, these can be quite different from the average level and sources of taxable income of all pensioners. On the one hand, if benefits from tax-favoured schemes were the sole source of taxable income, then the appropriate rate applied to measure revenues collected on withdrawal would be the average tax rate corresponding to the value of the annual benefit withdrawn. In practice, however, most recipients of tax-favoured pension benefits usually receive income from various other taxable sources, in which case applying the average tax rate corresponding to the level of private pension benefits would most certainly *underestimate* the amount of tax revenues recovered. On the other hand, applying the corresponding marginal tax rate would most likely lead to *overestimate* the tax revenues, if only because pensioners generally benefit from special tax rebates and other benefits. On balance, a 5 percentage point probably

¹⁶ A detailed exposition of the calculation of relevant tax rates and related assumptions can be found in Yoo and de Serres, 2004.

¹⁷ This is equivalent to assuming that 15 per cent of the shares held in the portfolio are sold every year. Admittedly, this is based exclusively on US observations (Burman and Ricoy, 1997).

¹⁸ There are a few exceptions to the 5 percentage points rule (Table 2), notably in the case of countries where the difference between marginal and average tax rates is relatively small (Mexico, Poland, Slovak Republic and Sweden) or where a large portion of pension benefits is exempted from taxation (Japan).

represents in most countries a fairly conservative spread, in particular in those with fairly steep tax schedule.¹⁹

36. Finally, the pre-tax nominal rate of return on assets is set at 6.5 per cent per annum, including 2 per cent inflation. The broad set of key assumptions made to generate the base case projection is presented in Table 2.

[Table 2. Main assumptions behind the base case projection]

4. Results

37. Current and future net fiscal revenues and assets have been estimated for 17 OECD countries.²⁰ The country coverage has been primarily conditioned by the amount of available information. However, the significance of participation in tax-favoured schemes has also been taken into consideration. Thus, the projections cover all the countries with accumulated assets in tax-favoured retirement saving schemes equivalent to at least 20 per cent of GDP. The baseline projections presented in this section are conducted as an accounting exercise and are based on the assumption that contributions to private pension plans do not affect the overall level of national savings. In other words, private consumption is assumed to remain unchanged following the introduction of a tax-favoured scheme (α is set to zero). Hence, while contributors are assumed to save the amount corresponding to the value of the tax break, they do not provide new saving, *i.e.* that would be financed by a reduction in current consumption. The potential implications of allowing for new saving are discussed in Section 4.3, on the basis of alternative scenarios.

4.1 Base case results

38. The base case projection provides, for each five-year period between 2000 and 2050, estimates of fiscal revenues foregone and collected in per cent of GDP. In addition, the stream of future net fiscal revenues over the period 2000-2050 is also discounted (using the rate of return on assets as the discount rate) to provide a measure of the implicit net fiscal assets as of 2000. The main results can be summarised as follows:

- Net fiscal assets are negative for all countries, and in the majority of them, even the flow of net fiscal revenues remains negative throughout the projection period, owing largely to foregone revenues on accrued investment income (Figure 5).
- In all countries except Sweden and Denmark, the flow of net fiscal revenues is projected to decline over the next 10 to 20 years, but to increase significantly thereafter in the majority of cases. By the end of the projection period, an improvement in the budget contribution relative to 2005 is expected in several countries. The improvement is particularly pronounced in Denmark, Iceland, the Netherlands and Sweden. In contrast, net fiscal revenues are expected to remain below their 2005 level at the end of the projection

¹⁹ Two factors could contribute to a wider spread. One is the possibility in many countries to withdraw benefits in the form of a lump sum, which in some cases is treated more leniently from a tax standpoint. The other factor, which is more relevant for European Union countries, concerns the possibility for pensioners to migrate to a lower tax country. On the other hand, some pensioners could face very high marginal rates if they lose means-tested benefits as they withdraw pension benefits.

²⁰ The countries included are Australia, Canada, Denmark, Iceland, Ireland, Japan, Mexico, the Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom and United States.

period in Ireland, Japan, Poland, Portugal, Slovak Republic, Switzerland and the United Kingdom

- Net fiscal revenues are projected to eventually turn positive in Sweden, Denmark and Iceland, though they are substantial only in Denmark. In all three cases, the cost related to the partial taxation or non-taxation of investment income in pension schemes is low. In the first two countries this reflects the fact that accrued income on investment is at least partly taxed (ETT treatment) whereas in the case of Iceland it results from the low tax rate imposed on benchmark savings.
- In the case of Japan, Poland and Portugal, the flow of net fiscal revenues continues to decline throughout the projection period, as the results are dominated by the cost related to the non-taxation of investment income, which grows continuously with the build-up of assets.

[Figure 5. Projected net fiscal revenues and their components, 2000-2050]

39. These results may look surprising in the face of arguments that governments should expect a windfall from tax-favoured schemes over the next decades (see Annex 1). These claims notwithstanding, the above findings should not be seen as counter-intuitive. In the absence of new savings, each currency unit invested in an EET pension scheme entails a net fiscal cost over the whole life span of the investment, owing mainly to the non-taxation of investment income. For the aggregate cost to turn into a net benefit, total withdrawals would have to exceed total contributions by a sufficient margin to at least compensate for the revenue losses due to the non-taxation of investment return.²¹

40. Using equations (10) and (11), the amount of withdrawals needed at one point in time to balance net fiscal revenues, *i.e.*, NFR=0 is in the cases of EET and ETT schemes respectively:

$$\frac{B_t}{C_t} = \left(1 + \frac{\mu_a}{\mu_c} \cdot i \cdot \frac{A'_{t-1}}{C_t} \right) \cdot \left(\frac{\mu_c}{\mu_b} \right) \quad [12a]$$

$$\frac{B_t}{C_t} = \left(1 + \frac{\mu_a}{\mu_c} \cdot i \cdot \frac{A'_{t-1}}{C_t} - \frac{\mu'_a}{\mu_c} \cdot i \cdot \frac{A_{t-1}}{C_t} \right) \cdot \left(\frac{\mu_c}{\mu_b} \right) \quad [12b]$$

41. Required ratios of withdrawals to contributions are calculated for each country, using country-specific information about tax rates, levels of contributions and assets as well as the common assumption of a 6.5 per cent rate of return. The results of these calculations, shown on Figure 6, suggest withdrawals would have to exceed contributions by a factor of 16 (Japan) to a factor of slightly over one (Denmark) to bring net fiscal revenues to balance at a given point in time.²² Consistent with the results shown above, the required ratio of withdrawals to contributions to balance net fiscal revenues is larger than the projected one, except in the cases of Denmark, Sweden and Iceland. In the cases of Japan, Poland and, to a lesser

²¹ Assuming that the tax rates on contributions and withdrawals were the same, the revenues collected on future withdrawals would, in present value terms, just offset the revenues lost from contributions. In such a case, the net fiscal cost would correspond to foregone revenues on accrued income from investment, which rises with the accumulation of assets.

²² Since these required ratios depend on the amount of assets, they are calculated for the year during which the projected withdrawal to contribution ratio reaches its peak. In most cases, this is near the end of the projection period, *i.e.* between 2035 and 2050 depending on the country.

extent, Portugal and Switzerland, large ratios would be required because accrued investment income outside pension schemes in those countries is taxed at a higher rate than labour income.²³

[Figure 6. Projected and required ratio of withdrawals to contributions]

4.2 Sensitivity analysis

42. In order to assess the sensitivity of the overall results to changes in initial conditions and some assumptions, a number of variants of the baseline projection have been implemented (although the impact of new versus diverted saving is examined in the next section). The results are summarised in Table 3, which reports the average sensitivity across countries, and in Figure 7, showing the sensitivity for Canada, Denmark, Spain and the United States as illustrative cases, although the discussion below concerns all countries studied (complete individual country results are available on request).

[Table 3. Sensitivity Analysis]

[Figure 7. Sensitivity analysis: selected countries]

43. Overall, the results indicate that the estimates of net fiscal revenues and their discounted sum over time (net fiscal assets) can be quite sensitive to some of the initial conditions, assumptions or tax parameters. Even so, the broad picture described above would only be altered in the cases of substantial changes in those factors or if several of them were to change in the same direction. First, an increase in the contribution rate unambiguously lowers net fiscal assets for every country examined and indeed countries with relatively high contributions as a share of wages (such as Ireland, the Netherlands and Switzerland) are the ones with the lowest net fiscal assets (or largest liabilities).²⁴ Second, the overall impact of a change in the amount of initial assets is ambiguous as lower initial assets accumulated from diverted savings reduce foregone revenues from accrued income (raising net fiscal assets) but also potential withdrawals (lowering net fiscal assets). Which of these effects dominates depends largely on the tax rate on accrued income. In countries with high tax rates on accrued investment income from alternative saving vehicles (e.g. Canada) lower initial assets would raise net fiscal assets, as the reduction in foregone revenues is larger than the decline in taxes on withdrawals. In general, however, the impact on withdrawals tends to dominate in other countries with large assets built-in (e.g. Netherlands, United Kingdom, and United States).

44. The results are more sensitive to changes in some of the basic assumptions regarding productivity growth and rates of returns even though in both cases the effects are also ambiguous *a priori*. Higher productivity growth or inflation increases revenues foregone on contributions and accrued income but also raises revenues collected from higher withdrawals. However, in all countries the first two effects are found to dominate, implying a decline in net fiscal assets. A higher real rate of return raises both foregone revenues on accrued income and revenues collected on withdrawals. With the tax rate on withdrawal being in most countries higher than that on accrued investment income from accumulated assets, the effect on net fiscal assets is generally positive, albeit relatively small. A lower discount rate gives more weight to future flows of net fiscal revenues in the calculation of net fiscal assets. Hence, the impact on the latter is negative in countries where the future flow of net revenues remains negative over the whole horizon but is near zero or positive in Sweden and Denmark where positive flows are generated in the future.

²³ Japan is a unique case where accrued income on investment is taxed at a much higher rate than contributions or withdrawals, resulting in a very high required ratio.

²⁴ Note as a reminder that the contribution rate per cohort is assumed to remain constant at its initial value.

45. Reducing the spread between the marginal tax rate on contributions and the effective tax rate on withdrawals by one percentage point brings net fiscal liabilities down by 2.3 percentage points of GDP on average. The same is true for a reduction in the implicit cost for the non-taxation of investment income (*i.e.* a fall in the tax rate on alternative saving vehicles), which has a similar impact on net fiscal assets. Finally, in order to illustrate the impact of population ageing separately, the profiles of net fiscal revenues and net assets are projected under the assumption of a constant population structure. Not surprisingly the effect of population ageing is generally large (around 3.5 percentage points of GDP on average), in particular in countries where participation in tax-favoured schemes is high. However, ageing has less of an impact in countries where it occurs late in the projection period (*e.g.* Portugal and Spain).

4.3. *The importance of new saving in lowering the cost of tax-favoured schemes*

46. The projections shown above have revealed that the budgetary cost of tax-favoured schemes in terms of revenues foregone is likely to remain significantly larger than revenues collected despite the sharp rise in the latter resulting from population ageing. However, as mentioned earlier, this result partly depends on the assumption that tax incentives lead to saving diversion rather than creation.²⁵ This sub-section highlights how saving creation could help closing the gap between costs and revenues stemming from private pension arrangements.

47. The extent to which tax incentives create rather than divert saving is ambiguous in theory and still unresolved empirically, despite the large amount of studies addressing the question, in particular in the United States.²⁶ As reported in more detail in Annex 2, a selective review of the empirical literature shows no consensus on the effectiveness of tax-favoured savings plans in the United States despite intensive research focusing on 401(k) plans and individual retirement accounts (IRAs).²⁷

48. In any case, to give a feel for the potential impact on net fiscal revenues and assets of allowing for new saving, alternative projections have been generated under two scenarios, one where new saving finances around 25 per cent of total contributions and another one where that proportion is set at around 50 per cent, as assumed in Boskin (2003).²⁸ Any proportion of total contributions in private pension that is financed by new – as opposed to – diverted saving lowers the budgetary cost arising from foregone revenues on accrued investment income given that these funds would not have been saved elsewhere in the first place.

49. This direct income tax effect from additional national saving is taken into account in the alternative scenarios presented here. But, additional saving is also likely to generate a rise in domestic

²⁵ Clearly, to assume that these incentives fail to generate any new saving as is done in the base case projections reported above may be seen as an extreme view, even though one can not exclude *a priori* the possibility that national saving decline as a result of the tax incentive. This would be the case if contributors were to consume part of the tax subsidy.

²⁶ The theoretical ambiguity arises from the uncertainty as to which of the familiar substitution or income effects on saving dominates in the long run.

²⁷ The range of estimates found, even in the most recent papers, still goes from almost one extreme to the other. Nevertheless, the weight of evidence would suggest a proportion of new saving in total contributions of between 25 to 40 per cent at most.

²⁸ More specifically, the assumption made is that the proportion of personal savings (*i.e.* total contributions excluding the tax subsidy) that is financed by new saving is 1/3 and 2/3, respectively. What this implies in terms of the proportion of new saving in total contributions (*i.e.* including the tax subsidy) actually varies slightly across countries as it depends on the marginal tax rate used to calculate revenues foregone on contributions. In the case of the United States, it represents 25 and 50 per cent of new saving, respectively.

investment, bringing about a larger capital stock. This in turn should boost profits as well as wages and therefore tax revenues on capital return and labour income, helping the government to reduce debt and so on. On the other hand, the reduction in consumption in the short run would entail a loss of tax revenues. Furthermore, an increased supply of saving may well have an impact on investment returns. Formally taking into account these other direct and potential second-round effects is beyond the scope of this paper, and would be best addressed in the context of a general equilibrium model. However, the potential implications are illustrated and discussed in Annex 3, on the basis of a simple generic example.

50. As expected, increasing the proportion of total contributions that is financed by new saving has a substantial impact on estimated net fiscal assets and the level of net fiscal revenues, even abstracting from potential second-round effects (Figures 8 and 9).²⁹ The impact is particularly large in countries where investment income in non-pension savings instruments is taxed at a relatively high rate (United States, United Kingdom, Canada and Australia). Even in the case of 25 per cent new saving, net fiscal revenues rise above the 2005 level by the end of the projection period in most countries. And, under the more optimistic assumption of high new saving (50 per cent), net fiscal revenues would turn positive in a majority of countries. In light of these results, and given that a growing number of countries have decided in recent years to implement tax-favoured plans or expand coverage of existing plans, it is important to assess how they can best stimulate private saving.³⁰

[Figure 8. Net fiscal revenues under alternative assumptions on new savings]

[Figure 9. Implicit net fiscal assets under alternative assumptions on new savings and discount rate]

5. Policy issues

51. This section explores a number of policy options to maximise the amount of additional saving per dollar of tax concession on tax-favoured private pension schemes and, therefore, to minimise their budgetary cost.

5.1 *The link between distribution across income levels and effectiveness of tax-favoured plans*

52. One of the factors potentially affecting the effectiveness of tax incentives to generate new saving is the distribution of participants across categories of income. Recent empirical studies looking at the impact of 401(k) plans on saving patterns across income levels have found a significantly stronger impact of incentives on new saving among low- and middle-income earners or savers (Poterba, 2003; Engen and Gale, 2000; Benjamin, 2003).³¹ Hence, the higher is the proportion of upper-income individuals in total

²⁹ The impact on net fiscal assets of different saving scenarios is compared under two assumptions regarding the discount rate, one where it is equal to the rate of return on investment (as in the base case projection) and one where it is set at a lower rate.

³⁰ For example, the US Administration is proposing to replace the traditional Individual Retirement Accounts (IRAs) with two new TEE instruments, one specifically for pension saving (Retirement Saving Account) and another for general saving purpose (Lifetime Saving Account). Contribution ceilings would be in both cases higher than the current limit for IRAs. The French government is also introducing a new EET personal pension plan (*Plan d'Epargne Retraite Populaire*) with broad eligibility.

³¹ The reasons for this are not entirely well understood although they may be viewed as consistent with recent empirical observations suggesting that high-income people have higher saving rates (Dyran *et al.* 2004). Other explanations have also been suggested. One is that tax-favoured schemes such as 401(k) lower transaction and information costs of investing on the stock market, allowing for an easier access to

participation in tax-favoured schemes, the less new saving is likely to be generated. Furthermore, given the progressive nature of the tax system prevailing in most countries, the cost of the incentive rises with the income of participants, just as the effectiveness may well be declining.

53. A look at the age and income profiles of participants compared with that of all employees in the United States, the United Kingdom and Canada indicates that at least in countries where participation is voluntary, tax-favoured schemes indeed tend to be used disproportionately by upper income individuals (Tables 4 to 6). First, the average income of participants (across all ages) exceeds that of employees by 28, 33 and 45 per cent in the United States, United Kingdom and Canada, respectively.³² Second, in all three countries, participation is quite strong among high-income individuals even in the case of age groups where overall participation is relatively low, such as young and old people. In fact, the age-income profile of participants is much flatter than that of total labour force, suggesting a higher degree of homogeneity in the income of participants across age groups. Third, the average amount contributed is also substantially higher in the upper-income categories. Even though various limits are imposed on deductible contributions, they are set at fairly generous levels in Canada and, to a lesser extent, the United States (Table 7).³³

[Tables 4 to 6. Age and income profile of participants to private pension schemes]

[Table 7. Characteristics of the main private pension plans in Canada and the United States]

54. As a result, while individuals earning 200 per cent or more of the average wage represent 13 per cent of all employees in the United States, they account for around 20 per cent of total participants and nearly 50 per cent of total contributions, whereas their share of total salaries is 38 per cent.³⁴ Similarly, in Canada, 13 per cent of workers earn 2 times the average wage but form 26 per cent of participants and account for 47 per cent of contributions, compared to a share of total income of about 40 per cent.³⁵ Considering the size of the tax break in these countries, not only is such a skewed distribution of participants potentially expensive, but it also has implications for income re-distribution.³⁶ In this regard, encouraging a more balanced participation across income levels may not only be desirable from a strict equity perspective but, as suggested above, it may also lead to better results in terms of boosting private saving, which is the primary goal of tax-favoured plans.

shareholding for low-income households. Another possibility is that the higher degree of economic sophistication allows upper-income individuals to better maximise the advantages of tax sheltering without having to cut current consumption. A third possibility is that low-income earners are less likely to hold the types of assets which are a close substitute to retirement savings, raising the likelihood that contribution would be funded by reduced consumption (Samwick, 1995).

³² The lower percentage in the United States can be partly explained by one of the rules governing 401(k) plans according to which firms offering the plan must include a minimum proportion of participants among the lower income categories.

³³ In the United States, major increases in the contribution limit were introduced in 1985 and 2001, whereas in Canada the limits were raised significantly during the reform of 1993.

³⁴ This is consistent with the observation that the contribution rate in the United States is found to rise steadily with income levels (CBO, 2003).

³⁵ These figures concern participants to the occupational regime and therefore exclude those who only make contributions to the personal retirement saving plan (RRSPs). The motivation for excluding those is that many contributors to the latter are not in the labour force.

³⁶ One could argue that in several countries, not least in the United Kingdom and Canada, this partly counterbalances the highly redistributive nature of the public system in favour of lower-income households.

5.2 *Factors affecting the distribution of participants across income levels*

55. Possible explanations for the weaker participation and contribution rates from low and middle-income groups focus on two aspects: variations in workers' access to occupational pension plan membership and differences in the set of incentives and options faced by eligible employees. Eligibility may play a significant role to the extent that when plan membership is available within a firm, non-discrimination rules usually ensure that the offer is extended to all categories of workers and, partly as a result, employee participation is often automatic.³⁷ In fact, data on sponsorship of pension plans by US firms indicate that for various reasons, lower-income workers are less likely to be employed by a firm that offers membership (Copeland, 2003).³⁸ One possible reason is that low-skills, low-paid jobs may be more highly concentrated among small and medium-sized firms who may not as easily absorb the administrative costs of pension plans sponsorship.³⁹ Another possible contributing factor, at least based on some evidence from Canada and the United States, is the relative decline in manufacturing jobs – and along with it the decline in unionisation.⁴⁰

56. Variations in eligibility to occupational pension plans can only go so far in explaining the uneven distribution of participants across income levels. After all, tax-favoured personal pension plans are available in many countries, in part to give workers with no access to an occupation scheme an opportunity to accumulate retirement saving under similar tax rules. However, it appears that where eligible workers do have a choice of whether to join or not, as is the case with personal pension plans and many occupational schemes (such as the 401(k) plans in the United States), participation is also weaker at lower income levels.⁴¹ One basic reason is that for individuals living on very low income, saving may be neither accessible nor optimal, in particular for those whose income prospects have clear chances of improving over time. Relatively high replacement rates in countries with a highly redistributive public pension pillar may also reduce incentives to participate in tax-favoured schemes for low income earners.

57. Perhaps more importantly, given that in most countries the tax relief on contributions takes the form of a deduction, the value of the incentive diminishes when income levels fall and may be of little value for workers with low taxable income. In addition, given that in many countries the basic state pension and other transfers are often incomes-tested, the marginal effective tax rate on benefit withdrawals may be very high for individuals whose pension income is expected to hover around the incomes-testing threshold. For instance, calculations based on the US tax and social security systems suggest that depending on the assumed rate of return, contributing to 401(k) plans may actually raise lifetime tax

³⁷ Automatic enrolment is particularly strong in the case of defined-benefit plans, in large part owing to the fact that employers are often the main, if not the sole, contributor. In the United States, automatic enrolment is the norm in the case of defined-benefit plans but not for 401(k) plans in which case employees from sponsoring firms must be offered the choice to participate.

³⁸ According to data on plans sponsorship by various characteristics, less than 50 per cent of workers with an annual income below \$50,000 are employed by a firm that sponsors a plan, whereas the sponsorship rate rises to 75 per cent for workers with earnings above that level.

³⁹ The numbers for 2002 indicate that while the sponsorship rate is around 68 per cent in large US firms (over 100 employees), it falls to 28 per cent among smaller firms (less than 100 employees). Viewed from another angle, while small and medium-sized firms account for 50 per cent of employees, they account for less than 30 per cent of total eligible workers.

⁴⁰ In the United States, the sponsorship rate is higher in manufacturing (63 per cent) than wholesale and retail trade or personal services (around 45 per cent on average). In Canada, the decline in occupational pension plan participation during the 1990s has been largely attributed to two factors: the relative decline of manufacturing sectors and the rise in administrative costs (Morissette and Drolet, 2001).

⁴¹ The same is true regarding participation in personal pension schemes in Canada.

payments for families earning \$50,000 or less (Gokhale and Kotlikoff, 2001).⁴² In contrast, one factor contributing to the generosity of the tax incentive for high income individual is that tax-deferred schemes (EET or ETT) are generally designed in a way that creates the scope for significant tax smoothing, especially in countries with very progressive tax schedules.⁴³

5.3 *Policy options to increase participation of workers at low and middle income levels*

58. Several countries have achieved rates of participation in tax-favoured private pension plans that are both high and uniformly distributed across income levels, but they have done so by means of compulsion, either *de jure* or *de facto*. For instance, membership in an occupational private pension plan is mandatory in Australia, Hungary, Iceland, Mexico, Poland and Switzerland.⁴⁴ As mentioned in Section 2, Denmark, the Netherlands and Sweden have also reached a quasi-universal degree of private pension coverage, but this has been achieved *via* broad collective agreements between social partners, whereby most firms are bound by industry-wide commitments to sponsor membership. Such a widespread degree of commitment may not be easily replicated, however, in countries where collective bargaining is much less centralised.

59. One feature of compulsion – aside from ensuring a uniformly high participation rate across the income distribution – is that the budgetary cost can be reduced given that the tax concession need not be as generous, even if encouraging contributions beyond the compulsory threshold may remain an objective. Indeed, countries with compulsory or quasi-compulsory schemes generally tend to offer less generous tax breaks. For instance, three of them (Australia, Denmark and Sweden) tax the accrued return on investment in private pensions, albeit at a favourable rate relative to the taxation of non-pension saving instruments. The potential budgetary implications of introducing a small flat rate tax on accrued investment income are illustrated below.

60. These advantages notwithstanding, some countries may find difficult to justify compulsion in the case of private pensions, not least when those are supplementary to one or two layers of mandatory public schemes. In such cases, the discussion in the previous sections suggests that in order to maximise the creation of new saving, the value of incentives may need to be strengthened for low and middle-income workers. One way to do so – in the context of EET or ETT schemes – would be to replace the deduction from taxable income with a non-wastable tax credit (or a subsidy) that would be set at a flat rate. Currently, only a few countries apply a tax credit for contributions to tax-favoured schemes (Austria, Belgium and Portugal) or a subsidy (Czech Republic, Germany and Mexico). The potential budgetary effects of such a measure are also illustrated for a number of countries in the next sub-section.

⁴² The calculations take into account the interaction of the tax treatment social security, housing and college tuition and are based on maximum contribution rates. The authors also show that low and medium income households can lower their lifetime taxation if they contribute significantly less than the maximum allowable amount.

⁴³ As mentioned earlier, the main reason for this is that for contributors at the top marginal tax rate, each unit of contribution to the scheme earns the investor a full deduction from taxable income at that high marginal rate, whereas the effective tax rate on benefits withdrawn is more likely to lie somewhere between the top marginal rate and the average tax rate.

⁴⁴ In all these countries, employers are legally obliged to enrol their employees into a pension plan, although the rules and the extent of the coverage vary across them. For instance, self-employed as well as employees earning very low income are not covered by the mandatory rule in Australia and Switzerland. In countries where the plans have been introduced in recent years (Hungary, Mexico and Poland) compulsion does not generally apply to the current cohorts of older workers.

61. Incentives can only be effective, however, if potential participants are given a relatively simple and easy access to a pension plan. One question is whether such access is most efficiently provided by personal pension plans (such as IRAs in the United States) or occupational schemes. Since they are not based on an employment relationship, one advantage of personal pension schemes is that they largely avoid the problem of portability of pension plans. They may also facilitate access to private pension saving for part-time workers or for those whose labour market participation is not continuous. Furthermore, considering the potential difficulties for many small and medium-sized firms to bear the administrative costs and responsibilities of sponsoring a pension plan, it is probably easier to achieve broad eligibility with personal plans. In fact, the recent problems experienced by many large firms with the funding of their pension plans (prompting some of them to terminate those plans or to exclude new employees) suggest that the difficulties may not be confined to small firms only.

62. However, an advantage of the employment-based scheme is that the higher likelihood of a matching contribution by employers creates an additional incentive for the employee to join membership.⁴⁵ Investment fees are also generally lower in the case of occupational plans. In addition, occupational schemes may be better suited to take advantage of the recent findings from the behavioural finance literature, which underscores the important role that inertia or procrastination appear to play in the decision to participate in a retirement saving plans (Mitchell and Utkus, 2003). In particular, a number of studies have shown that by making enrolment in a plan the default option and by having participants to pre-commit to rises in contribution rates which are linked to wage increases, membership in voluntary schemes can be boosted substantially.⁴⁶ Such arrangements, which are essentially designed to help individuals to discipline themselves to save, may be more difficult to implement in the context of personal plans.

5.4 *Impact of alternative tax treatment on net fiscal revenues*

63. The previous discussion has identified two ways in which net fiscal revenues from tax-favoured plans could be increased: introducing a flat tax on accrued investment income, which would seem particularly appropriate in countries with mandatory schemes; and replacing tax deductions with tax credits or subsidies. Both these measures would have repercussions on behaviour, at least in countries where participation is voluntary. Indeed, introducing a tax credit would be expressly designed to improve incentives for low- and middle-income participation to tax-favoured schemes, thereby increasing new saving. However, the projection model used in this paper cannot account for such behavioural changes. Nonetheless, this section examines, for illustrative purposes, the potential impact on net fiscal revenues and net fiscal assets of replacing the deduction of contributions by a tax credit or of taxing investment income.

64. To this end, the rate of tax credit is assumed to be equal to the effective tax rate on benefit withdrawals. The impact of this change on the relative size of the incentive across income levels is shown in Figure 10. Even though the incentive is lower on average, it is raised for low-income groups in a number of cases shown. Not surprisingly, the effect is larger in countries with steeper tax schedules. As for the flat tax rate on accrued investment income, it is fixed at a modest 5 per cent across the board. As mentioned

⁴⁵ In fact, the possibility of a matching contribution may partly explain the success of 401(k) plans in the United States relative to IRAs (Poterba, 2003). Note, however, that employer contributions are also possible under personal plans although they tend to be less common in practice.

⁴⁶ For instance, one study has shown that participation is higher at firms where employees are automatically enrolled unless they signal their wish to opt out (Madrian and Shea, 2001). Another study has reported the case of a mid-sized firm which saw contribution rates tripling shortly after adopting a plan under which employees are invited to join at a low initial contribution rate but that is set to rise (up to a point) with each subsequent pay increase (Thaler and Bernatzi, 2004).

earlier, the primary purpose of the flat tax rate on investment income would be to lower the cost of tax-favoured schemes, in particular in a context where compulsory participation would be envisaged.⁴⁷

[Figure 10. Revenues foregone per unit of contribution for different levels of income]

65. The effects on net fiscal revenues from these measures can be substantial, especially in the case of the flat tax rate on accrued investment income in countries accumulating a large amount of assets (Figures 11 and 12). For instance, net fiscal liabilities would be reduced by half in Canada, Iceland, United States, United Kingdom and Switzerland.⁴⁸ By comparison, the effect of a tax credit would be significantly smaller, inducing generally a modest upward shift in the profile of net fiscal revenues. However, this partly reflects the relatively high rate chosen for the tax credit in this experiment as well as the fact that the potential impact on participation across age groups and on saving creation is not taken into account.

[Figure 11. Net fiscal revenues under alternative tax treatment]

[Figure 12. Net fiscal assets under alternative tax treatment]

6.0 Conclusions

66. This paper has provided estimates of the implicit fiscal asset, as well as of the evolution over time of fiscal costs and benefits related to tax-favoured pension regimes in 17 OECD countries. More specifically, the study has provided estimates of the future net tax revenues that government can anticipate as larger cohorts of workers who have benefited from the tax exemption reach retirement age and begin relying on taxable pension benefits to finance consumption. The main finding and conclusions are:

- In a baseline scenario where tax incentives are assumed to lead to saving diversion rather than creation, the budgetary cost of tax-favoured schemes in terms of revenues foregone is likely to remain larger in the future than revenues collected, despite the sharp rise in the latter resulting from population ageing. However, relative to its current level, this net budgetary cost is projected to decline over time in several countries.
- Budgetary costs would be significantly reduced if tax incentives were to lead to additional savings. However, the effectiveness of tax-favoured schemes in raising private and national savings is an issue that remains largely unresolved both theoretically and empirically. This underscores the importance of assessing how tax-favoured schemes can be best designed to stimulate personal savings.
- In countries where participation in private pension plans is largely voluntary, the effectiveness of private pension schemes in boosting personal saving may be undermined by the uneven distribution of participation across income levels. Unsurprisingly, micro evidence from a few countries indicates that tax-favoured schemes tend to be used disproportionately by upper-income individuals. And, according to some empirical studies,

⁴⁷ One advantage of a small tax on accrued investment income is that it can lower the fiscal cost in a way that is equitable across generations to the extent that all contributions already accumulated would be affected.

⁴⁸ The reason for this is that relative to the EET treatment the government taxes back part of the subsidy granted initially. This is because under an ETT scheme, the investment return on all assets is taxed, including the portion of assets that corresponds to the accumulation of the tax subsidy on each unit of contribution. In the EET case, only the portion of asset accumulated from diverted personal savings is relevant for the calculation of the budgetary cost arising from the non-taxation of investment income.

the latter are more likely to finance the bulk of their contributions by diverting other sources of savings rather than by reducing consumption.

- The weaker participation rates among lower-income employees can be explained in part by the fact that they are less likely to work for a firm that sponsors a pension plan as compared to highly skilled workers. Another explanation is that in most tax-favoured schemes the value of the incentive diminishes as income levels fall. As well, income testing in public transfer or pension plans may reduce the incentives for private pension saving among the low- and middle-income groups.
- One way to achieve participation rates that are high and uniform across income levels is to make membership in an occupational plan compulsory, as is currently done in a number of countries. In such a case, authorities could envisage imposing a flat tax on accrued investment income in tax-favoured private pension plans so as to lower the fiscal cost. Simulation results suggest that a flat tax on investment income, even at a low rate (5 per cent) could have a substantial impact on net fiscal revenues.
- The participation of lower-income earners in voluntary occupational or individual retirement plans could be enhanced by rebalancing in their favour the value of the tax incentive. This could be done by replacing the tax deduction with a non-wastable tax credit (or subsidy) set at a flat rate.

67. The existence of tax-favoured pension arrangements does not seem to be questioned even though these schemes appear to be costly from a public finance point of view. In fact, more and more countries are either introducing them or extending their coverage. A question that arises is whether tax-favoured arrangements can be justified even if they fail to raise private and national saving. Three factors could help motivate their existence. One is that the shift towards long-term retirement saving may be an objective worth pursuing, not least to stimulate the demand for long-term financial instruments.

68. Another is the need to establish a framework for encouraging private pension in order to ease the impact of reductions in public pension benefits on the income level of future retirees. The latter concerns primarily countries where the pension system rests essentially on a public pay-as-you-go pillar and who are under pressures to reform the system so as to cope with ageing population. Several of these countries, including Germany, France and Spain have implemented or extended the EET-type private arrangements in recent years to promote the development of private pensions. However, promoting private pension as a substitute for public pensions raises issues regarding risk bearing and administrative costs which needs to be carefully examined. Finally, one could argue that tax-favoured retirement-saving plans have played a useful role in allowing governments to shift important fiscal revenues to a period in the future where the fiscal impact of ageing will peak. Without such a shift, it is not clear that governments would have resisted political pressures to spend these revenues rather than using them to build assets so as to meet the future cost of populations ageing.

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ANNEX 1. NET FISCAL ASSETS IN THE UNITED STATES

69. Based on an accounting framework similar to the one adopted in this paper, Boskin (2003) finds that implicit net assets in tax-favoured retirement saving schemes in the United States could be as large as \$1.7 trillion, even in the case where second-round effects arising from new savings are ignored (*i.e.* only the direct income tax effects are considered). This contrast with this paper's finding (referred to as OECD) that implicit net assets may instead be negative at -\$4.2 trillion. The gap between these two sets of results stems essentially from the different assumptions underlying the two exercises (Table A1.1). In fact, using Boskin's assumptions, this paper's estimates of implicit net fiscal assets would rise to \$1.2 trillion (Table A1.2).

70. Two key sources of difference are Boskin's assumptions that nearly 50 per cent of total contributions are funded by new private savings – reducing foregone revenues from accrued income – and that there is no spread between the effective tax rate on pension income and the marginal tax rate on contributions.¹ However, the assumption regarding the share of new saving has been disputed by some, including Auerbach *et al.* (2003) who have argued that a proportion of 25 per cent of total contributions would seem more reasonable. Furthermore, there is no clear evidence that the tax rate on withdrawals should be as high as the one on contributions, as tax-deferral may provide opportunities for some tax smoothing.

71. Another key assumption driving Boskin's results concerns the withdrawal function. He assumes that accumulated assets in tax-favoured plans are entirely withdrawn as a lump-sum at the age of 65.² Although such a front-loading of withdrawals does not change the net present value of tax revenues over the whole period 2000-2040, it contributes to bring about positive net fiscal revenues earlier on in the projection period, preventing thereby the build-up of net fiscal liabilities. Finally, given that in Boskin's model the future is discounted at a lower rate than the rate of return on assets, the future net fiscal revenues translate into higher fiscal assets in present-value terms.

72. The contribution of each of these assumptions is shown in Table A1.2 below:

Table A1.1 Assumptions

	OECD	Boskin
Contribution rate (contributions over total wages)	8.0%	8.0%
Share of total contributions financed by new savings	0%	46.4%
Effective tax rate used to calculate revenues foregone on contributions	29.0%	28.7%
Effective tax rate used to calculate revenues collected on withdrawals	24.0%	28.7%
Effective tax rate used to calculate revenues foregone on investment income	22.3%	15.0%
Inflation	2.0%	3.0%
Productivity growth (average annual growth)	1.7%	
Employment growth (average annual growth)	0.46%	
Salaries and wage growth (nominal)	4.21%	4.76%
Nominal rate of return	6.5%	7.5%
Discount rate	6.5%	5.3%
Withdrawal function	Annuity 65 to 85	Lump sum 65

¹ Boskin (2003) assumes that diverted savings represent 25 per cent of total contributions. As 28.7 per cent of total contributions are financed implicitly by the tax break, the rest (46.4 per cent) represents new savings.

² He nevertheless makes an adjustment to take into account that there are assets left beyond age 70. See Boskin (2003), page 34 and footnote 38.

Table A1.2 Present Value of Net Revenue from Tax-Deferred Accounts through 2040
(in Trillion US\$)

	Foregone revenue from/on		Tax on withdrawals	Implicit Net Assets
	Contributions	Accrued income		
Boskin base case (projected)	-4.3	-0.9	6.9	1.7
OECD base case	-3.2	-4.1	3.1	-4.2
New saving, 50 per cent of total contributions	-3.2	-1.4	3.1	-1.5
<i>New saving equal to 50 per cent plus (in cumulative steps):</i>				
- No spread between tax rates on pensions and contributions	-3.2	-1.3	3.7	-0.9
- Effective tax rate on diverted income 15 per cent	-3.2	-0.9	3.7	-0.4
- Inflation at 3 per cent	-3.2	-1.0	3.7	-0.6
- Lower growth in wages and salaries (productivity growth at 1.2 per cent)	-2.9	-1.0	3.6	-0.3
- Discount rate 2 percentage points below the rate of return	-4.4	-1.6	5.9	-0.1
- Withdrawal: lump-sum at 65	-4.3	-1.3	6.8	1.2

ANNEX 2. THE EFFECTIVENESS OF TAX-FAVOURSED RETIREMENT SAVING PLANS IN PROMOTING PRIVATE SAVINGS

73. This annex provides a selective review of the empirical literature on the effectiveness of tax-favoured retirement saving (TFRS) plans in stimulating private savings. Whether TFRS schemes generate new savings rather than divert savings is of crucial importance to determine the implicit fiscal costs of these schemes, and for the well-being of future pensioners. While economic theory is ambiguous on the issue, the available empirical findings range from large and significant effect of TFRS plans on saving behaviour (Poterba, Venti and Wise, 1995, 1996a,b) to little or not saving effects (Engen, Gale and Scholtz, 1994, 1996), reflecting the difficulties of addressing this issue.^{1,2}

74. In principle, the effect of TFRS plans on saving could be gauged by comparing the total savings of individuals who contribute to such schemes with those of individuals who do not contribute, under the assumption that eligibility is exogenous to saving propensities. In practice, higher savings of those participating in such plans could mainly reflect higher saving preferences rather than a genuine net increase in saving. The wide range of empirical results (Table A2.1 below) is partly explained by differences in the approach taken by authors to control for the potential heterogeneity in savers' preferences and other unobservable characteristics.

75. Venti and Wise (1990, 1991) compare household assets for contributors to IRA with assets of non-contributors, controlling for initial wealth. They conclude that most of IRA contributions represent new saving. However, two individuals with the same initial wealth do not necessarily have the same underlying preferences towards saving. Gale and Scholz (1994), on the other hand, find that a negligible fraction of contributions to IRAs comes from new saving. They allow the parameters of the saving relationship in their model to vary according to whether the individual is an IRA contributor or not, assuming different marginal propensities to save in IRAs and in other savings vehicles. They then identify the impact of IRAs on saving by looking at the effect of a change in the IRA contribution limit, distinguishing between contributors that have or have not reached the established ceilings. However, their approach does not eliminate completely the possibility of inferring incorrectly that IRA saving displaces other forms of saving (Bernheim, 1999) and their results were found to be highly sensitive to small changes in the sample (*i.e.* revenue threshold above which wealthy households were excluded from the analysis) (Poterba, Venti and Wise (1996a,b)).

76. Attanasio and DeLeire (2002) exploit the idea that correlations between IRA saving and non-IRA saving can be particularly informative in the case of new contributors. Using data from the Consumer Expenditure Survey (CES), they compare consumption growth in households that have recently opened an IRA account with growth in households that had already contributed to an IRA. They find that households financed IRA contributions not from a reduction in consumption, but rather from existing or planned saving. They estimate that only 9 to 20 per cent of IRA contributions represent net additions to national saving.

¹ Most of the literature focuses on the United States and its main TFRS schemes: IRAs and 401(k)s. The evidence for other countries is more limited.

² The same range of results was found for Canada. Venti and Wise (1995) find that, for the most part, RRSP contributions increased saving. However, Milligan (1998) argues that only small share of each dollar contributed to RRSP program represent net new saving.

77. Poterba, Venti and Wise (1995, 1996a and 1996b) compare the financial assets of households who are eligible to 401(k) with the assets of those who are not eligible. They find little substitution between 401(k) saving and other forms of financial asset saving, concluding that virtually all contributions to these schemes come from new saving. They use two approaches to deal with the problem of saver heterogeneity. Firstly, they assume that eligibility to 401(k) is exogenous to the propensity to save. Using the 1987 and 1991 waves of the Survey of Income Program Participation (SIPP)³, they find that eligibility is significantly correlated with median financial wealth.

78. However, some have questioned the assumption of exogeneity of eligibility to 401(k) (*e.g.* Engen, Gale and Scholz, 1994), arguing that employees with tastes for savings probably would tend to gravitate towards jobs that provide good pension coverage. Furthermore, employers may establish 401(k) programmes to attract employees with such tastes or to meet the preferences of existing employees. As an alternative, Poterba, Venti and Wise compare the three cross-sections of the SIPP, assuming that eligible workers in the three groups have similar saving preferences. They find an upward shift in the relative financial assets of those who are eligible to 401(k), concluding that all contributions are new savings. In contrast, following the same approach and using the same data set, Engen, Gale and Scholz (1994, 1996) conclude that only a negligible amount of 401(k) contributions represent new saving. The main difference is that they use a broader measure of wealth that includes housing equity⁴ to estimate whether 401(k) stimulate saving, arguing that increases in contributions to 401(k) could be financed with home equity, leaving therefore total wealth unchanged.⁵

79. The approach followed by Engen, Gale and Scholtz, and by Poterba, Venti and Wise which essentially compares the change in wealth over time in eligible and non-eligible workers, suffers from a number of caveats likely to bias the results in either direction. Firstly, outside factors like the stock market boom of the 1980s or proportionate shifts in the allocation of wealth from real assets to financial assets (in the case of Poterba, Venti and Wise), or equal percentage declines in housing wealth among eligible and ineligible groups during the period (in the case of Engen, Gale and Scholz), could have caused changes in financial wealth and/or total wealth that ended up being confused with the impact of 401(k). Secondly, using cross-sections to emulate longitudinal data may create a problem of dilution. For example, if new eligible workers are less motivated savers than those already eligible, the composition of the eligible group would become skewed towards less motivated savers creating a spurious downward shift in the estimated cross-sectional age-wealth profile of eligible workers, which would partly offset any shift due to the behavioural effect of 401(k).

80. On balance, the impact of 401(k) on saving is likely to lie somewhere between the extremes of “no new saving” and “all new saving” (Hubbard and Skinner, 1996), but with a fairly wide range of plausible estimates. In any case, more recent studies have underscored the importance on composition

³ The SIPP consists of three cross-sections: 1984, 1987, and 1991.

⁴ Housing assets net of mortgages.

⁵ Using a different data set (the Survey of Consumer Finances) to assess the effect of the 401(k) program on saving, Pence (2002) finds that 401(k) have little effect on saving. Unfortunately, this dataset does not contain a clear measure of 401(k) eligibility.

effects: for instance, Engen and Gale (2000) find that tax incentives in 401(k) are likely to raise savings for low earners or low savers but may have no effect on high earners or high savers; Benjamin (2003) finds that 401(k)s are more effective in raising new savings for renters and households without an IRA than homeowners and IRA holders.

Table A2.1 Effectiveness of Tax-Favoured Retirement Saving plans in promoting saving

Author(s)	Measure of effectiveness	Data ¹	Results (share of contributions that represent new saving)	Period
Venti and Wise, 1990, 1991	Change in wealth of those who contribute to IRAs as compare to non-contributors.	CES and SIPP	100 per cent	1982-1986
Gale and Scholz, 1994	Changes in wealth of those who contribute to IRAs as compare to non-contributors.	SCF	Negligible	1983-1986
Attanasio and DeLeire, 2002	Changes in consumption of new contributors to IRAs as compare to people who had already contributed.	CES	10-20 per cent.	1982-1986
Poterba, Venti and Wise, 1995, 1996a,b	Changes in financial assets for those eligible for 401(k)s as compared to the group of ineligible.	SIPP	75-100 per cent	1984, 1987, 1991
Engen, Gale and Scholz, 1994, 1996	Changes in total wealth, measured as financial plus housing wealth, of those eligible for 401(k)s as compare to the group of ineligible.	SIPP	0-10 per cent.	1984, 1987, 1991
Engen and Gale, 2000	Changes in wealth of those eligible for 401(k)s as compared to the group of ineligible, but allowing the effects of 401(k)s to vary by earning class over time and using a variety of functional forms for the dependent variable that are more robust to differences in initial asset position and to economy-wide effects that raise or lower all asset values proportionally, or have different effects across earning classes.	SIPP	Low income people: 100 per cent. High income people: 0 per cent.	1984, 1987, 1991
Pence, 2002	Changes in the wealth of 401(k) eligible and ineligible households over the 1989-1998 period controlling for the bias that higher taste for saving of eligible households would introduce by constructing subjective measures of saving taste from questions on the SCF and by transforming the wealth measure with the inverse hyperbolic sine.	SCF	5-10 per cent.	1989-1998
Benjamin, 2003	Changes in wealth using propensity score sub-classifications.	SIPP	Around 25 per cent. But renters, non-IRA holders: 100 per cent.	1984, 1987, 1991

1. The abbreviations stand for: Consumer Expenditure Survey (CES), Survey of Income and Program Participation (SIPP) and Survey of Consumer Finances (SCF).

ANNEX 3. THE FISCAL IMPACT OF TAX-FAVOURED RETIREMENT SAVINGS PLANS WHEN CONSIDERING CORPORATE AND CONSUMPTION TAX REVENUES

81. The baseline projections presented above abstract from behavioural responses and potential second-round effects. Section 4.3 showed the importance of new savings in lowering the costs of tax-favoured schemes. Additionally, new savings could bring about second-round effects that may alter these costs. This annex illustrates with a simple example the fiscal impact of tax-favoured schemes when second round effects of new savings, in particular, changes in corporate and consumption tax revenues are taken into account.

82. Feldstein (1995) has argued that traditional estimates of the tax expenditures related to tax-favoured retirement saving plans systematically over-estimate the true cost because they fail to take into account important feedback effects from higher national savings. His point is that the increase in national saving raises the capital stock and the overall level of profits (for a given return on capital), bringing higher corporate tax revenues. Extending the basic accounting framework to take into account corporate taxation (in addition to personal income taxation), he shows that even government savings can rise in the medium run as a result of the tax incentive. Naturally, a number of key assumptions make his results hold under special circumstances that can not necessarily be assumed to hold in other countries (Ruggeri and Fougère, 1997). Furthermore, considering the importance of new saving in generating the positive results, it may be more appropriate to also take into account the impact of the reduction in consumption on tax revenues. This could be particularly relevant for countries where consumption tax rates are substantially higher than corporate tax rates.

83. In order to illustrate the implications of introducing these additional tax revenues and second-round effects, the simple exercise below shows the fiscal impact of tax-favoured retirement saving plans i) when only income tax effects are considered; ii) when corporate tax revenues are included; and iii) when both consumption and corporate tax revenues are taken into account. For the specific case considered below, the results show that relative to the case where only income tax is taken into account, taking both corporate and consumption tax revenues into consideration reduce the fiscal cost of tax-favoured retirement saving plans.

84. Taking equation 10, consider an individual who starts a tax-favoured retirement saving plan and contributes 1,000€ a year during 30 years.¹ He then retires and withdraws his accumulated capital in the form of an annuity for 20 years.² The accumulated assets for a pre-tax return rate of 6.5 per cent would be 130,543€ after 30 years, financing a constant annuity of 11,848€ for 20 years of retirement with a 6.5 per cent implicit return. The top panel of Figure 3.1 shows net fiscal revenues for this individual over the 50-year period (solid line) when one-third of personal savings are new savings and in the case where, for illustrative purposes, the tax rates on accrued income and withdrawals are equal to 20 percent and the marginal tax on contributions is 25 per cent.³ The results are reported in present value terms using a 3 per cent discount rate. Given that only income tax revenues are considered in this first case, it is not surprising to find that net fiscal revenues are negative throughout the contribution period and turn positive when the individual retires.

¹ The contribution increases by 3.7 per cent annually in line with wages comprising 1.7 per cent growth in productivity and 2 per cent inflation.

² The model assumes that assets are exhausted at the end of the period.

³ The main conclusions would hold under reasonable alternative sets of tax rates.

85. Corporate tax revenues affect foregone revenues from accrued income in two main ways. First, returns on assets would be subjected to corporate income tax (CIT), but only the returns on assets from non-diverted savings as diverted savings would have been subjected to CIT in the absence of tax-favoured retirement saving plans. Considering τ as the CIT tax rate, i as the nominal rate of return on assets, and A total assets, the additional revenue from considering CIT is: $\tau \cdot i \cdot (A - A')$. Second, as only accrued income after paying corporate taxes is subjected to the tax rate on accrued income, μ_a , foregone revenues from not taxing accrued income becomes: $\mu_a \cdot (1 - \tau) \cdot i \cdot A'$. As a result of both effects, net fiscal revenues of tax-favoured retirement saving plans when corporate tax revenues are taken into account become:

$$NFR_t = \mu_b \cdot B_t - \mu_c \cdot C_t - \mu_a (1 - \tau) \cdot i \cdot A'_{t-1} + \tau \cdot i \cdot (A_{t-1} - A'_{t-1}) \quad [3.1]$$

86. Net fiscal revenues are also adjusted to take into account that new savings are financed by a reduction in consumption, which implies lower consumption tax revenues during the period of contributions to tax-favoured retirement saving plans, but also higher total tax revenues during the retirement period. Considering that μ_{vat} is the tax rate on consumption, α is the share of personal saving financed by a decline in consumption (new saving), and bearing in mind that only the part of pension benefits that comes from assets accumulated from non-diverted savings⁴ would lead to a net increase in consumption tax revenues (*i.e.* relative to the case of absence of tax-favoured retirement saving plans), net fiscal revenues at t become:

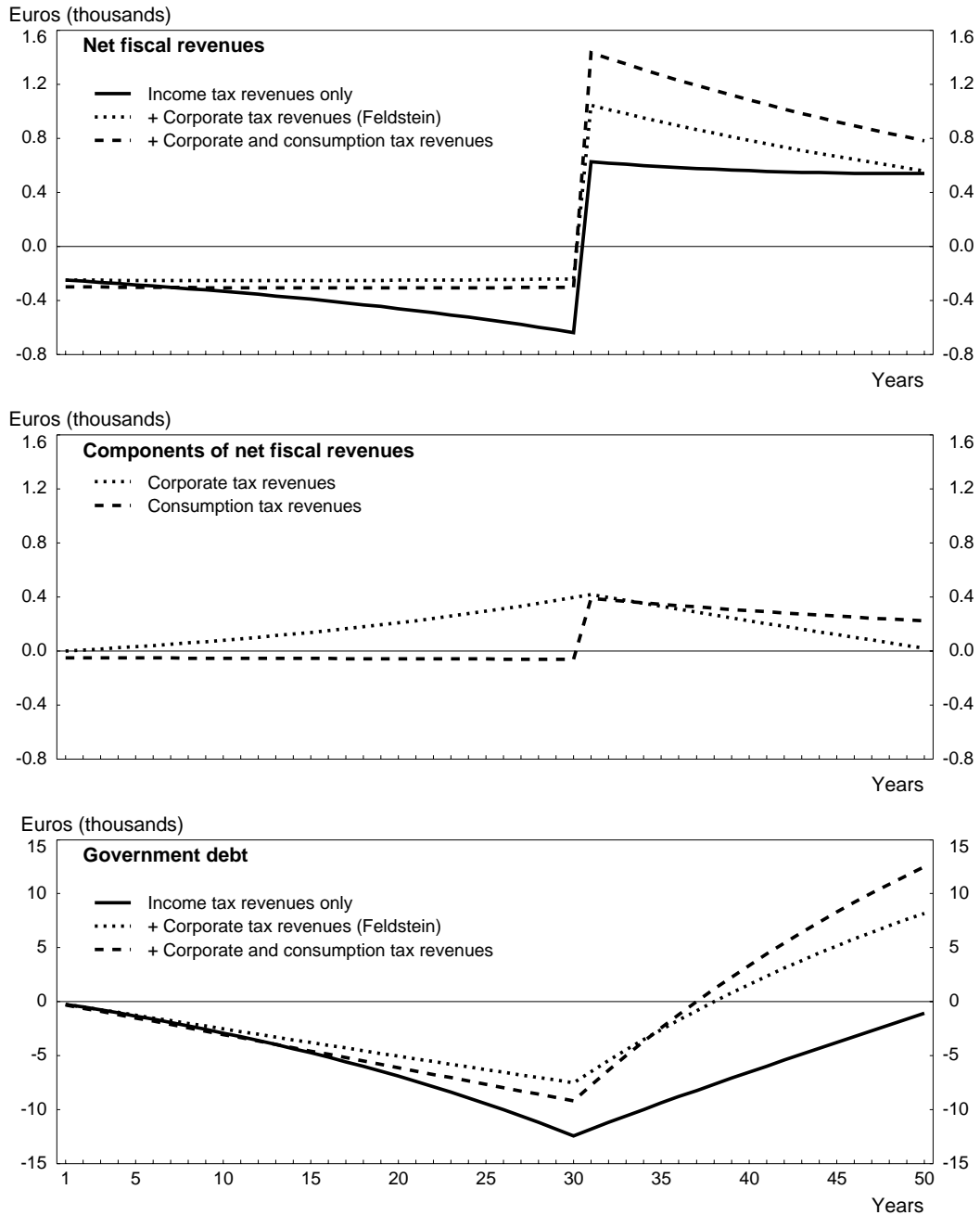
$$NFR_t = \mu_b \cdot B_t - \mu_c \cdot C_t - \mu_a (1 - \tau) \cdot i \cdot A'_{t-1} + \tau \cdot i \cdot (A_{t-1} - A'_{t-1}) + \mu_{vat} [(1 - \mu_b) B_t - \alpha (1 - \mu_c) C_t] \quad [3.2]$$

87. The central panel in Figure 3.1 shows net corporate tax revenues and net consumption tax revenues over the 50-year period assuming a corporate and consumption tax rate of 20 per cent. As assets peak at the time of retirement, net corporate tax revenues peak at the first year of retirement falling thereafter as withdrawals reduce remaining assets. Net consumption tax revenues are negative during the period of contribution but become positive in retirement. The net present value of the stream of net consumption tax revenues is positive as revenue losses are on new savings but revenue gains are on withdrawals from assets accumulated on non-diverted savings.

88. The fiscal impact of considering both corporate and consumption tax revenues, is to reduce net revenue losses during the years contributing and to increase net revenue gains during retirement. Furthermore, although the individual eventually withdraws all that he has accumulated in his tax-favoured retirement saving plan, the net increase in government revenues resulting from consumption taxation potentially allows for a permanent reduction in the government debt (Figure 3.1, bottom panel).

⁴ Non-diverted savings means the sum of new savings and the implicit tax subsidy. Non-diverted assets ($A - A'$) would finance a constant annuity B' .

Figure 3.1. Fiscal Impact of Tax-favoured Retirement Saving Plans (1)
(Present value)



1. In the case of an individual that contributes for 30 years and withdraws benefits for 20 years.
Source: OECD.

TABLES AND FIGURES

Table 1. Tax treatment of private pensions in 2003 ^a

Country	Contributions ^b	Fund	Pension payments ^e
Australia ^c	T	pT	T/PE
Austria ^c	T (PE)	E	T/PE
Belgium ^c	E (TC)	E	T/PE
Canada	E	E	T
Czech Republic ^c	T (S)	E	T/PE
Denmark	E	pT (15%)	T
Finland	E	E	T
France	E	E	T/PE
Germany	E	E	T/PE
Greece	E	E	T
Hungary ^{c, d}	T	E	E
Iceland	E	E	T
Ireland	E	E	T/PE
Italy	E	pT (12.5%)	T/PE
Japan	E	E	T/PE
Korea	E	E	T/PE
Luxembourg ^c	E	E	T
Mexico	E	E	T/PE
Netherlands	E	E	T
New Zealand ^c	T	T	E
Norway	E	E	T
Poland	E	E	T
Portugal ^c	E (TC)	E	T/PE
Slovak Republic	E	E	T (15%)
Spain	E	E	T
Sweden	E	pT (15%)	T
Switzerland	E	E	T
Turkey	E	E	E
United Kingdom	E	E	T
United States	E	E	T

Abbreviations:

E (exempt) T (taxed under personal income tax) TC (tax credit) PE (partial exemption or deduction from taxation) S (state subsidy) pT (partial taxation)

a) Private pension refers to mandatory or voluntary funded privately managed pension schemes.

b) Tax-deductible contributions are subject to a certain limit in most countries.

c) The tax treatment of the employer's contributions is different from those of the employee's.

d) Mandatory contributions are fully taxed, but voluntary contributions receive tax credits.

e) This generally concerns the tax treatment in the case of annuities. Many countries allow pension benefits to be withdrawn in the form of lump-sums, in which case a partial exemption is granted so as to preserve tax neutrality with annuities

Source: Yoo and de Serres (2004).

Table 2. Main assumptions behind the base case projection
(Percentages)

	Australia	Canada	Denmark	Iceland	Ireland	Japan	Mexico	Netherlands	Norway
Productivity growth (average annual growth)					1.7				
Nominal rate of return					6.5				
Discount rate					6.5				
Inflation					2.0				
Share of individual contribution that are new savings					0.0				
Employment growth (average annual growth)	0.4	0.3	-0.2	0.3	0.6	-0.9	1.2	0.1	0.2
Salaries and wage growth (nominal)	4.1	4.1	3.5	4.0	4.4	2.8	5.0	3.8	4.0
Contribution rate (contributions over total wages)	13.6	8.9	7.8	11.0	18.0	1.6	2.1	13.5	5.1
Effective tax rate on contributions	44.6	34.3	49.3	39.7	20.6	9.4	10.8	37.1	34.6
Effective tax rate on benefit withdrawals	44.6	29.3	44.3	34.7	15.6	3.5	7.6	32.1	29.6
Effective tax rate on accrued investment income	36.7	27.7	38.1-15 ¹	9.5	17.8	14.4	0.0	12.8	22.2
Withdrawal function					Annuity from 65 to 85				
Initial assets (% GDP, in 2000)	68.5	110.5	92.1	86.0	52.5	15.7	5.2	119.7	25.3
Number of participants (percentage employment)	85.4	60.1	95.0	100.0	46.6	33.0	37.2	90.0	61.8

Table 2. (cont.)
(Percentages)

	Poland	Portugal	Slovak Republic	Spain	Sweden	Switzerland	United Kingdom	United States
Productivity growth (average annual growth)								
Nominal rate of return					1.7			
Discount rate					6.5			
Inflation					6.5			
Share of individual contribution that are new savings					2.0			
Employment growth (average annual growth)					0.0			
Salaries and wage growth (nominal)	-0.7	0.0	-0.8	-0.1	-0.1	-0.2	0.0	0.5
Contribution rate (contributions over total wages)	3.0	3.7	2.9	3.7	3.6	3.6	3.7	4.3
Effective tax rate on contributions	4.1	4.2	0.6	2.8	6.8	13.4	10.6	7.8
Effective tax rate on benefit withdrawals	9.1	12.8	11.6	22.1	25.5	16.6	22.1	29.0
Effective tax rate on accrued investment income	6.6	7.8	7.1	17.1	24.7	11.6	17.1	24.0
Withdrawal function	13.4	12.3	10.6	14.5	28.3-15 ¹	12.7	20.1	22.3
Initial assets (% GDP, in 2000)	1.0	12.0	0.3	Annuity from 65 to 85	Annuity from 65 to 85	117.1	100.0	106.1
Number of participants (percentage employment)	59.4	6.1	7.1	41.5	85.0	80.0	59.0	53.7

1. In the cases of Denmark and Sweden the two numbers reported represent tax rates on accrued investment income in benchmark savings vehicles and private pensions respectively.
Source: OECD.

Table 3. Sensitivity Analysis
(Simple average of individual country results)

	Net Fiscal Assets	Net Fiscal Revenues in 2050	Difference in Net Fiscal Assets ¹
	As a percentage of GDP	As a percentage of GDP	Percentage points
Base case	-30.1	-0.2	
No population ageing	-33.6	-0.3	-3.5
<i>Initial conditions</i>			
Contribution ratio 1 percentage point higher	-32.9	-0.2	-2.8
Initial assets 10 percentage points lower	-30.4	-0.2	-0.3
<i>Assumptions on growth and returns</i>			
Productivity growth 1 percentage point higher	-38.6	-0.4	-8.5
Inflation 1 percentage point higher	-33.6	-0.3	-3.5
Rate of return 1 percentage point higher	-27.0	-0.1	3.1
Discount rate 1 percentage point lower than the rate of return	-37.2	-0.4	-7.1
<i>Tax rates</i>			
The spread between the tax rate on withdrawals and the tax rate on contributions is one percentage point lower	-27.8	-0.2	2.3
Tax rate on accrued income alternative savings is one percentage point lower	-28.6	-0.2	1.5

1. A positive sign means that Net Fiscal Assets become less negative, i.e. net fiscal liabilities decrease.
Source: OECD.

Table 4. Age and income profile of participants to private pension plans

United States, 1997

Panel A. Average income per employee and participants					
	Under 30	30 to 44	45 to 59	60 and Over	All Ages
Average income per employee \$	23137	44523	52698	41588	39704
In % of average income across all employees	58.3	112.1	132.7	104.7	100.0
Average income per contributor \$	32937	52911	60612	51652	50964
In % of average income across all contributors	64.6	103.8	118.9	101.3	100.0
In of average income of employees in same age group	142.4	118.8	115.0	124.2	128.4
Panel B. Percentage of workers participating by age and income level					
Income range	All Earners				
	Under 30	30 to 44	45 to 59	60 and Over	All Ages
Under \$20,000	18.7	26.4	27.5	21.6	22.0
\$20,000 to < \$40,000	52.9	57.2	60.1	45.6	55.7
\$40,000 to < \$80,000	67.4	70.0	73.7	56.2	69.8
\$80,000 to < \$120,000	78.9	79.0	82.2	58.6	78.7
\$120,000 to < \$160,000	76.8	80.8	80.0	61.7	78.4
\$160,000 and Over	79.2	79.3	78.3	54.8	75.7
All Income Groups	34.8	57.9	64.0	41.5	51.0

Source: CBO (2003).

Table 5. Age and income profile of participants to private pension plans

United Kingdom, 2001

Panel A. Average income per employee and participants ¹										
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	all ages
Average income per employee £	10953	17029	18944	20827	21222	21368	18858	16242	11949	17710
In % of average income across all employees	61.8	96.2	107.0	117.6	119.8	120.7	106.5	91.7	67.5	100.0
Average income per contributor £	15746	21444	23473	25595	25767	25485	22743	21300	18999	23501
In % of average income across all contributors	67.0	91.2	99.9	108.9	109.6	108.4	96.8	90.6	80.8	100.0
In % of average income of employees in same age group	143.8	125.9	123.9	122.9	121.4	119.3	120.6	131.1	159.0	132.7

Panel B. Percentage of workers participating by age and income level ²										
Income range	All Earners									
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	all ages
< 9,000	12.6	21.7	35.2	39.7	37.2	47.8	42.1	34.1	30.2	25.6
9,000 < 13,500	24.4	40.8	46.4	51.8	54.2	53.8	59.5	50.2	51.2	43.5
13,500 < 18,000	43.3	52.4	64.7	63.6	69.6	68.7	71.7	74.0	60.3	62.1
18,000 < 22,500	55.1	62.5	71.4	76.9	75.2	84.8	78.9	73.7	64.4	72.4
22,500 < 27,000	56.2	68.1	81.7	81.6	82.8	88.5	90.3	89.2	75.0	81.5
27,000 < 31,500	44.1	74.8	85.4	85.0	88.3	92.4	90.2	93.0	81.5	85.8
31,500 < 36,000	50.0	71.2	80.7	85.9	87.8	95.1	88.6	90.0	77.3	85.3
36,000+	50.0	79.2	84.5	90.8	90.8	90.9	91.2	87.3	82.9	88.0
All Income Groups	32.8	55.9	70.2	73.3	74.8	77.8	76.3	71.7	60.8	65.6

1. Full-time and part-time workers.

2. Full-time workers only.

Source : Department for Work and Pensions, Family Resources Survey (2002).

Table 6. Age and income profile of participants to private pension plans

Canada, 2001

Panel A. Average income per employee and participants							
	<25	25-34	35-44	45-54	55-64	65 +	all ages
Average income per employee \$	10977.6	28394.4	35935.2	39880.2	36924.1	35693.6	31282.6
In % of average income across all employees	35.1	90.8	114.9	127.5	118.0	114.1	100.0
Average income per contributor \$	21135.3	39196.8	47418.8	50580.8	49500.0	48283.6	45356.7
In % of average income across all contributors	46.6	86.4	104.5	111.5	109.1	106.5	100.0
In % of average income of employees in same age group	192.5	138.0	132.0	126.8	134.1	135.3	145.0
Panel B. Percentage of workers participating by age and income level							
	All Earners						
Income range	<25	25-34	35-44	45-54	55-64	65 +	all ages
<10,000	5.6	7.5	9.2	9.5	9.4	6.0	7.4
10,000 < 20,000	19.8	25.1	26.8	31.3	30.2	10.6	25.1
20,000 < 30,000	43.3	50.5	52.9	57.0	51.1	17.0	49.7
30,000 < 40,000	62.0	71.7	73.3	76.0	68.9	22.3	69.8
40,000 < 60,000	74.9	84.7	85.7	88.7	79.6	29.9	83.0
60,000 < 80,000	80.0	89.0	91.9	94.2	88.8	38.5	90.0
80,000+	73.6	90.8	92.9	93.1	91.0	40.7	89.5
All income groups	18.0	51.4	59.8	65.6	56.9	21.5	50.6

Source : Statistics Canada (2003).

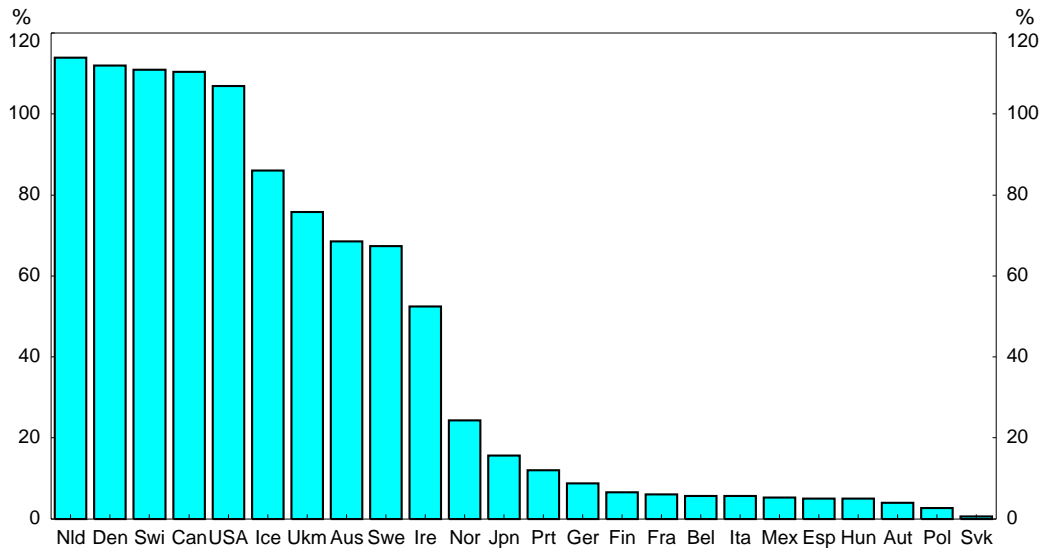
Table 7. Characteristics of the main private pension plans in Canada and the United States

	Participation	Funding	Tax treatment / Key rules
Canada			
Employment based RPPs	Voluntary 40% of dependent employees	<ul style="list-style-type: none"> - DB for 84% of participants - DC for 14% of participants - Underfunding of DB plans estimated in early 2003 at around 20% of GDP. - Average contribution per participant around 9% of participants' average income. Around 2/3 paid by employers and 1/3 by employees. 	<p>EET with limits on tax deductible contributions and benefits taxed as income.</p> <p>For DC plans: 18% of earnings up to a ceiling of around 250% of APW.</p> <p>For DB plans: pension benefits per year of services limited to 2% of earnings up to a ceiling of around 250% of APW.</p> <p>RPP accruals locked-in after two years of participation in a plan. Assets can be rolled-over tax-free to a RRSP-type plan on termination of a job.</p> <p>Normal retirement age: at latest one year after 65th birthday</p> <p>Early retirement age (withdrawal): 10 years prior to normal age.</p>
Individual RRRSPs	Voluntary 37% of taxfilers (50% of dependent employees)	<ul style="list-style-type: none"> - All DC. - Average contribution around 8% of participants' average wage. - Sum of occupation and individual contributions represent around 9% of total economy wages and salaries 	<p>EET with comprehensive limits on tax deductible contributions and benefits taxed as income.</p> <p>18% of earnings up to a ceiling of around 250% of APW, less contributions made to RPPs.</p> <p>No minimum age / penalty for early withdrawals. Interest free "borrowing" from the plan possible for first-home down payment or education spending.</p> <p>Maximum age for contributions: 69</p> <p>Minimum compulsory withdrawals at age 70 and above (at least 5% of assets must be withdrawn each year)</p>

Table 7 (cont.). Characteristics of the main private pension plans in the United States and Canada

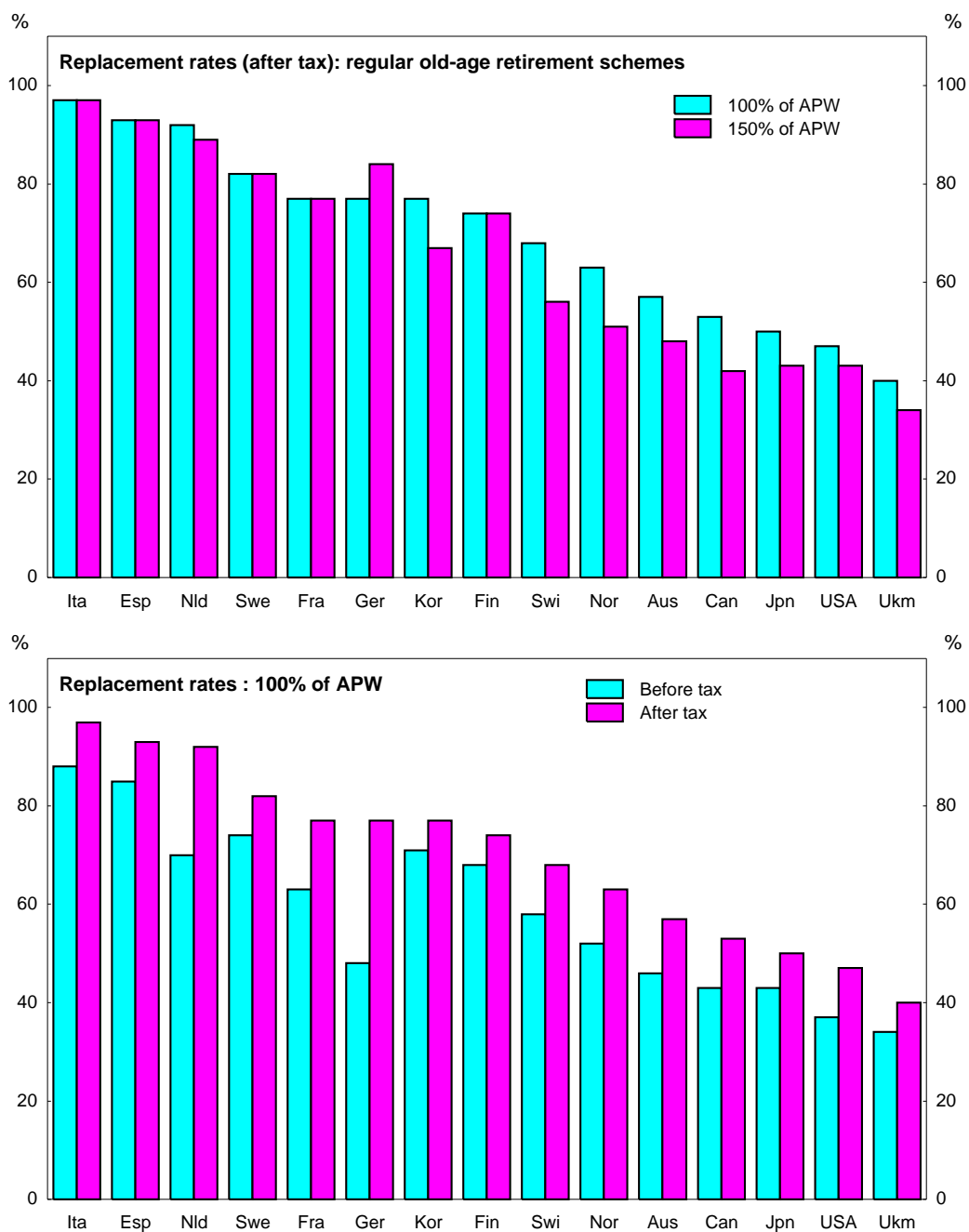
		Tax treatment / Key rules	
Participation		Funding	United States
Employment-based 401(k), 403(b), 457	Voluntary 47% of workers in 1997	<ul style="list-style-type: none"> - DB for 43% of participants - DC for 57% of participants - Proportion of DC plans rapidly growing. - Underfunding of DB plans of S&P 500 companies estimated at 2% of GDP - Total employer and employee contributions in 401(k) plans around 9% of participants' total salaries. 	<p>EET with restrictions:</p> <ul style="list-style-type: none"> - For DB plans, employer contributions only are tax-deductible (although DB plans are primarily funded by employers). Earnings ceiling for contributions set at \$160,000 (around 500% of APW). - For DC plans, limit on employee contribution set at \$12,000 (rising by \$1000 a year until 2006 and inflation-indexed thereafter). Some "catch-up" (up to \$2000) allowed for workers 50 and above. Total employer and employee contribution must not exceed the lesser of \$40,000 or 100% of earnings. <p>Minimum age for withdrawal without penalty: 59 ½ or 55 in case of financial hardship related to job dismissal. Penalty: 10% of amount withdrawn. Assets can be rolled-over tax-free into an IRA plan upon termination of a job before normal retirement age. Minimum compulsory withdrawal at age 70 ½ and above.</p>
Individual IRAs, Roth IRAs and Keogh (for self-employed)	Voluntary 7% of workers in 1997 participation not tied to employment but to income.	<p>All DC</p> <ul style="list-style-type: none"> - Average contribution around 4.5% of participant's average income. - Sum of occupational and individual contribution around 8% of total economy wages and salaries. 	<p>EET / TET depending on income level and plans.</p> <p>Traditional IRAs: For individual income no higher than \$40,000 (or joint couple income no higher than \$60,000) <i>tax deductible</i> contributions to <i>traditional IRAs</i> are allowed up to a limit of \$3000 in 2004. The limit will rise in steps to \$5000 in 2008 and will be inflation-indexed thereafter. Some "catch-up" (up to \$500) allowed for workers 50 and above.</p> <p>Roth IRAs: For individual income no higher than \$110,000 (or \$160,000 for joint couple income), <i>non-tax deductible</i> contributions to <i>Roth IRAs</i> are allowed up to the same limit as for traditional IRAs.</p> <p>Keogh: Maximum tax deductible contribution for a DC plan is the lesser of \$40,000 or 25% of earnings. Minimum compulsory withdrawal at age 70 ½ and above</p>

Figure 1. Assets in tax-favoured retirement saving plans
As a % of GDP, end 2001



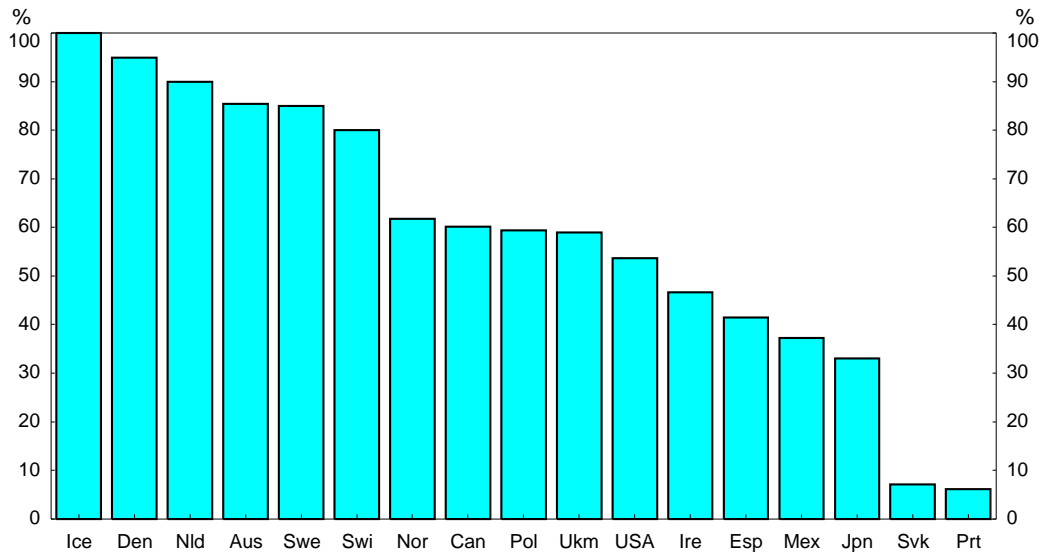
Source: International Pension Funds and their Advisors (2003), National sources and OECD.

Figure 2. Replacement rates from public pension plans
 At "normal" age of benefit, per cent of previous earnings



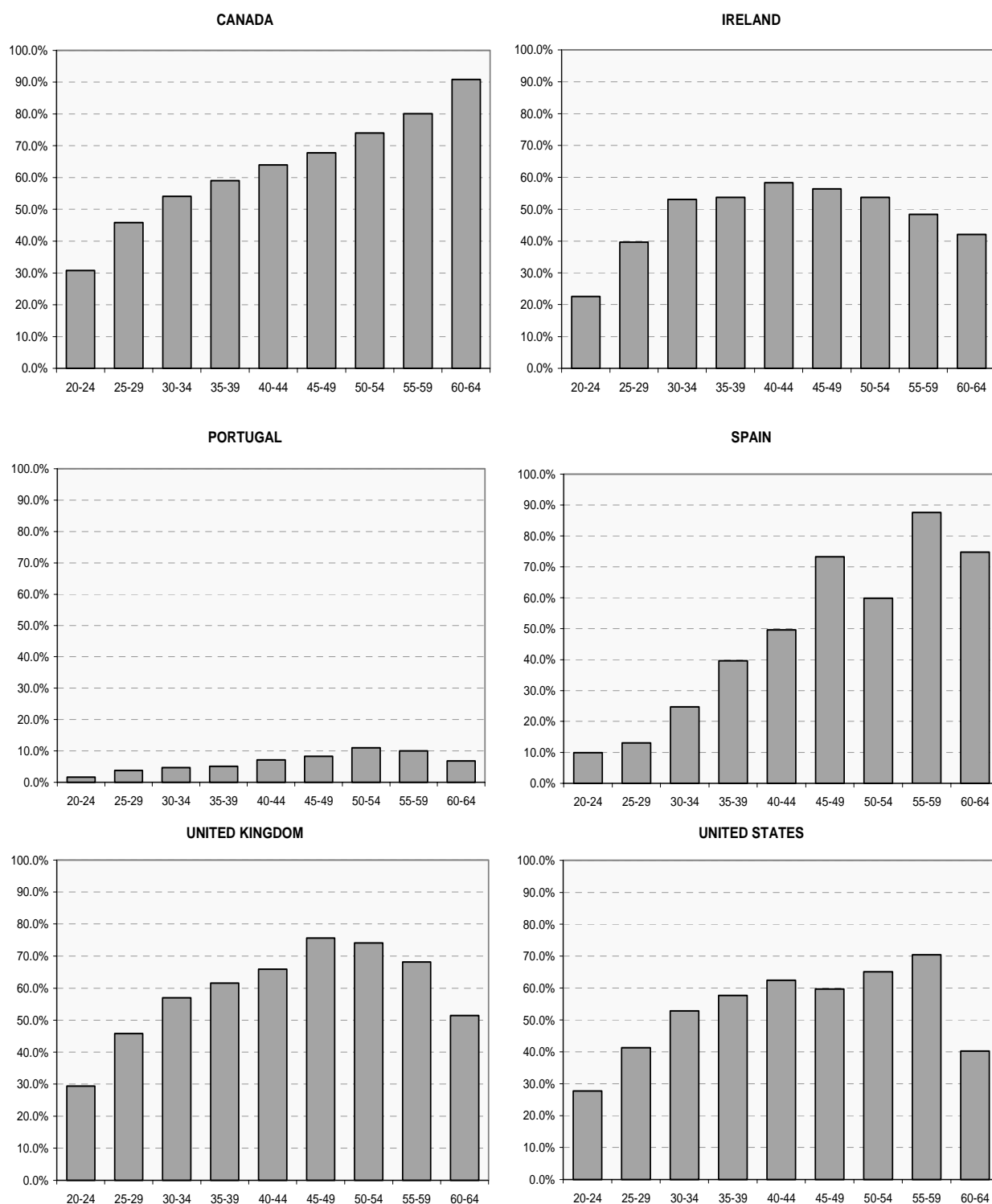
Source: Casey et al. (2003).

Figure 3. Participation in tax-favoured retirement saving plans
As a % of total employment



Source: National sources and OECD.

Figure 4. Participation by age group in selected countries with voluntary plans ¹
 (% of employment in 2000)

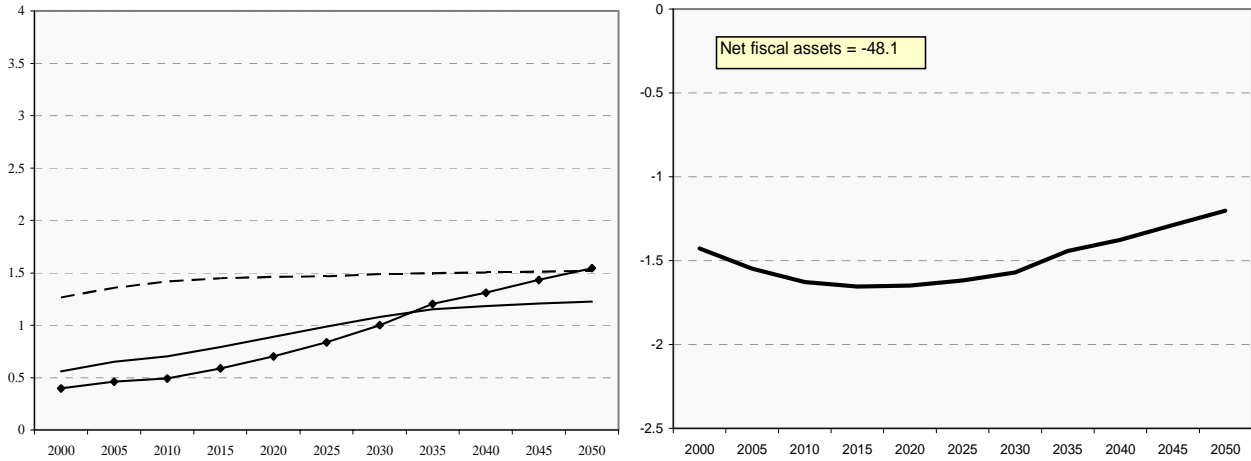


1. This includes participation to both occupational and personal plans, which explains the relatively strong participation rate for older age groups observed in countries where participation in personal plans is high.
 Source: National sources and OECD.

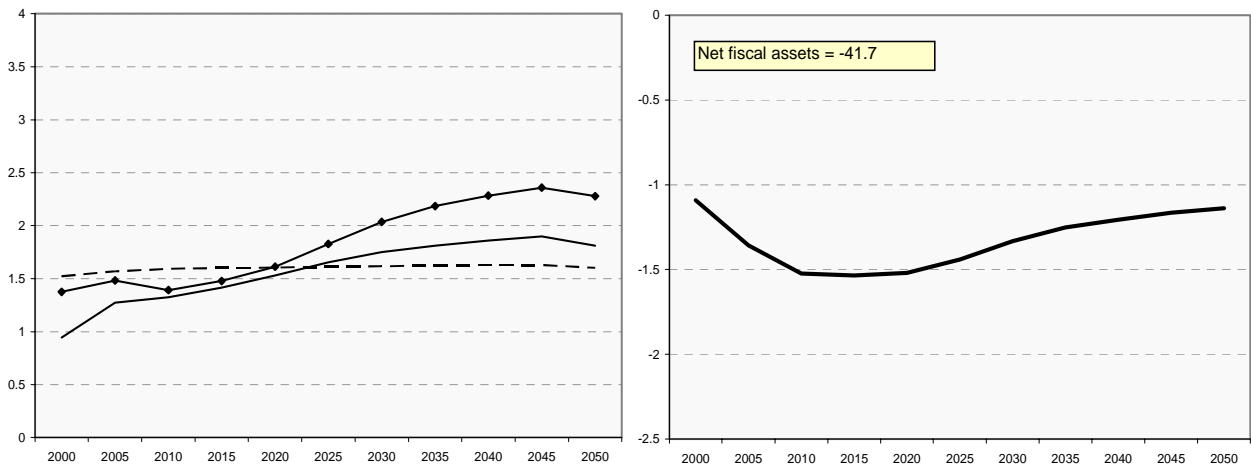
Figure 5. Projected net fiscal revenues and their components, 2000-2050 ¹
(% of GDP)

- Foregone revenues on contributions
- Foregone revenues on accrued investment income
- ◆ Revenues collected on withdrawals
- Net fiscal revenues

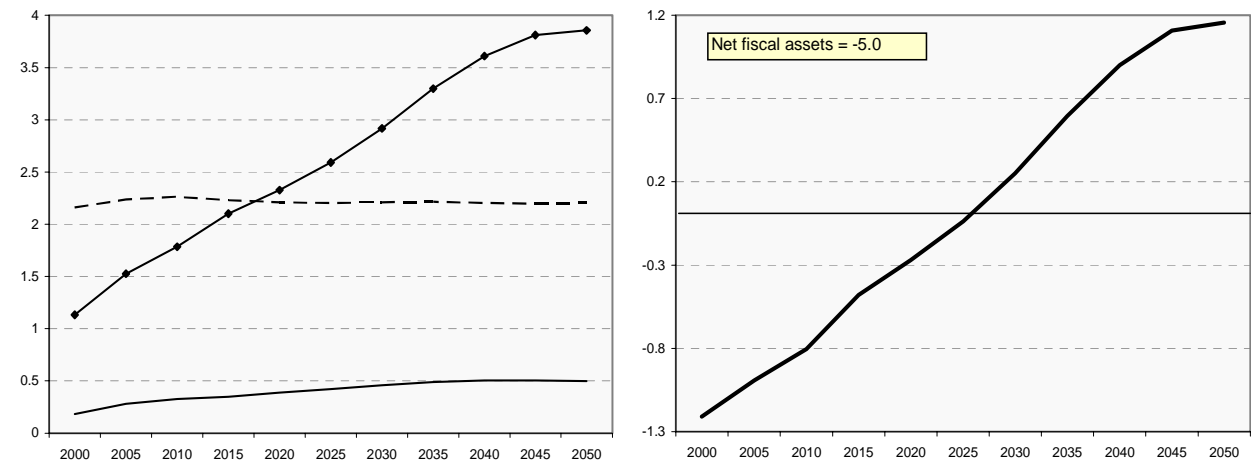
AUSTRALIA



CANADA



DENMARK

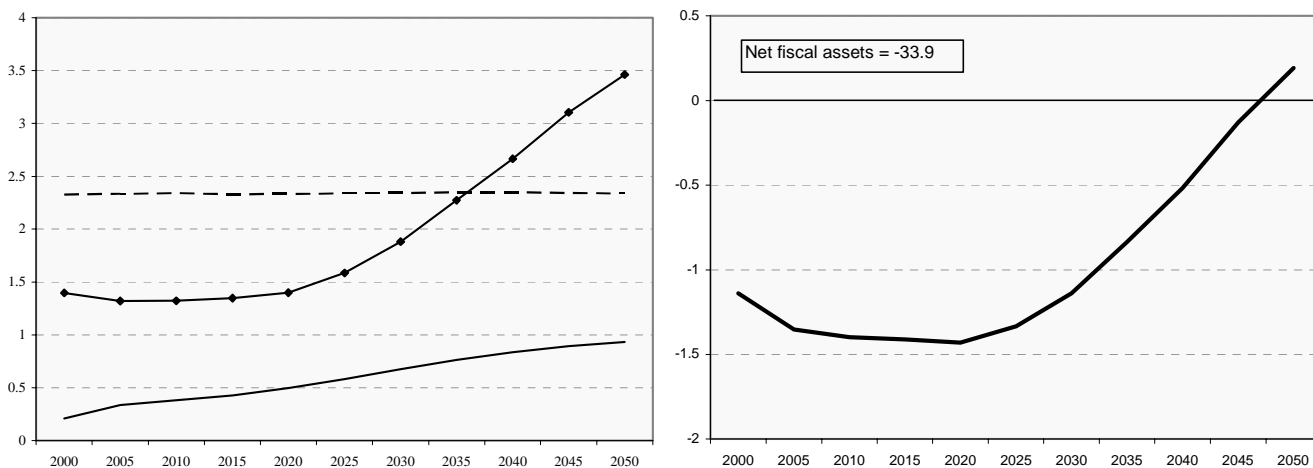


1. Net fiscal assets reported on the right hand side graphs for each country are the discounted stream of future net fiscal revenues from 2000 to 2050.

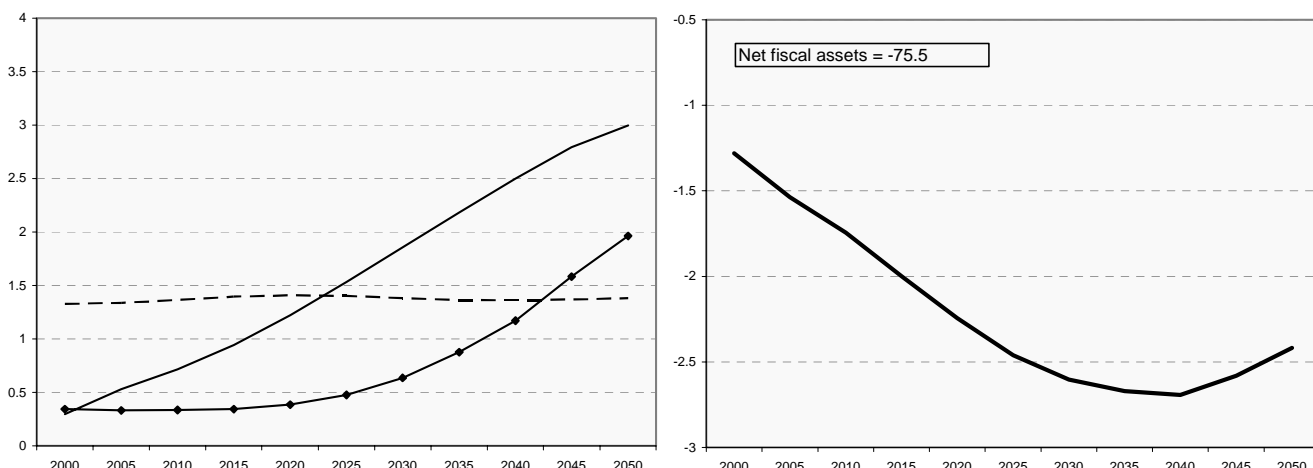
Figure 5. (cont.)
(% of GDP)

- Foregone revenues on contributions
- Foregone revenues on accrued investment income
- ◆ Revenues collected on withdrawals
- Net fiscal revenues

ICELAND



IRELAND



JAPAN

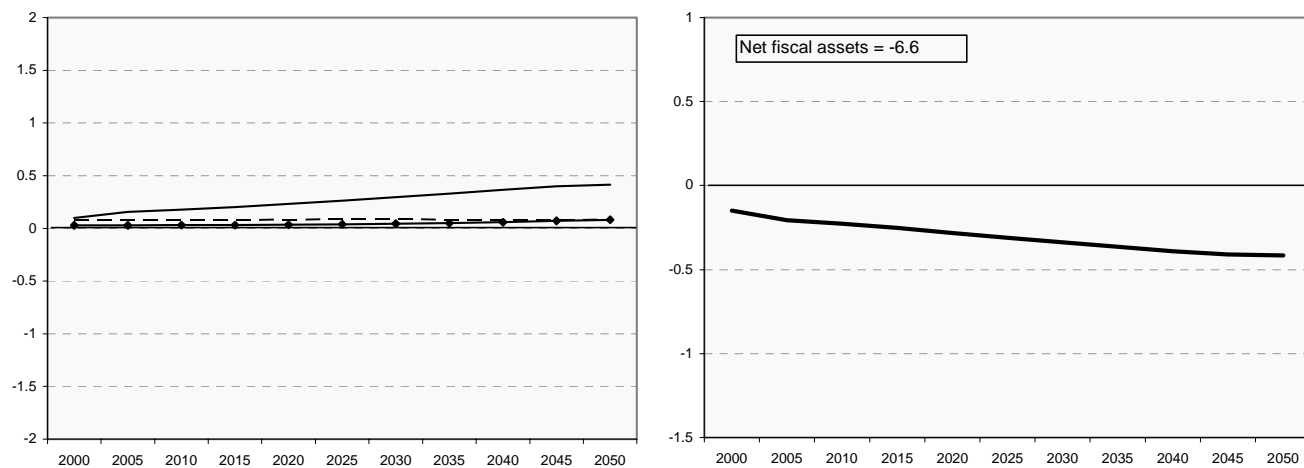
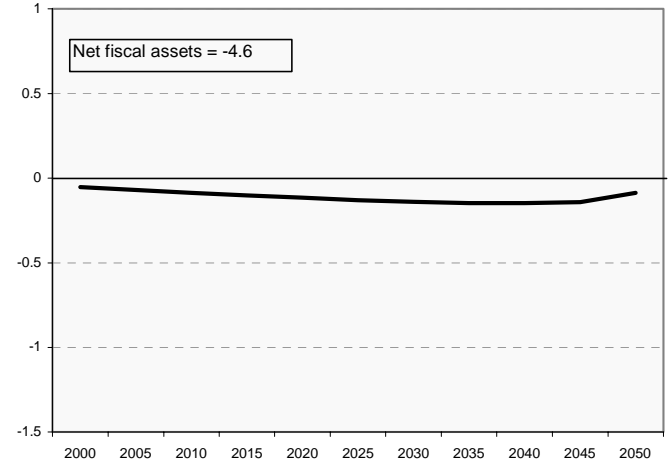
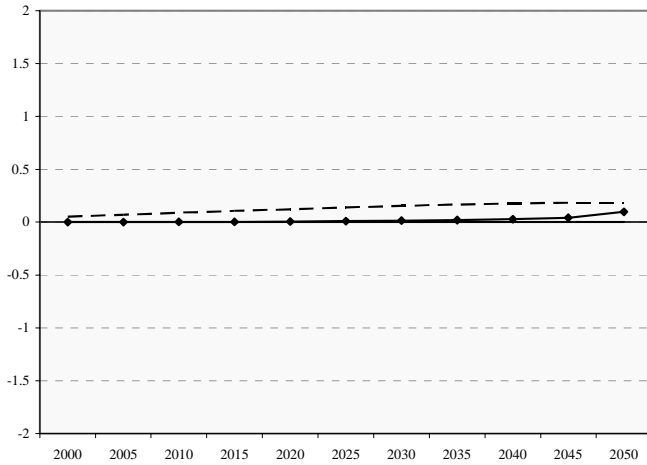


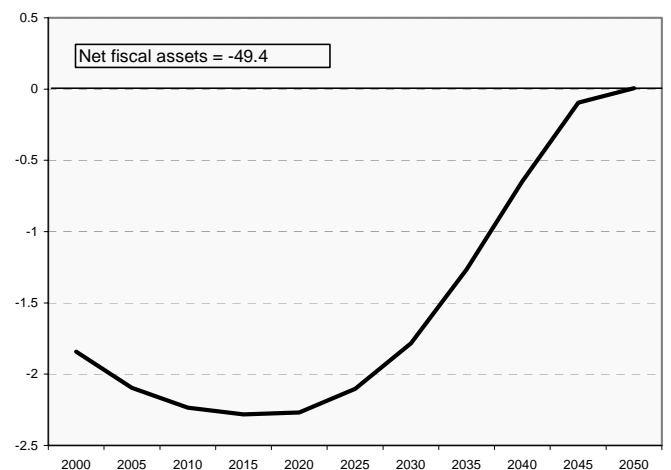
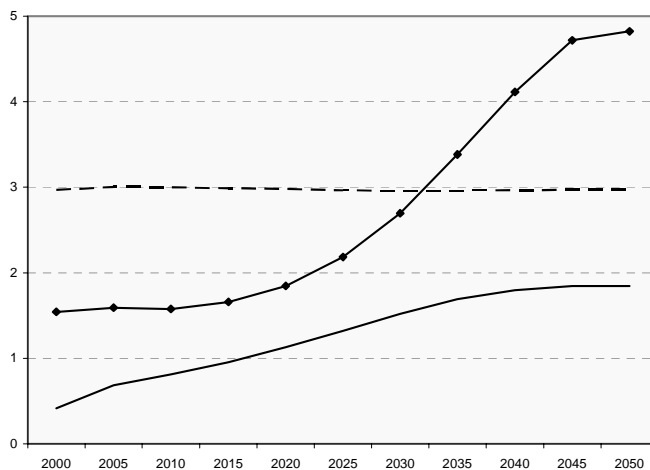
Figure 5. (cont.)
(% of GDP)

- Foregone revenues on contributions
- Foregone revenues on accrued investment income
- ◆ Revenues collected on withdrawals
- Net fiscal revenues

MEXICO



NETHERLANDS



NORWAY

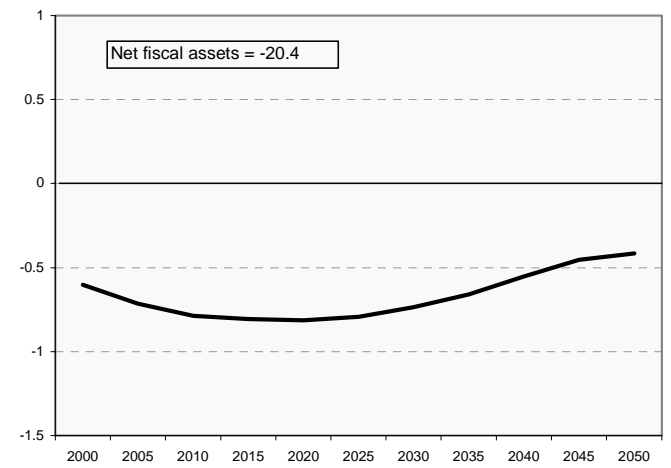
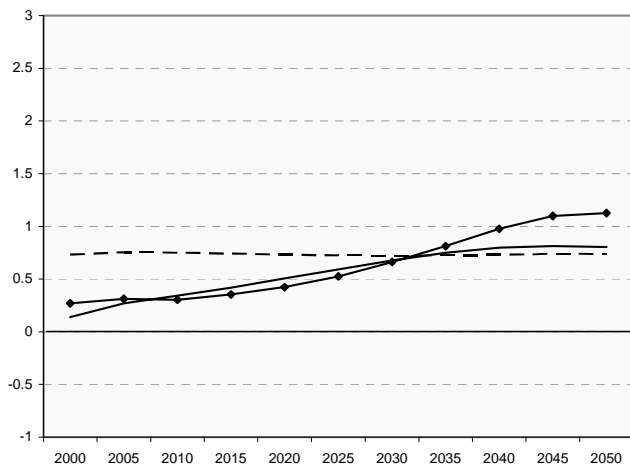
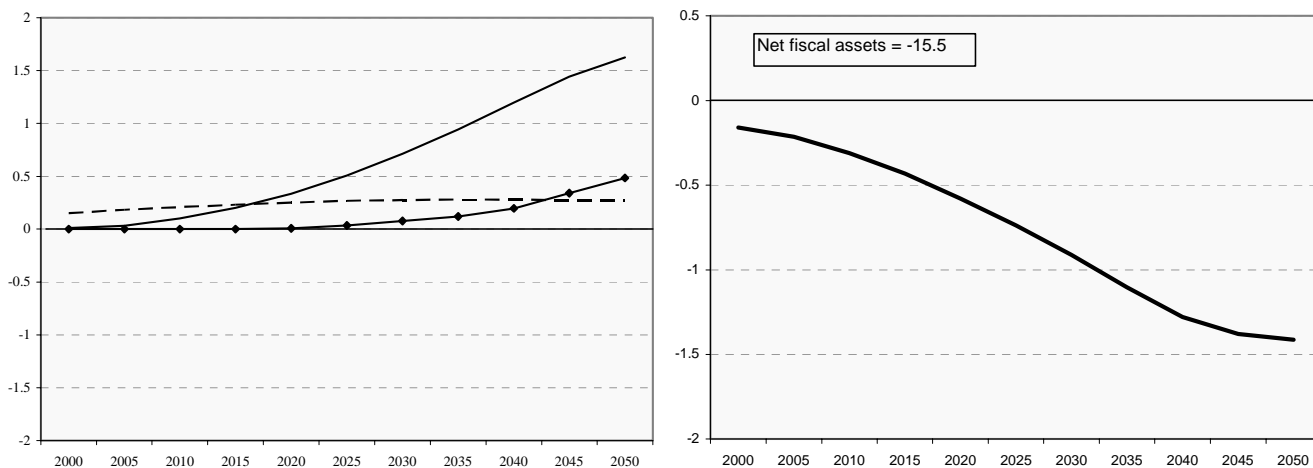


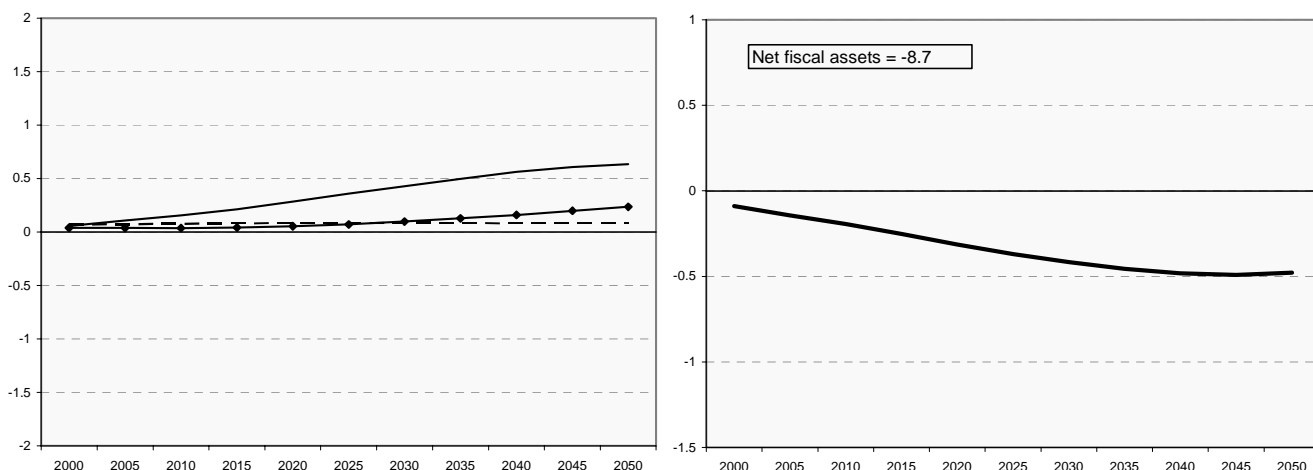
Figure 5. (cont.)
(% of GDP)

- Foregone revenues on contributions
- Foregone revenues on accrued investment income
- ◆ Revenues collected on withdrawals
- Net fiscal revenues

POLAND



PORTUGAL



SLOVAK REPUBLIC

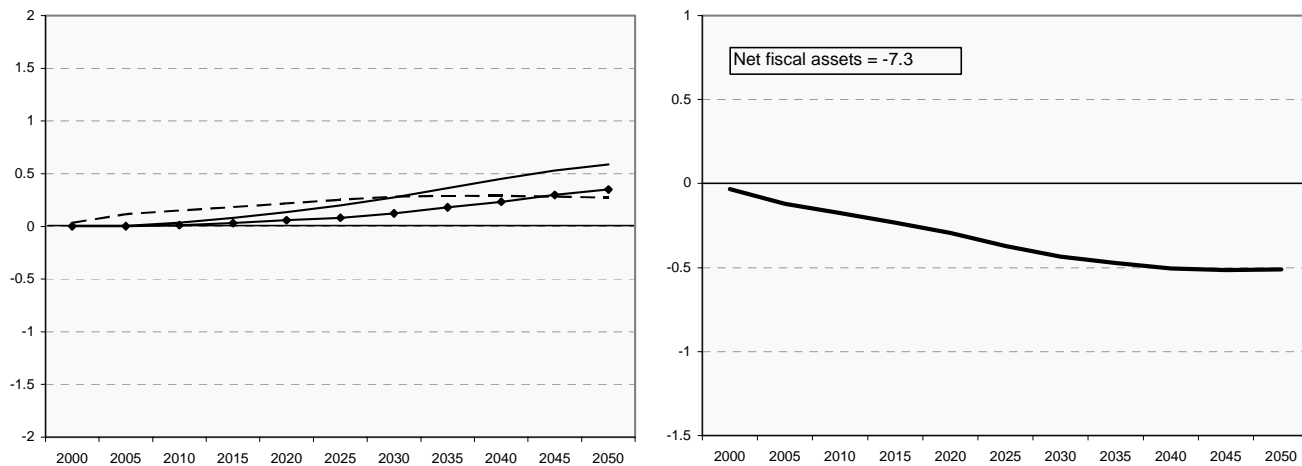
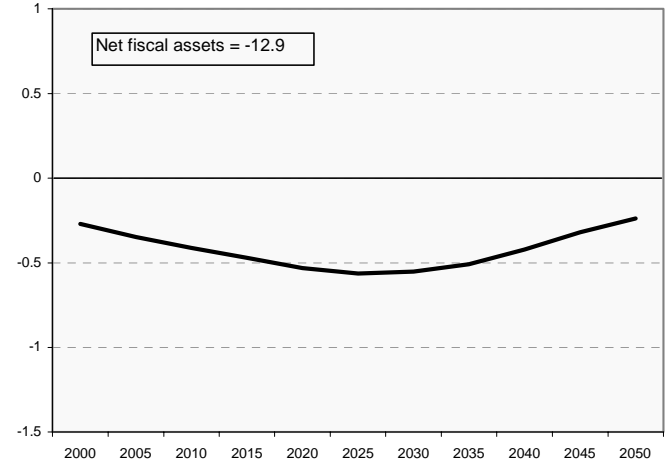
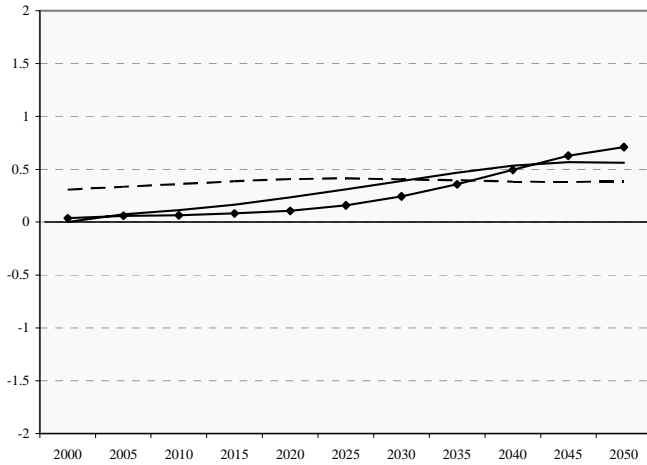


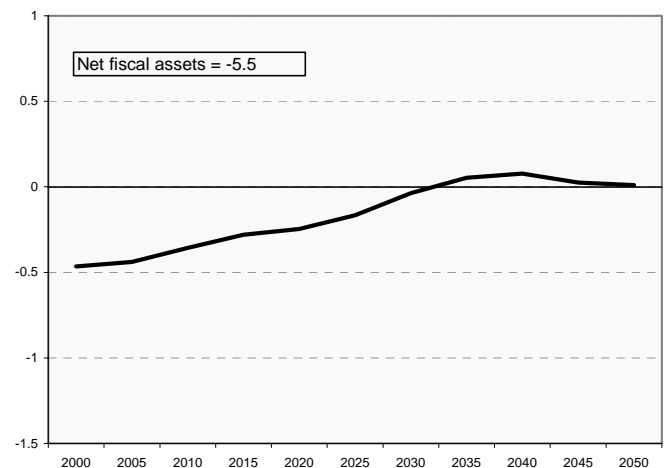
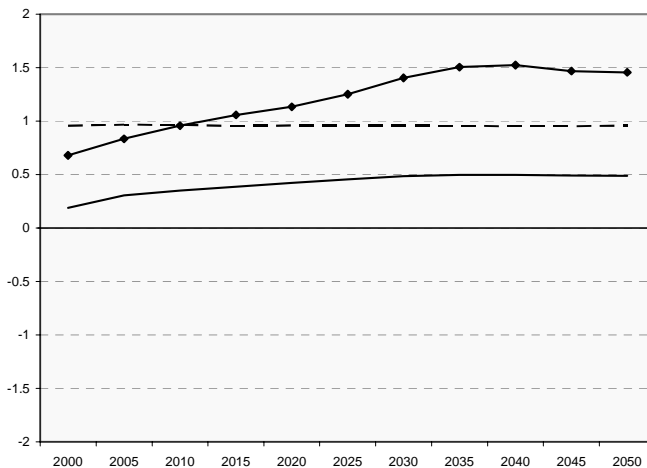
Figure 5. (cont.)
(% of GDP)

- Foregone revenues on contributions
- Foregone revenues on accrued investment income
- ◆ Revenues collected on withdrawals
- Net fiscal revenues

SPAIN



SWEDEN



SWITZERLAND

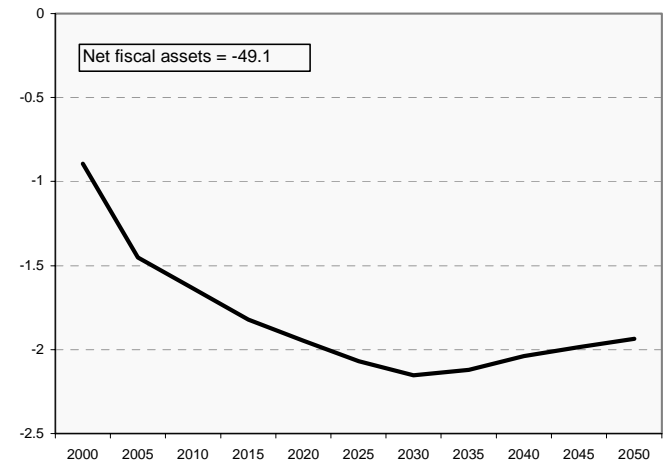
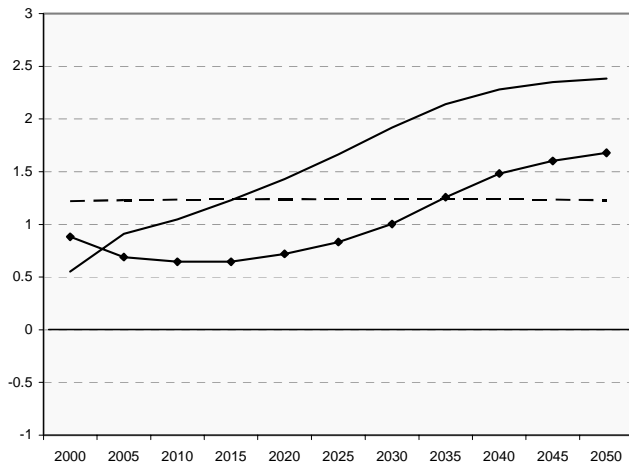
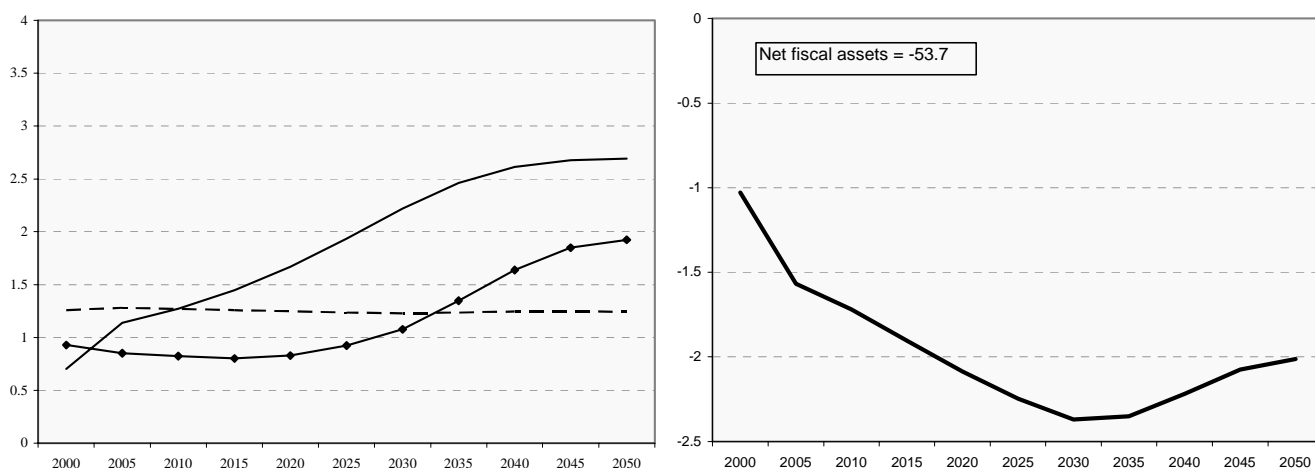


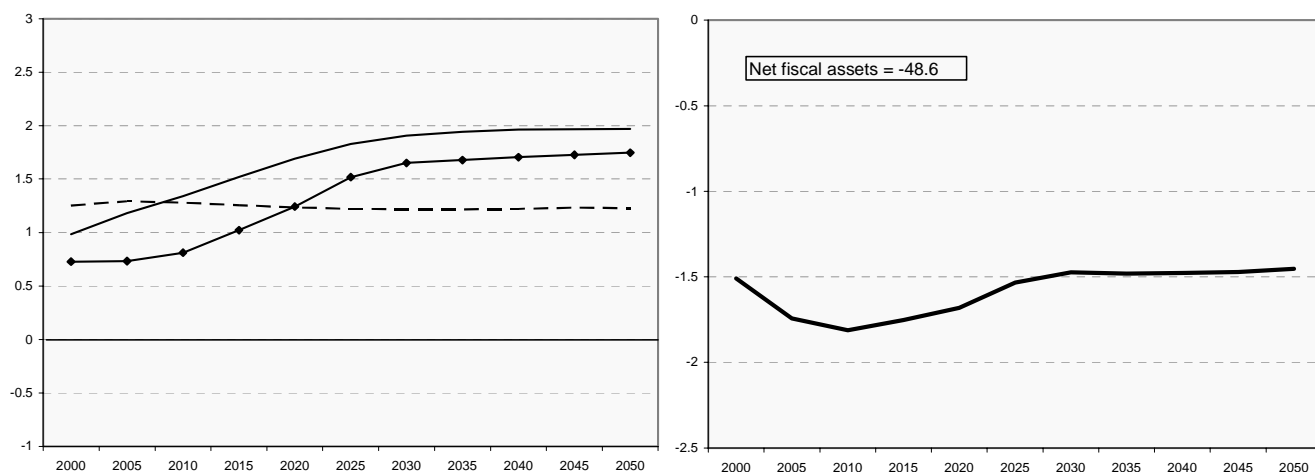
Figure 5. (cont.)
(% of GDP)

- Foregone revenues on contributions
- Foregone revenues on accrued investment income
- ◆ Revenues collected on withdrawals
- Net fiscal revenues

UNITED KINGDOM

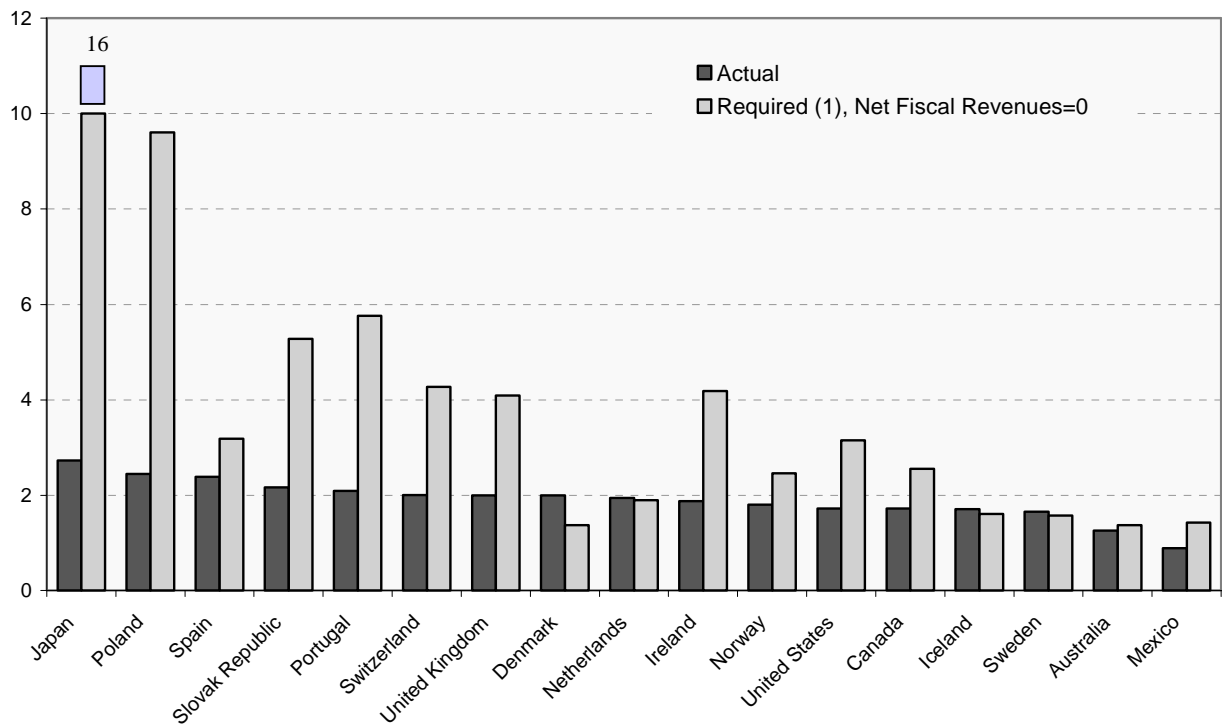


UNITED STATES



Source: OECD.

Figure 6. Projected and required ratio of withdrawals to contributions



1. This is the ratio of withdrawals to contributions that would bring net fiscal revenues to 0. They are calculated for the year during which the projected withdrawals-to-contributions ratio reaches its peak (between 2035 and 2050 in most countries).

Source : OECD.

Figure 7. Sensitivity analysis : selected countries
(Net fiscal revenue, as a % of GDP)

CANADA

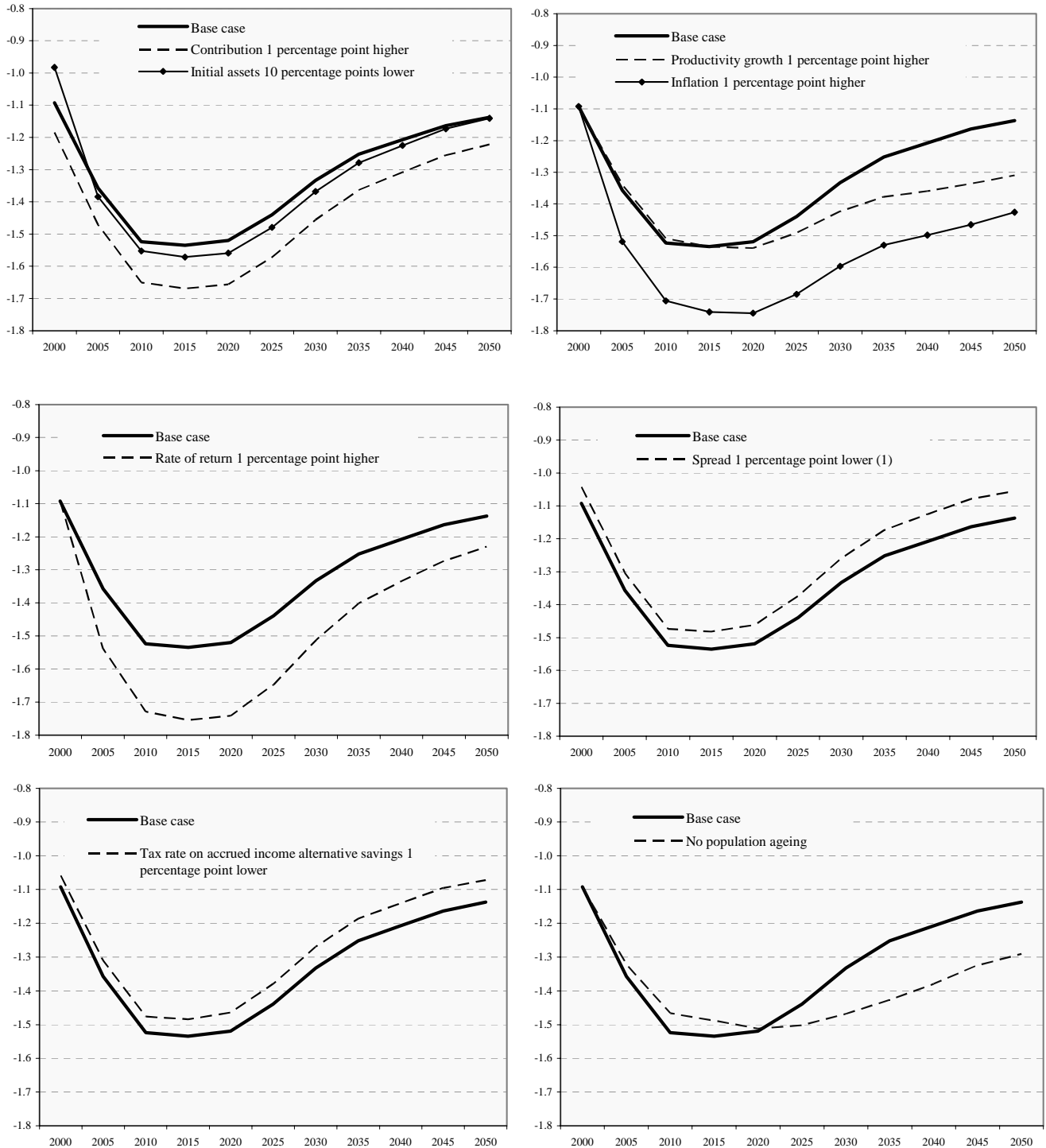


Figure 7. (cont.)
(Net fiscal revenue, as a % of GDP)

DENMARK

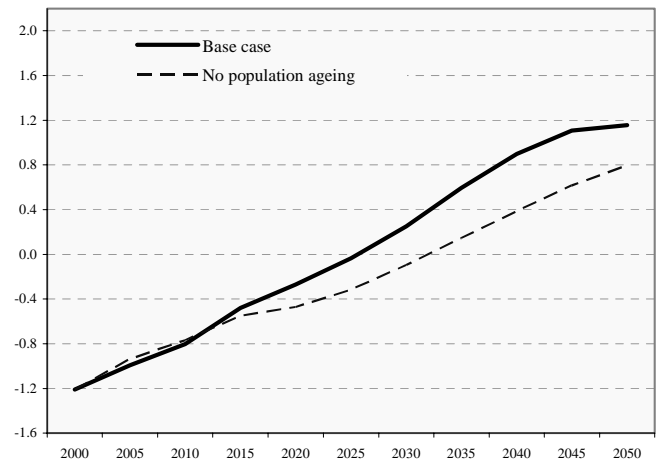
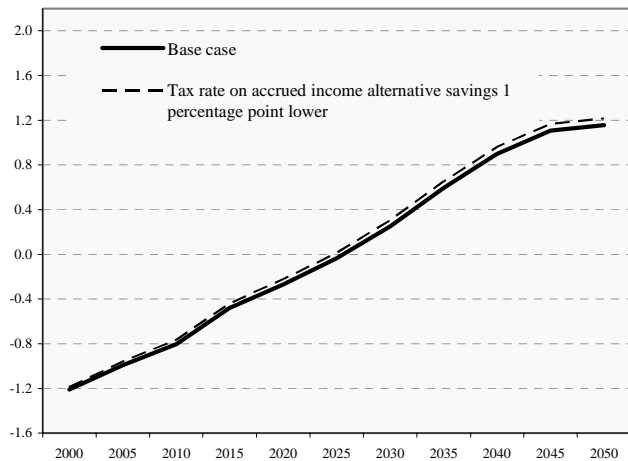
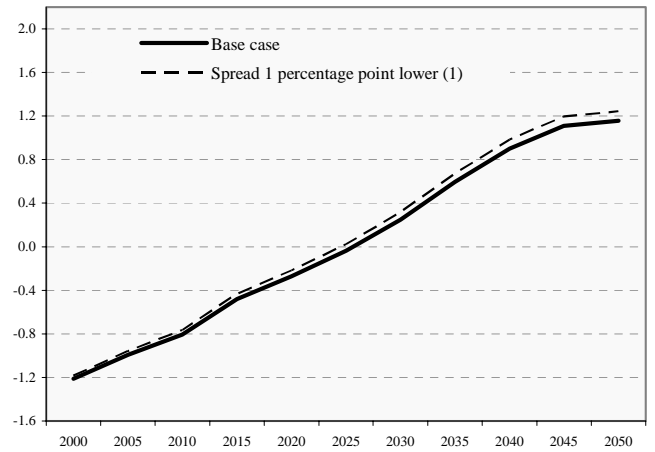
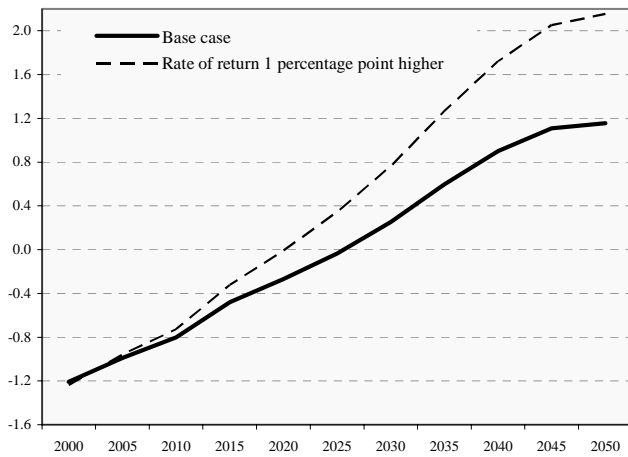
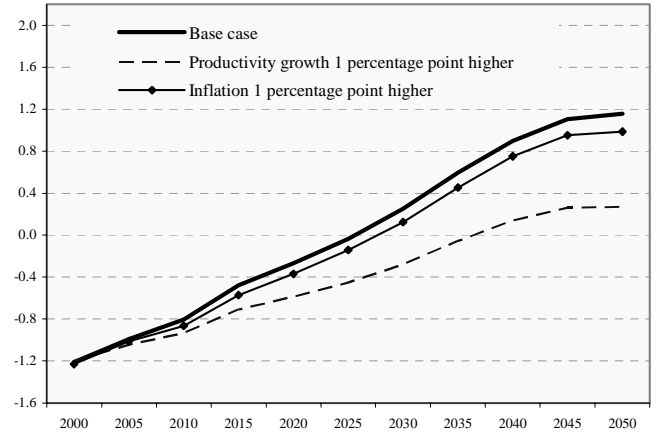
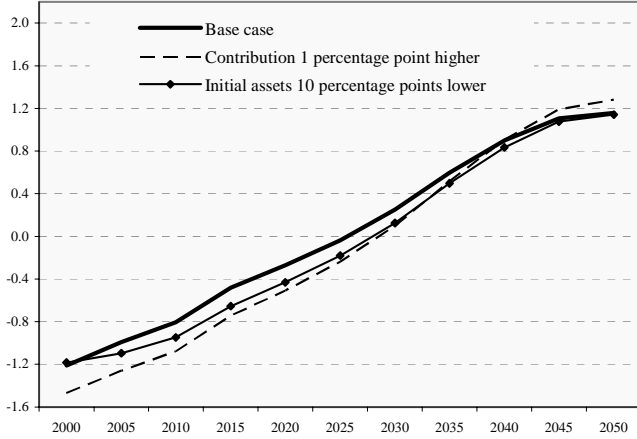


Figure 7. (cont.)
(Net fiscal revenue, as a % of GDP)

SPAIN

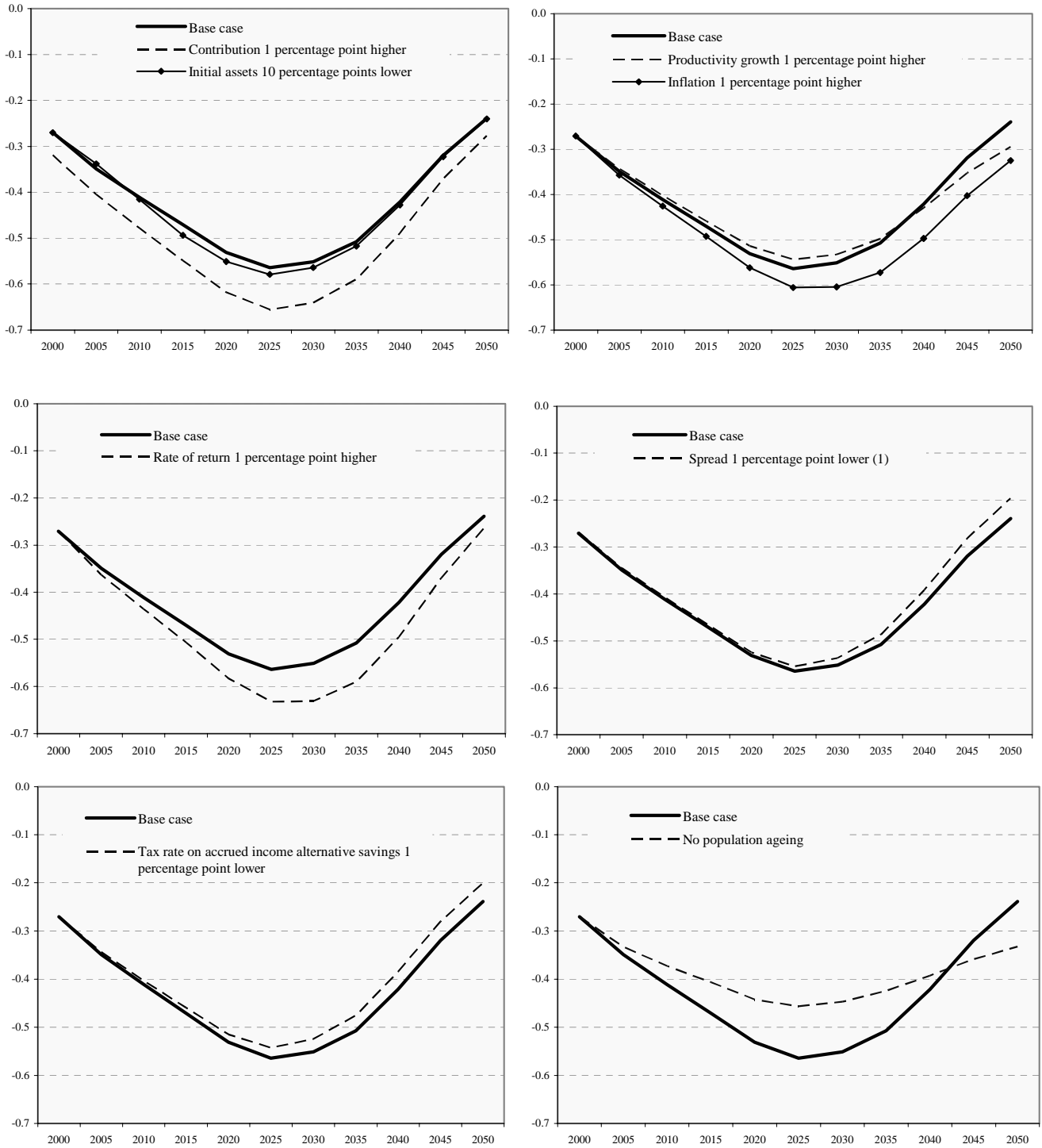
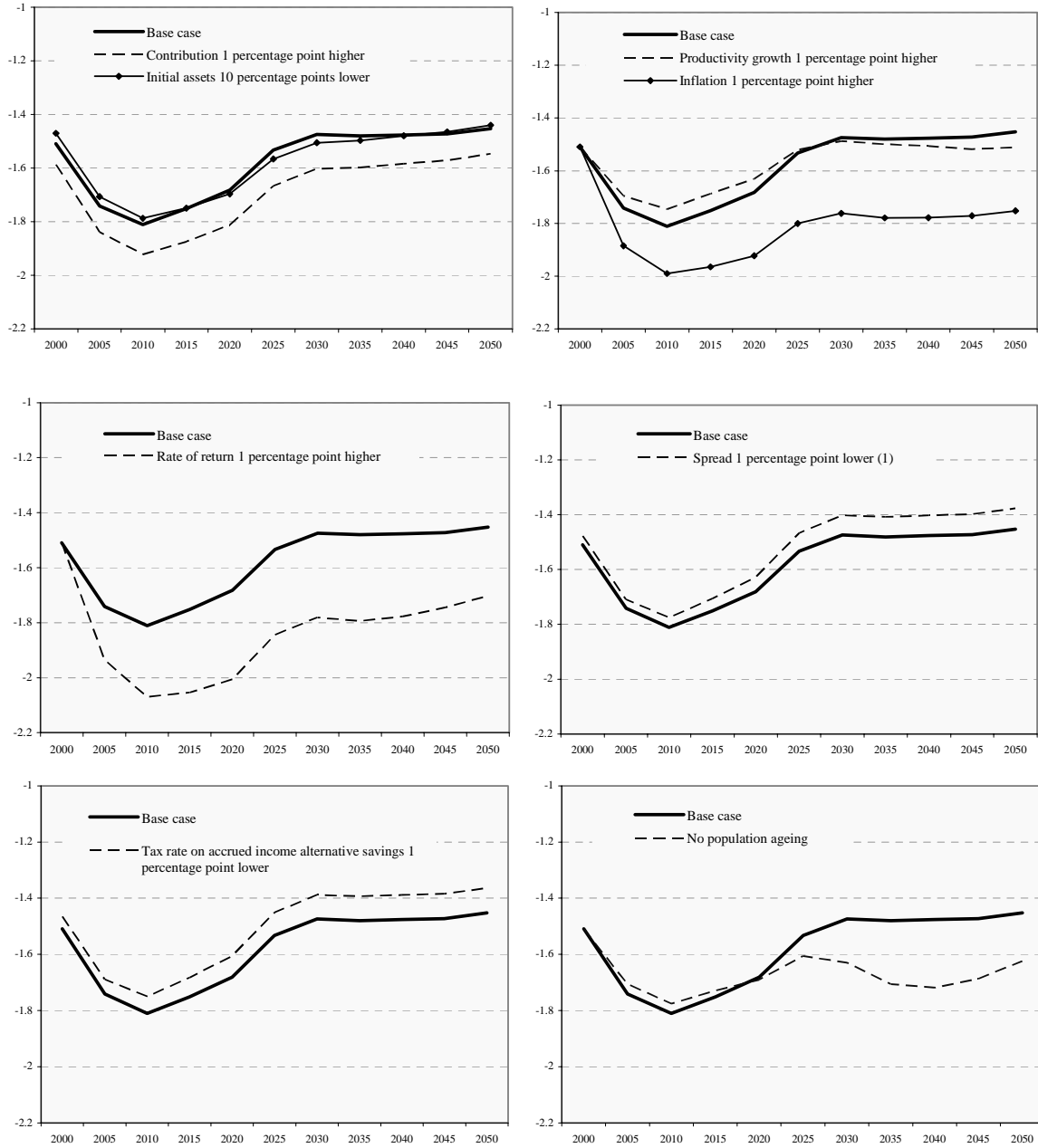


Figure 7. (cont.)
(Net fiscal revenue, as a % of GDP)

UNITED STATES



1. The spread between the tax rate on withdrawals and the tax rate on contribution is one percentage point lower.
Source: OECD.

Figure 8. Net fiscal revenues under alternative assumptions on new savings

— Base case, no new saving - - - Moderate proportion of new saving —◆— High proportion of new saving

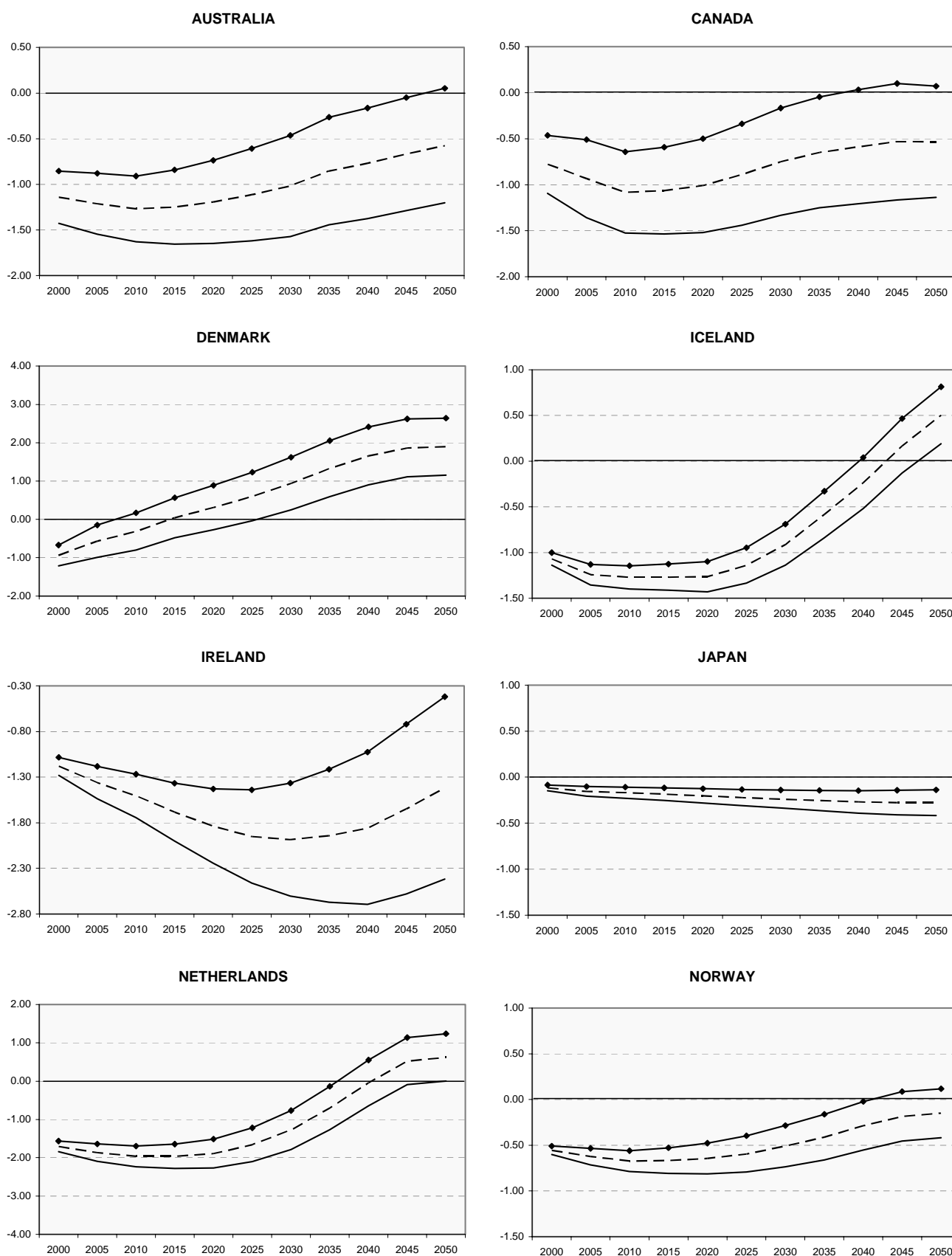
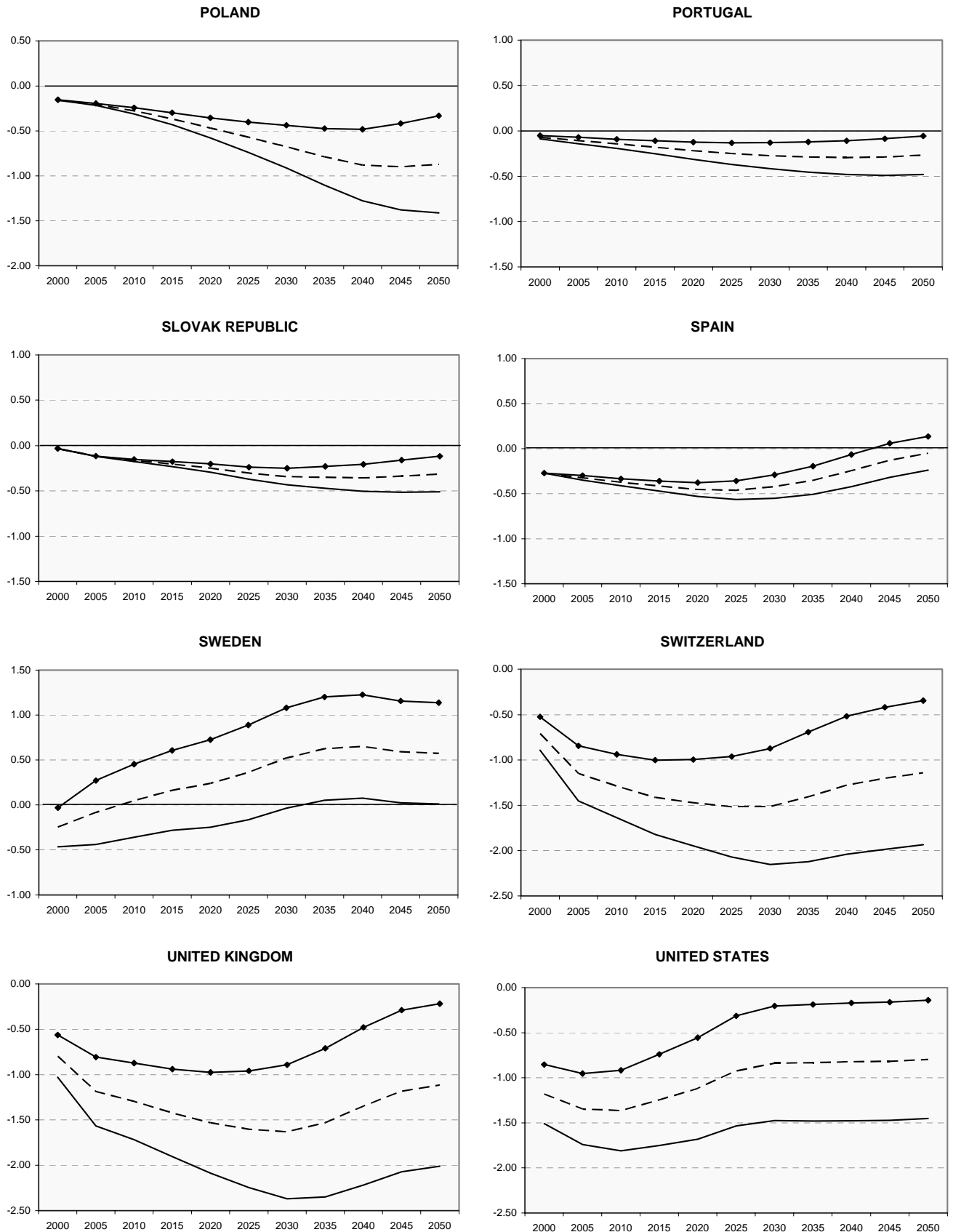


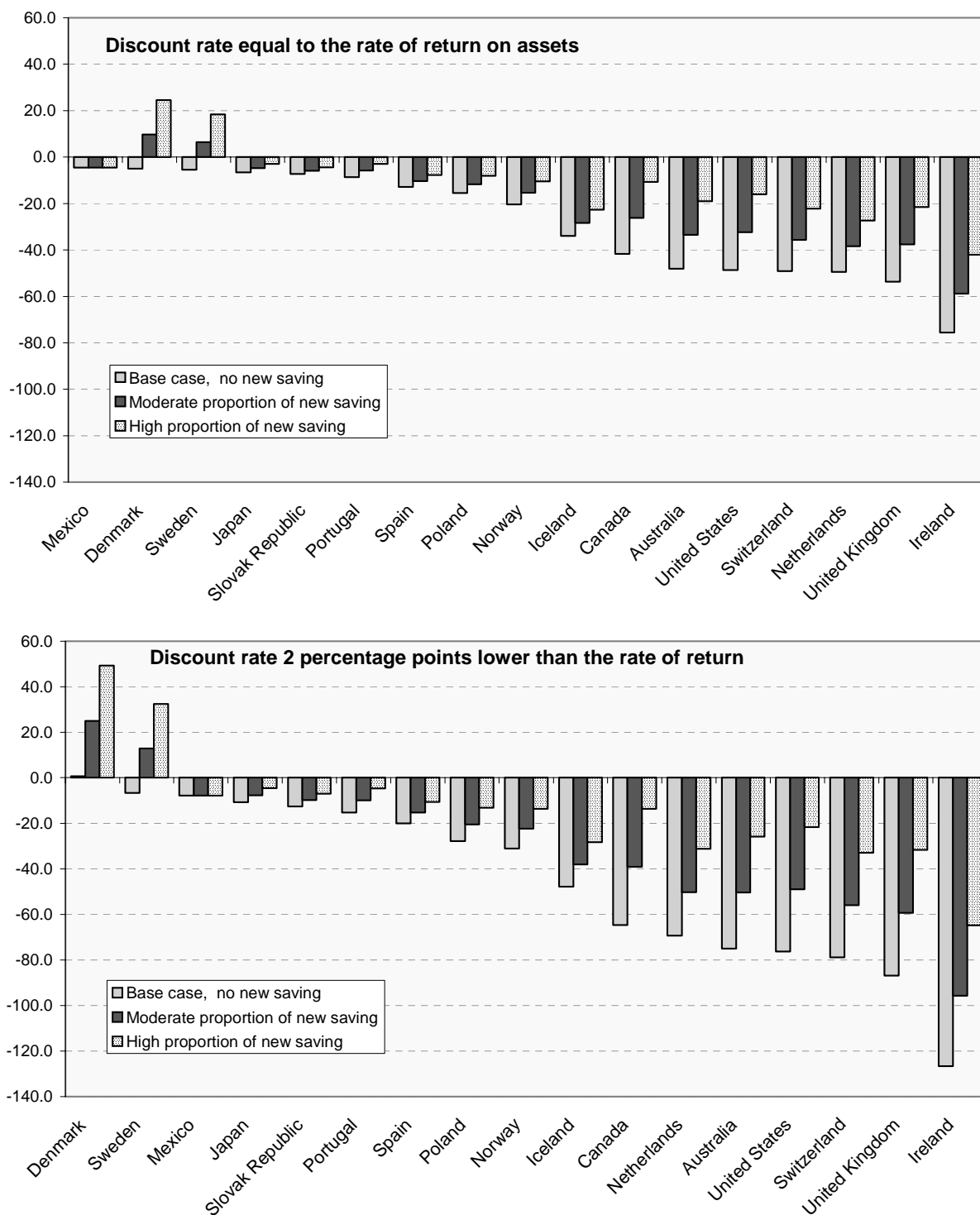
Figure 8. (cont.)

— Base case, no new saving - - - Moderate proportion of new saving —◆— High proportion of new saving



Source: OECD

Figure 9. Implicit net fiscal assets under alternative assumptions on new savings and discount rate
(% of 2000 GDP)



Source: OECD.

Figure 10: Revenues foregone per unit of contribution for different levels of income ¹
Deduction vs tax credit

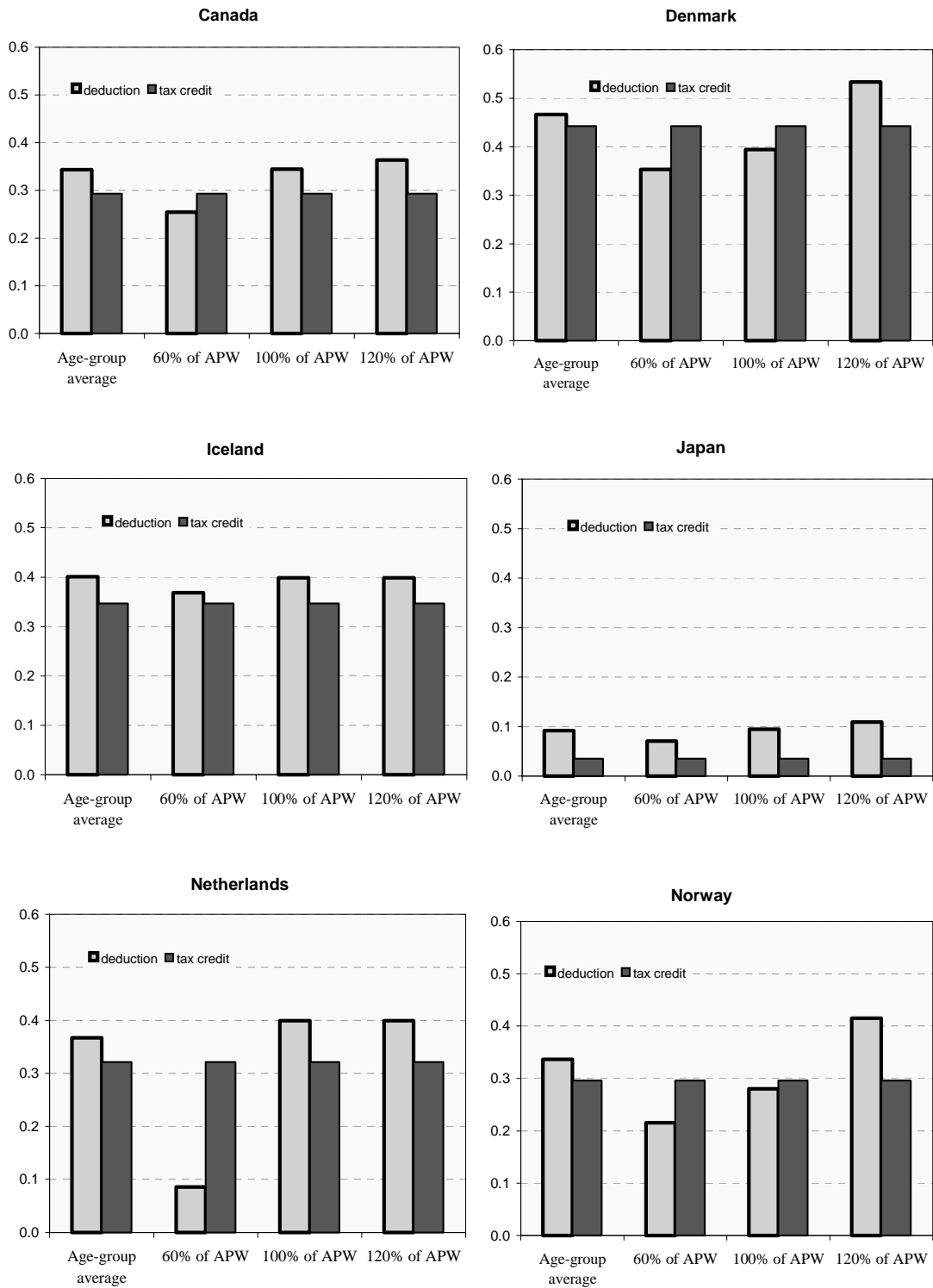
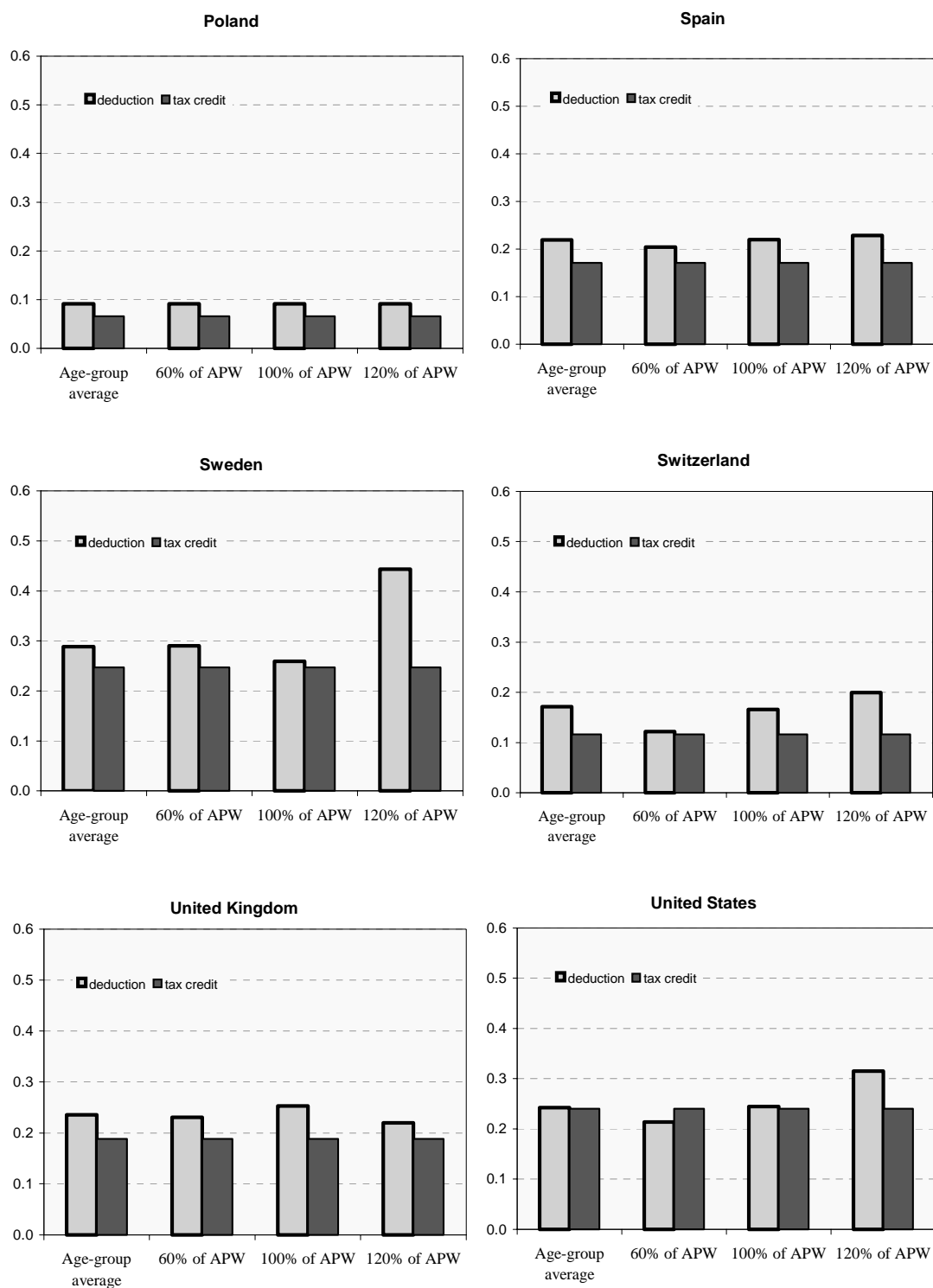


Figure 10. (cont.)



1. This compares the amount of revenues foregone in the cases where the contribution is either tax deductible or benefits from a tax credit. In both cases only one component (revenues foregone on contributions) of the net fiscal cost per unit of contribution appearing in figure 4 is shown.

Source: OECD.

Figure 11. Net fiscal revenues under alternative tax treatments ¹

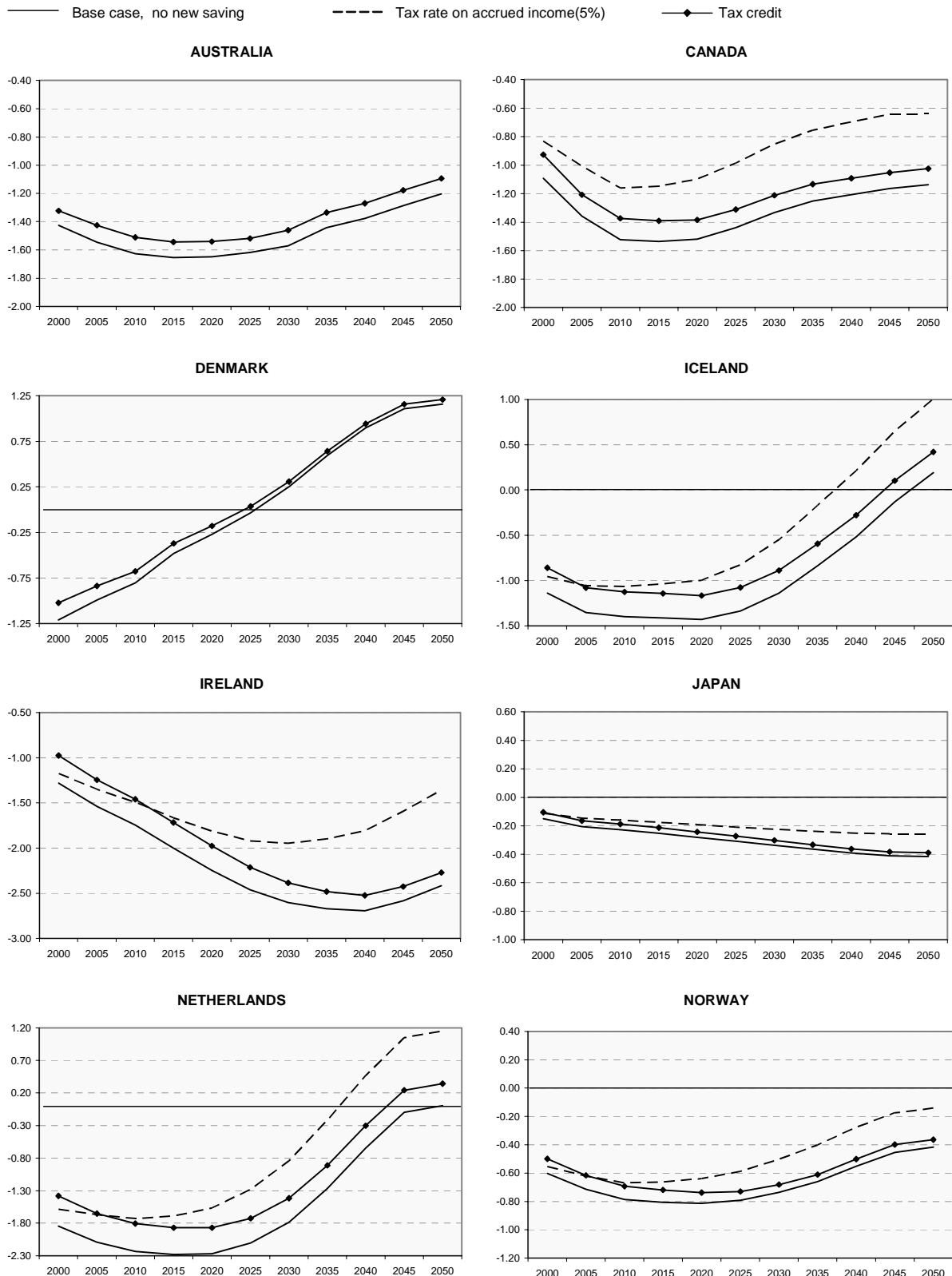
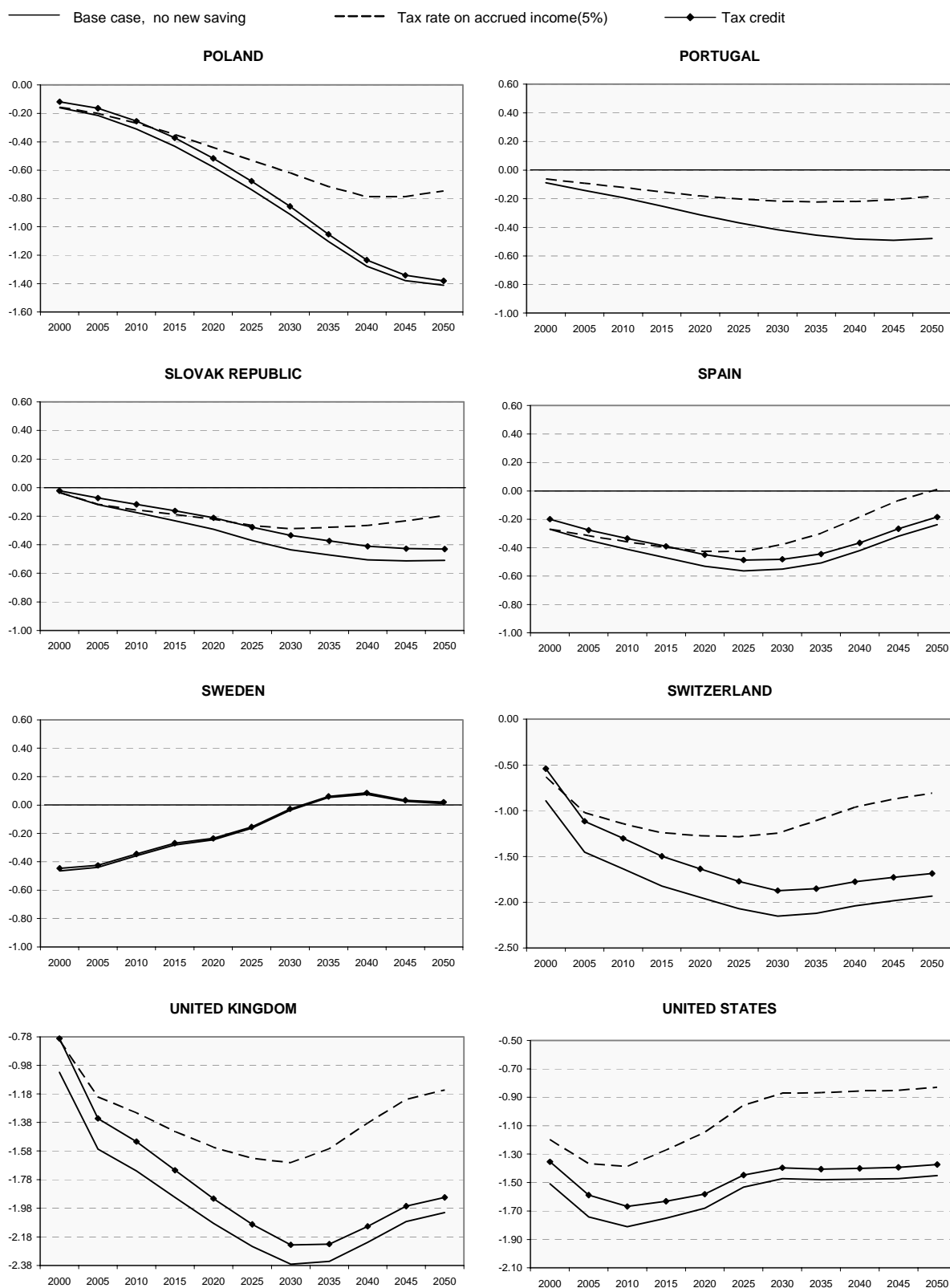


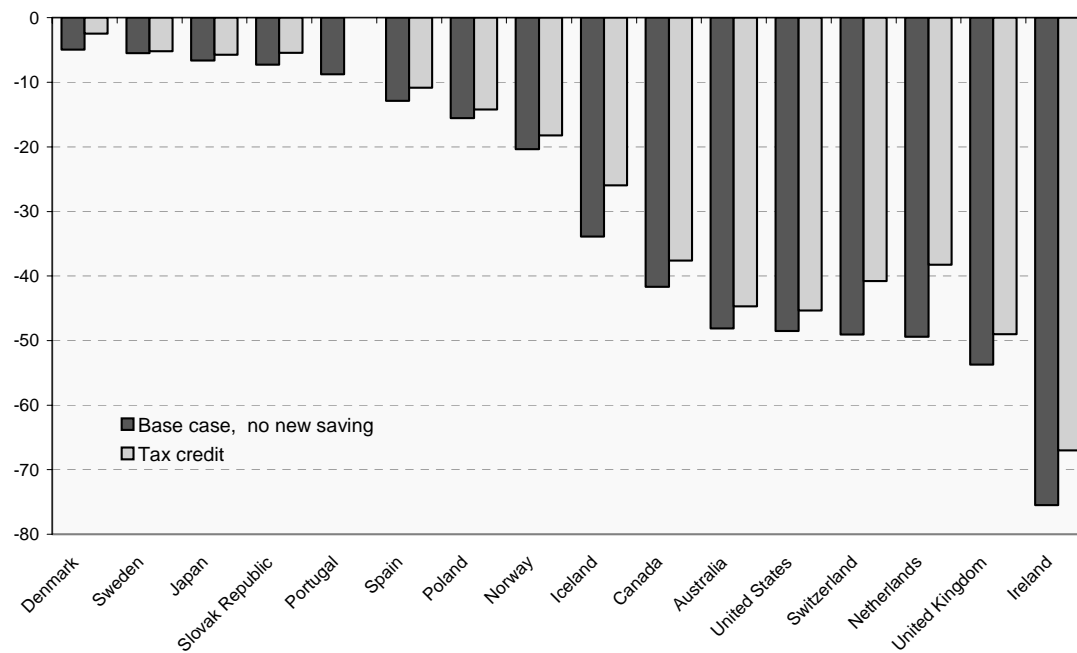
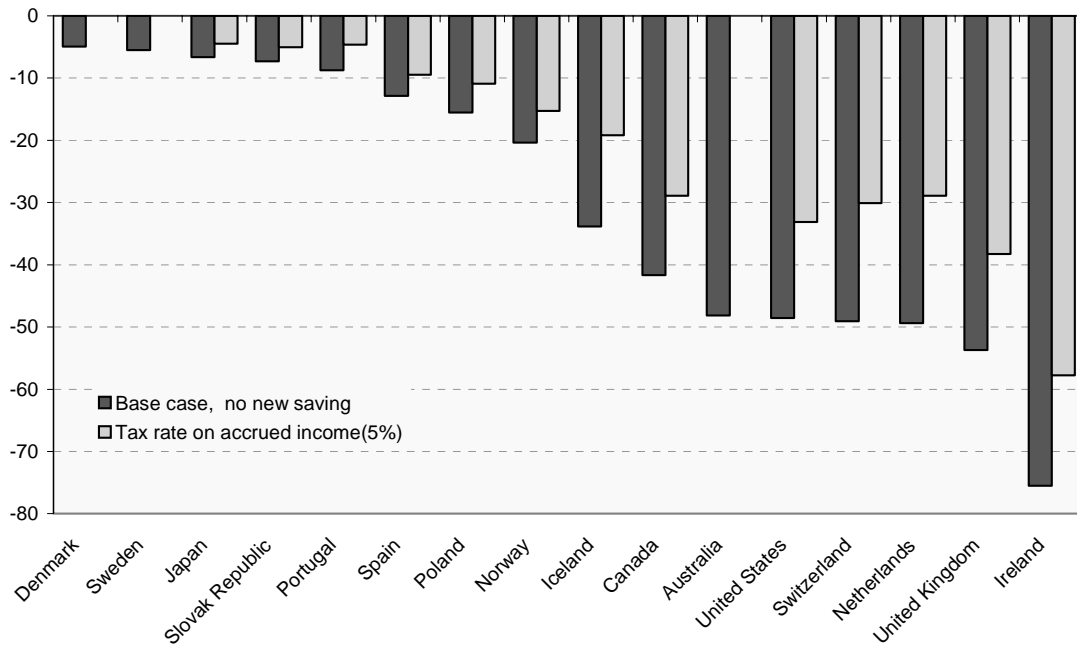
Figure 11. (cont.)



1. Given that Portugal already applies a tax credit, and that Sweden and Denmark already tax accrued investment income, they are left out from the respective simulations.

Source: OECD.

Figure 12. Net fiscal assets under alternative tax treatments ¹
% of GDP



1. Given that Portugal already applies a tax credit, and that Sweden and Denmark already tax accrued investment income, they are left out from the respective simulations.
Source: OECD.

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